

The State and Collective Action: Successful Adjustment by the Tamil Nadu Leather Clusters to German Environmental Standards

by

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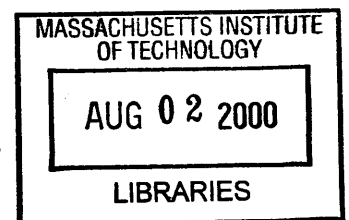
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Abstract

In the existing literature on industrial districts, collective action has mostly been conceptualized in terms of cooperation between firms organized as clusters. Few studies have looked at the role of the State in enabling firms to respond collectively to external pressures. In this thesis, I examine the case of the traditional, labor-intensive, predominantly small firm leather clusters of Tamil Nadu (India) to illustrate the role of the State in enabling quick, widespread and long-term compliance by the clusters to German quality standards. I argue that while joint action between firms was crucial in triggering certain kinds of government action, it alone cannot explain how compliance to the German bans was achieved and sustained. Indian central government agencies intervened in three specific ways. First, the central government's past policies, often criticized for being inefficient, had the surprising impact of compelling leading leather exporters to act collectively at the time of the German bans. Secondly, in the aftermath of the German bans, two Indian central government ministries took regulatory actions which were significantly different from the German regulations in that they banned production of chemicals (prohibited for import and sale within Germany), by targeting input suppliers and not tanners or leather exporters. Finally, a traditional supply-side central government research and development institute upgraded itself to act in a demand driven way. The focus of this thesis is to look at how the impact of these government actions played out in the context of the Tamil Nadu leather clusters and enabled them to adjust and sustain compliance. By focusing on the role of the State in helping small firms to act collectively, my thesis contributes to a neglected theme in the industrial districts literature. In addition, it throws light on two important debates in this literature, namely, (i) the conditions under which government agencies mediate crises facing industrial clusters and (ii) conditions under which small firm clusters can sustain compliance beyond the initial moments of crisis.

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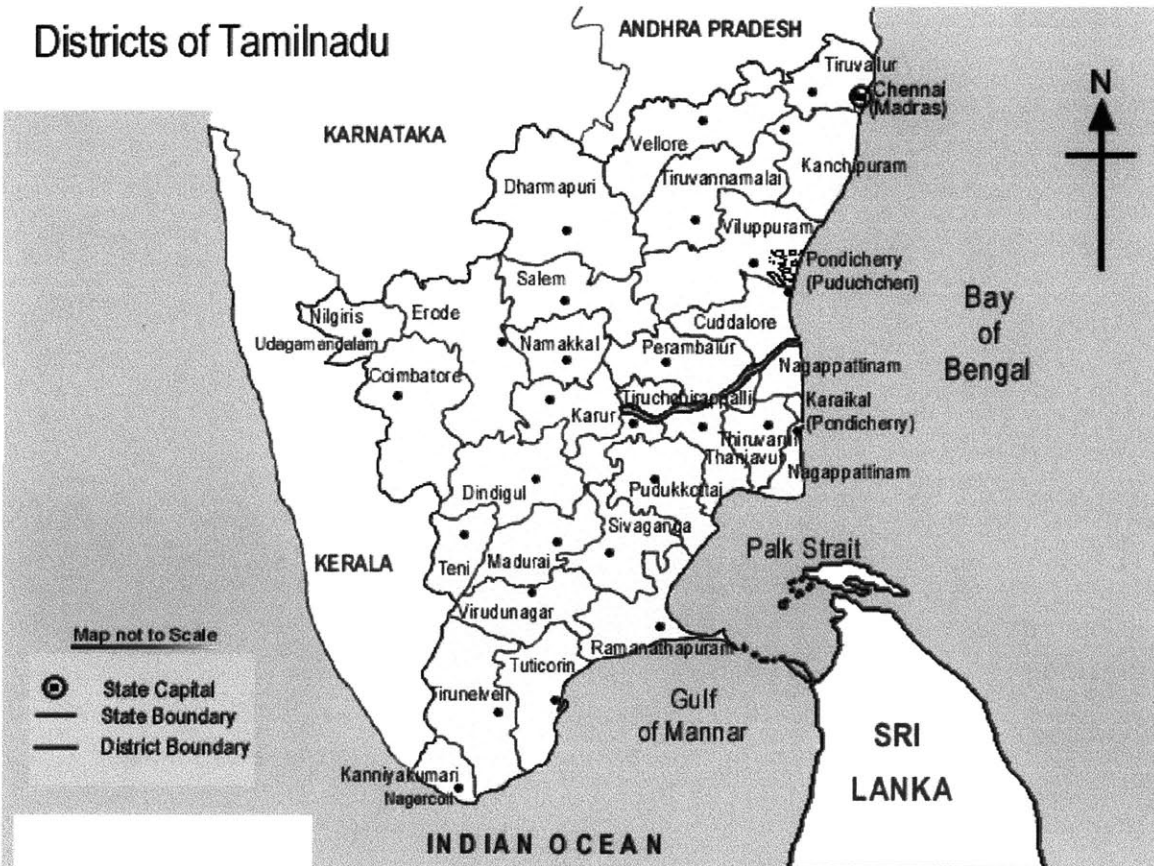
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Map of Tamilnadu

Districts of Tamilnadu



1 Introduction

The ability to meet international standards of environmental, labor and quality has become increasingly important for firms as they seek to enter new export markets or retain access to niche markets. While price continues to be important, raising product and process quality has become a significant element of a firm's competitive edge. In many cases, internationally recognized quality assurance certifications such as ISO 9000 have become necessary to enter quality markets in Europe and the US. Meeting these standards however, is not easy. It has numerous implications for the way in which firms organize production, how workers and managers learn new skills and technologies, and more generally, how they develop quality driven production values.

The existing empirical literature on industrial districts¹ has mostly explained the ability of firms to cope with such external pressures in terms of collective action, specifically on the part of firms organized as clusters.² While this approach is extremely

¹ The literature here is vast. Selected references include Piore & Sabel, *The Second Industrial Divide: Possibilities for Prosperity* (New York: Basic Books, 1984); Schmitz and Musyck, "Industrial Districts in Europe: Policy Lessons for Developing Countries?" *World Development*, 22(6) (1994): 889-910; Humphery, J, "Industrial Reorganization in Developing Countries: From Models to Trajectories," *World Development*, 23(1), (1995): 149-162; Harrison, B, *Lean and Mean: The Changing Landscape of Corporate Power in the Age of Flexibility* (New York: Basic Books, 1994) Pyke and Sengenberger, *Industrial Districts and Local Economic Regeneration* (Geneva: ILO, 1992); Pyke, F, *Industrial Development Through Small Firm Cooperation: Theory and Practice* (ILO: Geneva, 1992). Some recent articles include Rabelloti, R., "Recovery of a Mexican Cluster: Devaluation Bonanza or Collective Efficiency?" *World Development*, 27(9) (1999):1571-1585; Weijland, H., "Microenterprise Clusters in Rural Indonesia: Industrial Seedbed and Policy Target," *World Development*, 27(9) (1999): 1515-1530.

² According to Pyke and Sengenberger (1992), the term industrial districts refers to a particular form of industrial organization, not simply to the concentration of firms in the same manufacturing sector and operating in the same geographical area. An important characteristic of industrial districts according to them is the presence of strong networks between firms, which divide the labor required for manufacturing specific goods through specialization and use of subcontracting. This results in collective capability deriving from both economies of scale and scope. Crucial to the analysis of industrial districts is the view of firms as part of a network rather than working in isolation. Schmitz and Musyck identify some of the

useful, it often gives the impression that the role of the State is unimportant, a lacuna acknowledged by researchers working in this area (Schmitz, 1999; Schmitz & Nadvi, 1999). Firms seem to act on their own, while the important and sometimes unexpected role that the State can play in enabling collective action is neglected.

In this thesis, I address this gap in the literature by looking at what role the State can play in creating the conditions for collective action and long-term compliance to global pressures. I do this by examining the case of how two national government regulations enabled a predominantly small-scale, labor-intensive sector (finished leather and leather products) in India to adjust to two environmental regulations imposed by Germany in the early and mid 1990s. What is interesting is that not just the Indian government's present policies, but also older government policies often criticized for being inefficient, enabled the small-firm clusters to adjust through various unforeseen consequences. In addition, a traditional supply side central government research and development institute acted in a demand driven way to provide necessary technical assistance to the industry.

1.1 The Puzzle

In December 1989, Germany, the leading export market for Indian leather and leather products (see Table 1, Appendix) banned the import and sale of consumer goods containing pentachlorophenol (PCP) into Germany, declaring them to be carcinogenic. In July 1994, it passed another domestic regulation, banning the import and sale of consumer

key features of ideal typical industrial districts as “geographical proximity, sectoral specialization, predominance of small and medium-sized firms, close inter-firm collaboration, interfirm competition based on innovation rather than lowering of wages, a socio-cultural identity which facilitates trust relations between firms and between employers and skilled workers, active self-help organizations, and

goods containing 22 specific azo-dyes, stating that they were carcinogenic and hazardous to human health. At that time both these chemicals were routinely used in leather tanning in India, as in other countries.

These announcements had serious consequences for the Indian leather exporters,³ particularly those in Tamil Nadu. Leather and leather products (shoes, garments and leather goods), are one of India's fastest growing exports (Table 2, Appendix). Leather exports are also India's fourth largest foreign exchange earner (Table 2, Appendix). Moreover, almost half of India's total leather exports come from the single state of Tamil Nadu (Table 3, Appendix). In addition, 90% of leather exports from southern India, come from Tamil Nadu (Ahmed, quoted in *Frontline*). Soon after the announcement of the ban on PCP, Germany rejected several shipments of Indian leather products (Weimann, 1996). This elicited strong concern among Indian exporters. In July 1994, when Germany announced the ban on azo-dyes, the leather clusters in Tamil Nadu were similarly threatened by potentially losing out on a key export market, unless they complied with these new regulations.

In the Tamil Nadu leather clusters, 90% of leather processing takes place in the small-scale sector. According to the literature, small firms are often assumed to face difficulties in coping with external pressures due to lack of working capital, difficulty in obtaining commercial credit, access to markets, problems in obtaining raw materials and

active regional and municipal government which strengthens the innovative capacity of local industry" (1994, p. 890).

³ Throughout this thesis, I use the term "leather exporters" to refer to exporters of both finished leather and finished leather products such as shoes, garments, small leather goods such as handbags, wallets.

difficulty in acquiring information and learning new technologies.⁴ Moreover, although the industry has rapidly modernized, upgraded and diversified from manufacturing finished leather into product manufacturing over the last 20 years, much of leather processing is still based on traditional knowledge and practices of tanning. Hence, one would expect that it would be difficult for the Tamil Nadu leather clusters to adapt quickly to quality standards required to meet the German regulations.

Further, the problem of doing quality control in the Tamil Nadu leather clusters is complicated by the problem of geographical spread. It is not limited to tannery clusters in Tamil Nadu but must include other clusters in other regions from which semi-finished leather and sometimes even finished leather is obtained for the purpose of manufacturing leather products. This is because even though 90 to 95% of all the tanneries in Tamil Nadu are located in clusters, there is considerable inter-regional trade in raw and semi-finished leather. This arises from the fact that although the Tamil Nadu leather clusters are very strong in leather tanning and export oriented product manufacturing, they do not have a very strong raw material base. One consequence of this geographical spread is that it can create crucial constraints for monitoring and compliance in the context of a crisis demanding of quick quality control.

The Tamil Nadu leather clusters are also characterized by a splitting up of the value chain (Figure 1, Appendix). Only 21% of all tanneries are fully integrated, that is,

⁴ For a critical discussion of growth constraints faced by small firms see Hubert Schmitz's "Growth Constraints on Small-scale Manufacturing in Developing Countries: A Critical Review," *World Development*, 10(6): 429-450, 1982. See Grosh & Somolekae (1996) and Levy (1993) for discussion about difficulties small firms face in learning new technologies.

they carry out all stages of leather processing from raw to finish in the same unit.⁵ There is a significant fragmentation in the processing of leather, different stages of leather tanning being carried out by separate firms. Some studies (Kennedy, 1999) show that specialization within a cluster can generate cooperation and collaboration among firms, resulting in positive cluster level externalities. However excessive fragmentation can also create problems for quality control and impede rapid dissemination of information throughout the production chain. This can be a serious problem for a dispersed set of small producers in collectively meeting stringent quality standards as were required by the German regulations.

Despite these constraints, in both cases, the Tamil Nadu leather clusters' compliance to the German regulations was relatively quick and in both cases there is evidence that it has sustained (Dr. Ganga Radhakrishnan, interview). There is evidence that in both cases there has been a downward trend in the percentage of leather samples that failed standardized tests for measuring these chemicals, thus verifying long-term compliance to the German bans (Tables 4 & 5, Appendix). Not only did large and medium firms comply with the German regulations, but my fieldwork shows that small firms also complied with the German regulations. Further I found that this broad-based compliance had an unexpected consequence. It involved cooperation between small tanners and chemical producers that resulted in innovations that kept costs of switching over to substitute chemicals down.

⁵ This is estimated from data provided in (CLRI, 1990).

The widespread compliance of the Tamil Nadu leather clusters to German regulations is surprising because the literature provides considerable evidence that small firm clusters do not necessarily respond to external pressures collectively in all instances. The literature also provides evidence that national or local governments often do not perceive opportune moments for mediation and make necessary interventions. For instance, a recent study conducted by Schmitz (1999) in the Sinos valley shoe cluster in Brazil shows that instead of furthering the interests of the cluster as a whole, some of the large firms preferred to collaborate with a major global buyer (by selling them semi-finished leather) rather than cooperating with downstream manufacturers. As a result of this and lack of timely government mediation, the cluster was not able to upgrade in areas of marketing and design, resulting in failure of an ambitious program of multilateral cooperation. This occurred despite an excellent record of export performance based on upgrading product quality and skills, and also a previous history of collective action. Schmitz attributes this in part to the failure of the State to mediate between business associations and entrepreneurs at critical moments.

Further, the literature also points out difficulties of sustaining collective action necessary for maintaining quality standards beyond the initial moment of crisis (Blackman & Bannister, 1998; McCormick, 1999). For instance, analysis of how the Lake Victoria fish cluster (Kenya) coped with the EU ban on Nile perch shows that although the cluster was able to swiftly meet quality requirements, the cooperation between local fish processors that had enabled successful initial response, dissipated soon after the crisis had subsided (McCormick, 1999).

By contrast, the Tamil Nadu case is interesting because there was collective response to both the PCP and azo-dye bans, and in both cases it has sustained beyond the initial moments of crises. For example, in 1998, that is 8 years after the PCP ban was announced by Germany, the failure rate for PCP was about 7-8% (Dr. Ganga Radhakrishnan, interview). In addition, my study shows what role the State can play in enabling a traditional, labor intensive, competitive and highly dispersed sector to successfully meet environmental standards quickly and maintain compliance over a relatively long period of time.

1.2 The Argument

I argue that active government mediation and the intended and often unintended consequences its actions are crucial in explaining how the Tamil Nadu leather clusters adjusted rapidly to the German bans. These actions resulted from a process of negotiation between several government ministries, agencies and industry representatives. While joint action by “leading” firms⁶ within the cluster was important in motivating government intervention, it alone cannot explain why the compliance was widespread or how it has sustained. Timely mediation by central government ministries and agencies and the often surprising impact of their actions are crucial in explaining widespread and long-term compliance by the Tamil Nadu leather clusters. Three particular aspects of the Indian government’s role are important here.

First, I argue that the regulatory history, that is the central government’s past policies in regulating the Indian leather sector, played a crucial role in shaping the kinds of options small,

medium and large firms had in the face of the German regulations. Specifically, two old policies of the central government emerged as significant. (i) First was the policy of limiting the “primary” (that is processing leather from raw to semi-finished stage) phase of leather tanning to the small-scale sector (Figure 2, Appendix). This policy adopted in the early 1950s was in line with the government’s broader historical bias towards protecting and promoting small-scale industries. The impact of this policy in the aftermath of the German ban on PCP was that small firms doing primary phase of tanning had to be included by leather exporters, the segment most effected by the German bans, in successfully complying with the German standards. (ii) The second past policy that played an unexpected role in the context of the German ban on azo dyes was the central government’s licensing policy for DGTD⁷ units adopted in 1973. This policy was adopted to help the leather industry to modernize and diversify into manufacturing finished leather. One result of this policy was to result in the proliferation of small-scale “finishing” (that is, tanneries processing semi-finished leather to finished leather, also known as “secondary” stage of processing) units instead of DGTD units. In the context of the azo-dye ban, the impact of this old policy was that these small “finishing” units had to be included by Indian leather exporters, thus compelling them to seek a collective solution to the German azo-dye regulation.

⁶ In this thesis, I use the term “leading firms” in the general sense to refer to a group of firms that through innovation in a particular area say production, or by opening up access to raw material or to markets, leads the rest of the cluster to grow or upgrade.

⁷ The Indian government uses the amount of investment as the basis for distinguishing between small-scale (SSI) units and Directorate General of Trade and Development (DGTD) units. In 1990, units below \$87,500 of investment on plant and machinery were classified as SSI units, and those exceeding this threshold were classified as DGTD units. In 1996, the investment ceiling for SSI units was changed to US \$150,000 (Ministry of Industry, 9th 5 Year Plan, 1996).

Second, in addition to these past policies, two Indian central government ministries, namely the Indian Ministry of Commerce (in the case of the PCP ban) and the Ministry of Environment and Forests (in the case of the azo-dye ban), respectively passed (iii) a “blanket” regulation subsequent to each of the German bans. The key difference between the German and the Indian bans was that while Germany had banned the *import* and *sale* of consumer goods containing PCP and azo-dyes into Germany, the Indian government banned the *production, distribution, sale, storage*, that is, any sort of “*handling*” of PCP and azo-dyes within India. Thus, while the main constituency affected by the German regulations were Indian leather exporters, the constituency most effected by the Indian bans were leather chemical and dye manufacturers and suppliers. Thus instead of targeting the polluters (the leather industry), a more common practice in the context of domestic environmental regulations, the Indian government’s ban targeted input suppliers (leather chemicals and dye manufacturers).⁸ Though banning production of certain chemicals, especially those that are hazardous to human health is not exceptional, governments are often reluctant to target input suppliers because of several reasons. This could be because of the existence of powerful industry lobbies, possibility of

⁸ The literature on domestic environmental regulation in the US, for example, suggests that government regulations usually target polluters rather than banning production. The conventional command and control approaches to abating pollution have involved setting standards and have been very targeted at specific industries to reduce emissions to particular levels. For example, regulations emanating from the US Clean Air act have specifically targeted power plants and smelters for reducing emissions to specified standards. However, banning production of hazardous chemicals is not unusual, For instance, in the US, cancer causing agents have particularly evoked this kind of regulatory response (Moore, et al., 1993). The US EPA has banned the *production* of at least 50 different pesticides such as DDT and PCB assumed to be carcinogenic. While in some cases outright production is banned, in others, firms must get pre-manufacturing licenses from the government in order to produce these chemicals. For a clear discussion of different approaches to environmental regulation in the US, see Portney (1993).

exporting hazardous chemicals to other countries with less stringent environmental standards, and the ability to limit exposure without curtailing production.⁹

The central government ministries' regulatory actions were a result of a process of negotiation between several Ministries, government agencies and exporters' associations. They were "demand-driven" in the sense that they were requested by representative members of the industry, specifically through the politically influential exporters' association namely, the Council for Leather Exports (CLE). However, the Ministries did not pass these regulations only in response to requests made by "leading" exporters dominating the CLE.

The Indian government mediated because (i) leather is a key export sector and Germany is India's leading market for these goods (Table 1, Appendix). In addition, (ii) the bans also effected another important export sector, namely textiles. Germany is an important trading partner for textiles as well since 38% of India's exports in textiles are sold to Germany (Subramaniam, 1996). Although my fieldwork was limited to the leather industry in Tamil Nadu, there is evidence to suggest that negotiations between various government ministries and representatives from the textile industry also influenced the central government's regulatory action (Singh & Phalgumani, 1995). (iii) Moreover, the government was receptive to the Council for Leather Exports (CLE), the exporters' organization through which leading exporters approached government agencies, because of historical links between the Ministry of Commerce and the CLE, and also because of CLE's leadership structure. CLE was founded by the Ministry of Commerce in the early 1960s, and is headed by two people, one nominated by

⁹ One example here is benzene widely used in the plastics industry and other organo-chemical manufacturing processes. It has still not been banned in the US even though it is found to have

the industry and the other appointed by the Ministry of Commerce. These political connections went a long way in enabling access to the central government and creating a space for negotiations between the government and the exporters' association.

“Leading” exporters dominating the CLE played an important role in that they triggered technical assistance from a central government research and development institute namely the Central Leather Research Institute (CLRI), and through joint presentations, channeled information to central government ministries about the nature of problems exporters were facing in complying with the German bans. Specifically, leather exporters in Tamil Nadu are variously dependent on small tanners for the supply of raw, semi-finished and finished leather. Thus, in order for leather exporters to comply successfully with the German bans, small tanners had to stop using the banned chemicals and start using substitutes. However, because of the structure of the industry, fragmentation in the process of leather tanning, the problem of geographical spread arising from the inter-regional trade in raw, semi-finished and finished leather, informal nature of leather trading and lack of a single point of entry of the banned chemicals into the production chain, the best way to enable compliance to the German regulations “leading” exporters proposed, was to ban production of these chemicals. Informed by the nature of problems leather exporters were facing, and after negotiations between various ministries government agencies and industry associations, the Ministry of Commerce and the Ministry of Environment and Forests respectively passed blanket regulations, one year after the German ban on PCP and 3 years after the German ban on azo-dyes. In the case of as dyes, the

carcinogenic properties. I thank Salim Ali for helping me to clarify some of these issues.

relevant ministry in fact enacted the regulation despite stiff resistance from the Dye Manufacturers Association of India (DMAI).

The Indian government's regulatory action created a two-tier regulatory structure now consisting of both the German and Indian regulations. In this transformed regulatory context, the pressure was now both on Indian exporters of leather and leather products and also on manufacturers of leather chemicals and dyes. The *combined impact* of both these regulations was a key factor in helping small tanneries to comply. The pressure on Indian exporters (from the German ban) compelled them to pressure small tanneries to switch over to substitute chemicals. However, exporters were not able to provide small tanners with the necessary learning and technical information regarding the constituents of chemicals or the use of dyes. For this tanners needed to cooperate with chemical and dye manufacturers and suppliers. The Indian ban however, created the conditions to make this possible. As a result of the Indian ban, chemical and dye manufacturers were forced to stop manufacturing the banned chemicals. Since 90% of leather processing takes place in the small-scale sector, it was in the interests of chemical and dye manufacturers to start producing substitute chemicals (and in some cases expand production of substitute chemicals and dyes that they were already producing) and help small tanners in using them. One unintended consequence of the changed regulatory balance was innovation in the use of dyes that resulted from cooperation between dye manufacturers and small firms. These innovations enabled small tanneries to minimize the costs of switching over to substitute chemicals.

The third factor that helped the small firm leather clusters of Tamil Nadu leather to adjust was the ability of the Central Leather Research Institute (CLRI), a traditional supply side

central government research and development institute, to upgrade in response to requests made by “leading” exporters. In the period immediately following the German bans, CLRI responded to requests made by Indian leather exporters in two ways. (i) It standardized methods for testing the banned chemicals through an intense process of negotiation with a German research institute, namely the Pruf-und Forschungs Institut (PFI), Pirmasens (Germany) and other international research institutes. This was crucial in order to ensure that leather goods certified and cleared for exports in Tamil Nadu would not be rejected in Germany because of differences in testing procedure. (ii) Secondly, CLRI upgraded its own facilities for doing in-house testing of leather samples and provide certificates to exporters verifying whether or not they met the German standards. Developing local facilities for testing and certification was crucial in order to avoid delays in production and ensure quick delivery schedules.

CLRI’s ability to upgrade itself and standardize testing procedures was particularly crucial because it enabled leather exporters to randomly select samples from leather processed by their small firm suppliers, send it to CLRI for testing and thus verify whether or not their suppliers had switched over to substitute chemicals. Random testing of leather samples also enabled leather exporters to reduce monitoring costs especially with respect to purchases from small tanners located in other regions.

Thus, the underlying mechanism that the Indian government used for creating the conditions for collective action involved two distinct elements. On one hand, it involved two central government regulations that were applicable at a national level. On the other

hand it involved a strategy of a central government research institute working regionally, to upgrade itself.

My study contributes to the literature in several ways. First, by focusing on how the Indian government's old policies, such as the much maligned small-scale reservation policy played out in the context of the German bans, it provides evidence that these older government policies were not entirely inefficient, as they have been criticized in the literature. In fact my research shows that they can have various surprising outcomes in the context of future crisis. My point is that, methodologically therefore, it is important to look at the history of regulatory policies and understand why they may or may not work well in the present context.

Secondly, my study shows that a predominantly small firm, labor intensive and highly dispersed sector can successfully cope with costs related to complying with environmental regulations. Policymakers often perceive small firms as unable to cope with large capital expenditures related to complying with environmental regulations.¹⁰ Incurring capital and operating costs, it is assumed might render them un-competitive. Based on these assumptions, policy makers frequently have two kinds of responses to pollution caused by small firms. (i) Either small firms are exempt from environmental regulations (Brown, et al. 1990). (ii) Or, regulatory agencies target large firms while ignoring pollution caused by small firms. This derives from the added perception that small firms are dispersed and hence difficult to monitor. Thus regulatory agencies, often strapped for

¹⁰ This is itself based on the assumption that meeting environmental standards necessarily involves large capital expenditures.

resources for monitoring and enforcing regulations focus on pollution caused by large firms that release greater quantities of pollution. The problem with ignoring or exempting small firms from environmental regulations is that the pollution that they collectively cause may be quite significant (Gulati, 1997). My analysis of the Tamil Nadu leather clusters shows neither of these approaches are necessarily warranted. On the contrary, it shows that small firms can cope with costs related to complying with environmental regulations in various creative ways. In my case, this occurred through innovations in the process of dyeing leather with the use of certified chemicals.

Thirdly, my study also contributes to the literature on collective action, the conditions under which it takes place and the nature of collective action in small firm dominated clusters. For example, a recent study done by Kennedy (1999) on the Tamil Nadu leather clusters, the same region and industry as mine, focuses on collective action undertaken by tanners in response to the 1995 Indian Supreme Court decision to shut down tanneries in Tamil Nadu that were not treating their tannery waste. Collective action resulted in the installation and operation of 11 common effluent treatment plants (CETPs) to treat tannery effluents. My study differs from Kennedy's study in several ways. (i) While Kennedy bases her explanation on the internal dynamics of the cluster, my focus is on the role of the central government, a neglected area in the industrial districts literature. My point is not that the role of local economic actors, specifically cooperative action between "leading" exporters was insignificant. Rather, that it is not possible to understand successful adjustment without considering the kinds of actions that the government took and the intended and surprising impact they had. (ii) Kennedy's focus of analysis is on how

joint action in the form of creation and operation of CETPs enabled the leather clusters to meet pollution regulations. By contrast, my study focuses on how regulatory actions taken by two Indian Government Ministries resulted in widespread compliance by the industry through various intended and unintended outcomes. (iii) While the role of regulatory history of the leather industry in mediating future crisis is not analyzed in Kennedy's study, it is a central theme of my analysis and explanation. (iv) Finally, although Kennedy analyzes the nature of collective action in response to the Supreme Court order, she does not look at the conditions that led to collective action. A majority of the tanners joined CETPs because "*all* tanners were forced to act or perish" (Kennedy, 1999, p.1680). The underlying assumption here is that since a crisis is directed at all tanners, they chose to act collectively. By contrast, my study challenges this implicit assumption that there is something automatic about collective action simply because it is directed towards a group of economic actors. Rather it analyzes the conditions under which collective action can occur and be sustained.

Fourth, my findings highlight the conditions under which central governments might mediate crises facing industrial clusters. As the literature (Schmitz, 1999) suggests, the State does not necessarily intervene even when it does have a potentially important mediating role to play in negotiating conflict amongst competing economic actors. By contrast my study highlights three conditions under which the State mediated in the case of the Tamil Nadu leather clusters. (i) First, the State intervened because the leather industry is a key export sector in India. It is the 4th largest foreign exchange earner in the country and Germany is the leading market for Indian leather exports (Tables 1 & 2,

Appendix). (ii) A second reason why the State was responsive was because there are strong political connections between government ministries and the relevant exporters' association, namely the Council for Leather Exports (CLE). (iii) Third, the Indian government mediated because the German crises seriously affected another key export sector, namely textiles. Leather and textiles together account for two-thirds of exports from India to Germany (The Indian Textile Journal, 1996, p. 153).

Fifth, my study throws light on the conditions under which industrial clusters can sustain compliance to external pressures. As the literature shows (Blackman & Bannister, 1998; McCormick, 1999) even though industrial clusters are often able to act collectively in the initial stages of crisis, they often face difficulties in sustaining compliance. For instance, a recent study of informal sector brickmakers in Cd. Juarez (Mexico) shows that as a result of organizing efforts by a binational multisector coalition led by a local non-profit organization, almost 70% of brickmakers switched over to propane instead of highly polluting fuels (such as used tires and scrap wood) that they were previously using (Blackman and Bannister, 1998). However, most of this progress was shortly reversed due to nationwide reduction in propane subsidies. By looking at the impact of the Indian government's action, my study elicits at least four conditions that enabled long-term compliance by the Tamil Nadu leather clusters. (i) First, one reason for long-term compliance was the *presence of the two-tier regulatory structure one targeting polluters (leather industry, specifically exporters) and the other targeting input suppliers (leather chemicals and dye manufacturers)*. While the pressure on "leading" leather exporters compelled them to seek certain kinds of government assistance, ban on the production of

PCP and 74 azo dyes forced leather chemicals and dye manufacturers to stop manufacturing the banned chemicals. (ii) A second key factor was that the *polluters* (tanners) *are an important market for input suppliers* (leather chemicals and dye manufacturers). In my case, small tanners comprise a key market for leather chemicals and dye manufacturers since 90% of leather processing is done in the small-scale sector. This created incentives for leather chemicals and dye manufacturers to start manufacturing substitutes and cooperate with small tanners. (iii) Third, *innovation* in the process of dyeing leather, though unexpected, played an important role in keeping the costs of switching over to substitute chemicals down, thus facilitating compliance by small tanners over the long-term. (iv) Fourth, the *availability of technical services in close proximity* was another crucial factor in that it enabled leather exporters to randomly test leather samples they purchased from small tanners and thereby put pressure on the latter to continue complying. In addition, random testing of leather samples helped exporters to reduce monitoring costs particularly with respect to purchases from small tanners located in other regions.

1.3 Key Actors

There are 4 key actors who played an important part in this story. I briefly introduce each of these actors before describing the methodology and the organization of my thesis.

(i) The Central Leather Research Institute (CLRI). It was established by the Indian government in 1948 as one of the constituent National laboratories of the Council of Scientific and Industrial Research (CSIR). It has 5 regional offices with headquarters at Chennai. Its

main role has been to conduct research and provide technical support and training to the leather sector. It also assists the central government in policy formulation. The CLRI has strong links with the industry. About sixty percent of leather industry in Tamil Nadu is trained by CLRI. In my story this traditional supply side institution played a key role by acting in a demand driven way and providing technical assistance to leather exporters.

(ii) Leading exporters: These include owners of firms that export finished leather products (footwear, garments, small leather goods) or finished leather. They tend to have a strong base in tanning or long-term links with tanneries. They are a heterogeneous group of exporters in terms of whether or not they own tanneries, and in terms of the size of the firms they own. They constitute about 10-15% of all leather exporters in Tamil Nadu. They played a crucial role in this story by building alliances and channeling their demands to the central government and also to the regional office of the CLRI, in short triggering government action.

(iii) Council for Leather Exports (CLE). This is a quasi industry/quasi government organization that was established in the 1960s by the Ministry of Commerce to control the quality of products that were being exported. Most exporters in Tamil Nadu are members of CLE. Its Chairman is nominated by the industry. However, its Managing Director is an IAS officer appointed by the Ministry of Commerce. Its main purpose is to promote exports. It is sometimes criticized for giving preference to the interests of leading exporters. CLE was the conduit through which leading exporters channeled their requests to Central Government ministries and to CLRI.

(iv) Leather chemical and dye manufacturers and suppliers.

There include both Indian chemicals manufacturing firms and also foreign affiliates. Some of the chemical firms that played an important role in adjustment to the azo dye and PCP regulations were BASF, India, Quinn India, Salma, Chem Crown, Alpha and Colourtex. Many of them have offices in Chennai or sell their products through regional distributors. Their role in cooperating with small tanners was crucial to enabling the latter to adjust.

1.4 Methodology

This paper is based on field research that I carried out in the leather clusters in Tamil Nadu in January and February 1999. I interviewed owners of fourteen firms that included small firms and DGTD tanneries and product manufacturing units. Some of these firms are leading exporters from Tamil Nadu. Others owned small tanneries supplying to exporting units or catering to the domestic market. I conducted most interviews in the city of Chennai since many owners of tanneries located in different clusters tend to have offices in Chennai. Some of the firm interviews were conducted in the tannery cluster of Pallavaram and Chrompet, located on the outskirts of Chennai.

Fieldwork also involved interviews with members of leading industry associations such as the Council for Leather Exports (CLE) and Central Leather Research Institute (CLRI). At CLRI, I interviewed scientists who had been directly involved with technical assistance to the industry in the case of both the bans. I also interviewed economists who had an extensive understanding of the leather industry. In addition I interviewed officials at UNIDO's office at Chennai, and officials at the Indo German Chamber of Commerce, (IGCC). My interviews with chemical manufacturers and distributors who supply leather chemicals to the tanning industry were important in understanding the role they played in

enabling successful compliance to the German bans. My fieldwork also included interviews with faculty and students at the Madras School of Economics who have extensively studied pollution problems within the Tamil Nadu leather clusters. In addition to field research, this paper also draws on extensive documentary research conducted at the Madras School of Economics, Central leather Research Institute (CLRI), Council for Leather Exports (CLE), the Indo German Chamber of Commerce (IGCC) and at UNIDO's Regional Programme office at Chennai for the tanning industry in South Asia.

1.5 Organization of the Thesis

The following chapters are organized as follows. In chapter 2, after a brief introduction to the industrial structure of the Tamil Nadu leather clusters, I look at the role of government policy in enabling rapid modernization of the leather industry since 1973. This analysis highlights a more beneficial aspect of the much-criticized small-scale reservation policy adopted by the Indian government.

In chapter 3, I look at why and in what way Indian government ministries mediated in the crisis created by the German bans, what kinds of collective action problems leather exporters were facing, and why the government took regulatory action.

In this chapter I also show how past regulations surprisingly influenced the problems "leading" exporters faced in complying with the German regulations.

In chapter 4, I look at the conditions for long term compliance to the German bans. Specifically, I analyze the intended and unintended impacts of the two-tier regulatory structure comprising of both the Indian and German bans. I show how the Indian ban resulted in cooperation between small firms and chemical and dye

manufacturers, and how access to testing and certification from CLRI enabled exporters to pressure small firms into complying. Chapter 5 is the conclusion. Here I draw policy lessons that emerge from my study.

2 Industrial Structure and the role of Public Policy

India's policies of import-substituting industrialization and of protecting the small-scale sector have been much criticized in the literature on economic development (Kashyap, 1988; Mazumdar, 1991). For example, the small-scale reservation policy has been variously criticized for reserving the production of certain goods for the small-scale sector. It has also been criticized for reserving the scale of production of certain consumer goods below the optimum production size, thereby resulting in various inefficiencies. More generally, it has been criticized for not achieving the desired objectives of poverty eradication, growth of village economies and reduction of regional imbalances (Kashyap, 1988). This critique, while not inaccurate is incomplete and does not present the more positive and beneficial aspects of government policies as my case suggests.

In this chapter, I argue that government policies with respect to the leather sector have played an important role in rapid modernization and upgradation of the industry than the above monolithic critique suggests. In what follows, I begin with a brief discussion of the industrial structure of the Tamil Nadu leather clusters and then look at the impact of public policy on the dynamism of the industry over the last 20-25 years.

2.1 Industrial Structure

In Tamil Nadu, almost 90-95% of all the tanneries are located in clusters. Many of the prosperous clusters are located in the middle Palar valley around the towns of Ambur, Ranipet, Vaniyambadi, Pernambut, Vellore and Melvisharam. Tannery clusters are also

located in the outskirts of Chennai in the areas of Chrompet, Pallavaram and Madhavaram. Other major clusters are at Trichy, Dindigul, and Erode (Table 1).

The Tamil Nadu leather clusters (see Figure 1, Appendix) like the leather industry in India as a whole, are primarily comprised of small firms (Table 1). In addition there are a small number of DGTD units that include primarily medium sized firms and a few very large firms. According to one survey, out of a total of 577 tanneries in Tamil Nadu, 536 were in the SSI sector and 41 were categorized as DGTD units (CLRI, 1990) Thus, about 90% of the processing of leather in Tamil Nadu is done in the small scale sector (Table 1).

Table 1: Centerwise distribution of tanneries in Tamil Nadu

Centers	SSI Units	DGTD Units	Total (SSI & DGTD units)
Madras	107	6	113
Vaniyambadi	97	4	101
Ranipet	84	10	94
Ambur	61	13	74
Dindigul	48	1	49
Pernambut	44	0	44
Erode	40	1	41
Trichy	26	1	27
Vellore	11	4	15
Melvisharam	13	0	13
Coimbatore	2	1	3
Gudiyatham	3	0	3
Total	536	41	577

Source: Report on Capacity Utilization and Scope for Modernization in Indian Tanning Industry (CLRI, 1990)

There is no direct co-relation between firm size and the phases of tanning carried out by different tanneries (Tables 2a & 2b). Mostly small firms do the “primary” phase of tanning (Figure 2, Appendix), that is the processing of leather from the raw to semi-finished stage. This phase of tanning is reserved by the central government for the small-scale sector. Tanneries doing “primary” phase of tanning undertake two different types of

tanning, namely chrome tanning (which results in a type of semi-finished leather known as wet-blue leather) or vegetable tanning (also know as East India or EI tanning). A significant number of small tanneries (23% approximately) also do the “secondary” phase of tanning, that is, process semi-finished leather to finished stage or from an intermediary stage known as “crust” stage to finished stage. About 23% of small tanneries work independently buying raw leather and selling finished leather in the market. These including other small-scale tanneries could be in the organized or the unorganized sector. Many small tanneries do job work for agents or for other tanners and product manufacturers. Approximately 41% of the DGTD tanneries are fully integrated that is, they can process leather from raw to finished stage (Table 2b). 46% of DGTD units do various intermediary stages of leather tanning. However, they have to get a license to do the “primary” stage of tanning as opposed to small firms who do not need to get licenses.

Table 2(a): Classification of Tanneries according to Stages of Processing

Firm size	Units covered	Raw to E.I	Raw to wet blue	Raw to crust	Raw to finish	EI to finish	Wet Blue to finish	Crust to finish	Others	Processing from different stages
SSI units	227 (100%)	58 (26 %)	7 (3%)	5 (2%)	51 (23%)	21 (9 %)	25 (11%)	7 (3%)	6 (3%)	47 (21%)

Source: Report on Capacity Utilization and Scope for Modernization in Indian Tanning Industry (CLRI, 990)

Table 2(b): Classification of Tanneries according to Stages of Processing

Firm Size	Units Covered	Raw to E.I	Raw to Finish	E.I to Finish	Wet Blue to Finish	Processing from different stages
DGTD units	39 (100%)	1 (3%)	16 (41%)	3 (8%)	1 (3%)	18 (46%)

Source: Report on Capacity Utilization and Scope for Modernization in Indian Tanning Industry (CLRI, 1990)

In Tamil Nadu, there is significant fragmentation in the processing of leather, different stages of leather tanning being carried out by separate firms. Only 21% of all tanneries are fully integrated, that is, they carry out all stages of leather processing from raw to finish in the same unit. Contrary to some studies (Kennedy, 1999) that show that specialization within a cluster can generate cooperation and collaboration among firms, my study shows that this can create problems for quality control and impede rapid dissemination of information throughout the production chain.

The excessive fragmentation in the processing of leather is also indicated by the high incidence of job tanning. For example, about 32% of SSI units and 15% of DGTD units in the Tamil Nadu leather clusters are exclusively engaged in doing job-work (CLRI, 1990). In addition another 13% of DGTD units and 25% of small-scale units do job-work in addition to their own work.¹¹ The tannery and its machinery in job-working units are owned by an individual or partnership firm but leased out for different lengths of time against payment of a lease rent. In many cases, tanners contract out some stage of tanning to job-workers. In other cases, leather traders get orders from tanners or product manufacturers and get some part of leather processing done in job-working units.

A key fact to be noted about the approximately 289 exporters of leather products and finished leather in Tamil Nadu is that most of them are dependent upon small tanners for the purchase of raw, semi-finished and finished leather. For instance, many of the DGTD units that have integrated forward into product manufacturing for export have the

in-house capacity to process leather from semi-finished to finished (Figure 2, Appendix). This is because, it is in the “secondary” stage of tanning that product differentiation occurs, the “primary” phase being mostly standardized. However, they are dependent upon small tanneries for the purchase of semi-finished leathers. Small-scale leather products (garments, shoe and shoe uppers, leather goods) exporters are also dependent upon small tanners for the supply of raw, semi-finished and finished leather. Even those who have set up feeder units to do secondary stage of tanning are dependent upon small tanners for the supply of semi-finished leather. Even integrated units exporting finished leather are dependent upon tanners or agents for the purchase of raw leather.

By the term “leading” exporters in Tamil Nadu, I refer to a small subset of all leather and leather product exporters in the State. Most of them export finished leather products such as shoes, shoe upper and garments and also finished leather. They are quite heterogeneous in terms of whether or not they own a tannery and in terms of the size of the units they own. However, most tend to have a strong base in tanning or long-term links with small tanneries. “Leading” exporters tend to dominate the Council for Leather Exports (CLE) which has a lot of political clout with the Indian Ministry of Commerce.

An important feature of some of the prominent industry associations in Tamil Nadu is their strong relationship with the central government. These connections as I will explain in Chapter 3, played a crucial role in the enabling the small firm leather clusters in Tamil Nadu to respond collectively to the German bans. (i) One example is the leadership

¹¹ There are several reasons for the growth of job-tanning. These include lack of sufficient orders but availability of excess capacity in some tanneries, relatively lower risks involved in terms of pollution

structure of the Council for Leather Exports (CLE), which is a quasi-industry/ quasi government organization. While its director is an IAS officer appointed by the Ministry of Commerce, its Chairperson is nominated by the industry. This aspect of the organizational structure creates a context for close cooperation between the government and the industry.

(ii) Another organization that embodies a close connection between the government and industry is the Central Leather Research Institute (CLRI). CLRI was established in 1948 by the Government of India, and is the main research and development institute for the leather industry. Its main source of funding is from the Indian government, though it also generates revenues from training and consulting services and has been supported by different international institutions (such as UNDP) for specific projects. Over the past 5 decades, it has provided technical assistance to the industry on a number of fronts. These include technology development for the modernization of tanneries, for modern fallen carcass recovery centers in different parts of India, for leather product design and development, and for cleaner processing methods in the manufacture of leather. Like the CLE, it has direct connections with policy makers in the Central Government and is able to influence policy at the national level.

2.2 Impact of Public Policy

The Indian government's policies towards the leather sector have often been criticized for creating obstacles in the modernization of the industry. For example, the government reserves the mechanized production of shoes to the small-scale sector,

control, and conversion of several sick units into job-working units.

currently defined in terms of an investment ceiling of US \$150,000 (Ministry of Industry, 9th 5 Year Plan, 1996). This policy has come under considerable criticism because a viable unit for the manufacture of machine made footwear requires an investment of US \$1.25 million (India 2010, 1994). Despite criticisms such as these, it is important to recognize the role government policy has played in the rapid growth and modernization of the sector.

Since the early 1970s, the Indian leather industry has moved from exporting primarily raw hides and skins and semi-finished leather, to exporting predominantly finished leather products by the late 1990s. This shows a remarkable shift in the character of the products the leather industry exports over the last 25 years. During this time-period, the industry has grown annually at the rate of 25%. Its current global market share is 4.5% and export earnings are estimated at US \$1.5 billion each year (CLRI, 1998). For the Indian government, it is a key sector because apart from generating revenue, it provides direct employment to about 1.5 million people in India and indirect employment to another 150,000 people (Ministry of Industry, 9th 5 Year Plan, 1996). In addition, the leather sector has high potential for value addition with relatively low inputs of capital (Banerjee and Nihila, 1998, p. 7).

Until the 1950s, there was not much technical progress in the industry. India was primarily exporting raw hides and skins and a type of semi-finished leather, processed by using vegetable tannins known as East India (EI) leather. During the 1970s, many tanneries in developed countries started to close down due to tightening environmental regulations, increasing costs of pollution control, and inability to stay competitive in the

face of wage increases. Also, in the early seventies, many developing countries faced a serious balance of payment crisis resulting from the sudden increase in the price of oil.

In the face of both of these pressures/opportunities, the Indian government identified leather as one of the sectors that had export potential and introduced policies to support this endeavor. 1973 was a turning point for the leather industry and the spate of policy initiatives taken by the Central government during the following decade played a key role in the subsequent modernization and upgradation of the industry.

In 1973, the Indian government banned the export of raw leather, phased out the export of semi-finished leather eventually banning it in the early 1980s. It also placed an export tax on the export of semi-processed leather. The government did so to promote export of finished leather and leather products and also increase the employment potential for the industry. In 1979, the Indian government liberalized the policy relating to import of capital goods (that is, tanning, finishing and leather goods machinery) with the objective of increasing the mechanization of the industry. In 1984, the Indian government designated footwear the most important export item. During the 1980s, the central government further reduced import duties on various inputs such as raw hides and skins and chemicals not available locally. India now imports large quantities of raw hides and skins from Europe, Australia and Africa.

Government policy also influenced the shift from exporting finished leather to exporting finished leather products. For example, in the 1985-86 budget, an additional duty was levied on the exports of finished leather compared to leather products. By 1998, 80% of India's exports were in the form of finished leather products. Thus, during

the 1980s and 1990s, firms slowly began manufacturing and exporting finished leather (Table 2, Appendix). Although the potential for forward linkages existed before, it was during the mid-1980s and 1990s, that several tanners diversified and moved up the value added chain by manufacturing finished leather products (such as shoe uppers, garments, leather accessories). Most of the leather goods, garments and shoe production units that emerged during this time though, remained in the small-scale sector. This emerged in a landscape marked by a vast network of pre-existing cottage and small-scale firms making a wide range of footwear and a variety of leather goods for the domestic market.

Public policy therefore has had a strong impact on the leather industry's growth and export performance, especially between 1980-1998 (Table 2, Appendix). More recently, (1996-1997) the industry faced a slump in exports, in part due to the Supreme Court ordering the closure of tanneries that were not meeting regulations for pollution control. The closure of many tanneries for several months, resulted in a shortage of finished leather thereby affecting manufacture and export of shoes, uppers and garments.

The above discussion shows that despite its limitations, central government policies have provided a strong impetus for rapid growth and diversification of the leather sector, an aspect often written out of critiques of the small-scale reservation policy. In the next chapter, I look at how the Indian central government, both through the surprising effects of its past policies and through deliberate action it took after the German bans, enabled leather exporters in Tamil Nadu to find a collective solution to the problem of compliance to the German bans.

3 Regulation and collective action

In much of empirical literature on industrial districts, the role of the State in enabling small firm clusters to respond collectively to external pressures remains unclear. Studies have mostly focused on the collective action taken by firms organized as clusters in responding to crisis (Nadvi, 1999, Kennedy, 1999). Moreover, the literature also provides evidence that national and local governments do not necessarily mediate between dissenting firms and associations quickly or at opportune moments (Schmitz, 1999). One example is the Sinos valley shoe cluster in Brazil where a few large firms preferred to collaborate with a major global buyer (by selling them semi-finished leather) rather than cooperating with downstream manufacturers. As a result of this and lack of timely government mediation, the cluster was not able to upgrade in areas of marketing and design, resulting in failure of an ambitious program of multilateral cooperation. By contrast, in this Chapter, I show how and under what conditions different ministries of the Indian central government mediated quickly and effectively, and in one instance, even acted against stiff opposition from specific interest groups to help leather exporters comply successfully to German quality standards.

In highlighting the role of the State, my point is not to undermine the important role played by “leading” exporters in triggering specific kinds of government assistance in response to the German crises. To be accurate, the actions taken by the central government were a result of a process of negotiation between a powerful exporter’s organization namely, the Council of Leather Exports (CLE) and several central government ministries and agencies. As I will show, several actions that the government took were requested by “leading” leather

exporters dominating the CLE. However, as the literature (Schmitz, 1999) would lead us to expect, government agencies do not necessarily mediate as they did in this instance. Neither do they actively respond to requests made by every exporters' association. Here they did so for at least three reasons. First, the central government mediated because leather is a leading export sector and Germany is India's leading market for leather exports (Table 2, Appendix). As I have discussed in Chapter 2, since the 1970s, the Indian government has introduced various policies to promote exports in this sector. Secondly, the German bans also affected Indian textile exports, 38% of which are exported to Germany.¹² Leather and textiles together account for two-thirds of exports from India to Germany (The Indian Textile Journal, 1996, p. 153). Thus, the Indian government's actions need to be seen in terms of keeping exports to Germany afloat and maintaining good relations with an important trading partner.

Third, central government ministries responded to requests made by representatives of the Council for Leather Exports (CLE) because the CLE has significant political influence. It is a quasi-government/ quasi industry hybrid association and was established by the Ministry of Commerce in the early 1960s to promote leather exports. Further, its leadership structure comprising of a Chairman nominated by the industry and a Managing Director appointed by the Ministry of Commerce itself creates a valuable context for channeling information between industry and government.

Specifically, in the aftermath of the German bans, Indian government agencies took several actions of which two are particularly important. First, on the request of "leading"

¹² Indian exports to Germany include other products as well including carpets, computer software, automotive components and bicycles and bicycle components.

exporters, the Central Leather Research Institute (CLRI), a central government research and development institute with headquarters in Chennai, standardized testing methods and upgraded its own facilities to do in-house testing and verification of leather samples. While important, this technical assistance directed mainly at exporters, gradually seemed to be inadequate because it could not solve the more critical problem that leather exporters faced namely, how to prevent PCP and azo dyes from entering the production chain. Leather exporters are dependent upon small tanners for the supply of raw, semi-finished and finished leather. Thus it was difficult for leather exporters to successfully adjust to the German bans unless the small tanners complied as well. Given the structure of the industry, the dependence of exporters on small tanners, the problem of geographical spread resulting from the inter-regional trade in raw and semi-finished leather, the informal nature of leather trading, and there being no single identifiable point through which PCP and azo dyes enter the production chain, the only way to comply with the ban seemed to be by banning production. As such, “leading” exporters through the CLE started requesting the central government to consider issuing a ban on the production of PCP and azo dyes. These requests were crucial in informing the government about the nature of the problem “leading” exporters faced.

It is important here not to make a clear-cut separation between requests for technical assistance and for regulatory action. Requests for regulatory action started being made even before testing procedures had been fully standardized. Hence these requests must be seen as overlapping and cannot be given the status of separate events having a clear-cut sequence.

Secondly, as a result of various negotiations between different central government ministries, agencies, and exporters’ associations, a year after the German ban on PCP and 3

years after the German ban on azo dyes, the Indian Ministry of Commerce and Ministry of Environment and Forestry respectively issued “blanket” regulations that were significantly different from the German regulations. (i) First, while the German government had banned the *import and sale* of consumer items containing micro-quantities of PCP and azo dyes within Germany, the Indian government banned *any sort of “handling,” including production, sale, import, trade* of these chemicals within India. As the literature on domestic environmental regulation suggests, targeting input suppliers is a more unusual regulatory action, the more common practice being to target the polluters. (ii) Secondly, since Germany is a key export market for Indian leather goods, Indian leather exporters constituted the segment most effected by the German bans. By contrast, the Indian bans directly targeted input suppliers, namely manufacturers of leather chemicals and dyes and prohibited them from producing or selling PCP and azo dyes in India. (iii) Finally, in the case of the azo dye ban, while Germany had banned only 22 specific amines, the Indian government banned 74 different types of azo dyes and hence was much broader. In both cases of the PCP and the azo dye bans, the Indian government’s regulatory action created a two-tier regulatory structure that comprised of both the Indian and German bans that eventually created the conditions for long-term compliance to the German bans.

In what follows, I look at the various overlapping and often simultaneous events following the German bans and explain how different Indian government agencies mediated at the regional and national levels to the crisis created by the German bans. In the first section I look at how the Central Leather Research Institute’ (CLRI) upgraded itself to provide technical assistance to leather and leather products exporters, and explain why though

important, it was limited. In the second section, I look at the specific way in which the problems that “leading” exporters faced were a collective action problem, and in what way the Indian government’s regulations addressed that problem. In analyzing the conditions for collective action, I add to Kennedy’s (1999) analysis of the Palar valley leather clusters, the same industry and region as mine. While Kennedy limits her analysis to the nature of collective action, my study goes a step further by analyzing the conditions that make collective action possible in the first place. In the second section, I also show, how surprisingly, two past central government policies contributed to collective action problems that “leading” leather exporters faced. These were (a) the policy of reserving the “primary” phase of tanning to the small-scale sector and (b) licensing policy for DGTD units, both of which compelled “leading” leather exporters to include small firms in their strategy for complying with the German bans. Finally, in the third section, I examine in more detail the conditions that led the Indian central government ministries to take regulatory action. I show how the central government’s regulatory actions were an active form of mediation that accommodated requests made by “leading” exporters.

3.1 Importance and inadequacy of a Technical Solution to the German bans

Leather exporters in the Tamil Nadu leather clusters are variously dependent on small tanners for the purchase of raw, semi-finished and finished leather. In order for exporters to comply with the German regulations, it was important for them to inform small tanners about the bans and determine the extent to which the leather they were purchasing from them contained the banned chemicals. Hence, in the period immediately following the announcement of the German bans on PCP (December 1989) and azo dyes (July 1994), “leading” exporters

who dominate the politically influential organization, Council for Leather Exports (CLE), approached the Central Leather Research Institute (CLRI) to find out precise information about the ban and also find a technical solution to the problem. In the case of both the bans, CLRI organized several seminars and invited representatives of various tanners associations to disseminate information about the ban. Being organized under the CLE which has direct links with the Indian Ministry of Commerce, was important for “leading” exporters in making alliances with CLRI, because it allowed a rather heterogeneous group of exporters to have a common voice and lend political weight to it.

Leading exporters’ search for a technical solution was necessitated in part because of the technical nature of the German bans. Both the German bans on PCP and azo dyes required micro-quantities of the banned chemicals to be detected and tested. The German ban on PCP had prohibited the import and sale of consumer items containing more than 5mgs of PCP per kg of leather, within Germany. The German azo-dye ban had banned import and sale of consumer items containing 0mgs of 22 specific azo dyes. Hence, allying with CLRI whose headquarter is located in close proximity to the clusters, was a crucial step in complying with the German regulations.

The CLRI took two important steps to help provide technical assistance to leather exporters. In doing so, it was assisted by central government ministries and also CLE in different ways. (i) First, since there were no internationally accepted standardized methods for testing micro-quantities of PCP or azo dyes at the time of the bans, CLRI started extensive consultations with a German Research Institute Pruf-und Forschungs Institut (PFI) (Germany) and other international research institutes to standardize testing procedures. This was crucial

in order to ensure that leather goods certified and cleared for exports in Tamil Nadu would not be rejected in Germany because of differences in testing procedure.

(ii) Secondly, CLRI upgraded its own facilities for doing in-house testing of leather samples and provide certificates to exporters verifying whether or not they met the German standards. Developing local facilities for testing and certification was a crucial long-term strategy in order to avoid delays in production and ensure quick delivery schedules. In order to upgrade itself by purchasing instruments and training personnel, CLRI needed access to funding. In the case of the PCP ban, the Ministry of Commerce provided funds to CLRI from the Leather Development Fund for purchasing testing instruments on the behest of CLE. The Indian government also requested the German government to assist by giving laboratory equipment and setting up testing facilities for PCP analysis.

In the case of the azo dye ban, the CLRI took an important step that helped it to get access to funding for purchasing instruments and more importantly, created a forum for discussion about collective action with respect to the azo dye ban. It initiated the formation of a steering committee comprising of representatives from the industry, Ministry of Environment and Forests, Bureau of Indian Statistics, National Environment Research Institute, Central Leather Research Institute, Council for Leather Exports and members of the State Pollution Control Board (PCB). The steering committee enabled representatives from different government ministries, research institutes and industry to exchange information and discuss possible forms of intervention. One outcome of this committee was to recommend to the Ministry of Commerce to sanction a large amount of money for importing equipment for testing micro-quantities of banned amines. The CLE

also contributed in providing funding for the purchase of this equipment. Thus with financial help from the Ministry of Commerce and also the CLE in the case of the azo dye ban, CLRI set up a state of the art eco-testing laboratory called Expertise Center for Eco-Testing Laboratory (EXCEL) at Chennai and two regional labs at Calcutta and Kanpur. Thus, within six months of the German ban on PCP ban, and a year after the German ban on azo-dyes, CLRI started testing leather samples and issuing certificates to exporters who sent leather samples for testing.

However, even while CLRI was upgrading its facilities for testing and verification leather exporters continued to face the problem of the banned chemicals entering the production chain. Addressing this problem required a broader, collective solution. In the next section, I look at why it was difficult for “leading” exporters to prevent the banned chemicals from entering the production chain and in what particular way this constituted a collective action problem.

3.2 Reason for new regulation: Old regulations and other factors

In order for Tamil Nadu leather exporters to prevent PCP and azo dyes from entering the production chain, it was very important for them to identify which tanners were using the banned chemicals. However, several factors including two previous central government regulations namely the policy of protecting of primary phase of tanning to small-scale sector and licensing policy for DGTD units made this difficult.

(i) One problem facing leading Indian exporters was that there was no single point at which either PCP or azo dyes entered the production chain. It could enter the production chain during the processing of leather and also during product manufacturing.

This was because although PCP was mainly used in the first stages of leather curing and preservation (see Figure 2, Appendix), it could be present in various leather chemicals as a preservative and could enter leather processing at different stages such as chrome tanning, fat liquoring and/or finishing (Dr. Sundar Rao, Maitra, interviews). Some of the dye solutions could also contain PCP. PCP could also be present in certain leather chemicals/auxiliaries that required preservatives such as vegetable tannin extracts, fat liquors, protein binders and adhesives. Further, PCP could also enter the production chain during the product manufacturing stage because it could be present in chemicals used to preserve leather products.

The point at which the banned azo-amines entered the production chain was also difficult to identify with certainty. Although they are used during the dyeing stages (Figure 2, Appendix) when leather is converted from semi-finished to finished leather, the banned amines could also enter the final product through use in the production of various components such as shoe laces, shoe soles, etc. Hence, in both cases there was no single easily identifiable point at which PCP or azo dyes entered the production chain.

(ii) Secondly, two previous government regulations further added to the difficulty for exporters in identifying which firms were using PCP and azo dyes. (a) First was the central government regulation reserving the primary phase of tanning to the small-scale sector. This policy was adopted by the government soon after independence so as to protect the employment of Muslims and scheduled castes, the communities primarily engaged in the recovery and processing of hides and skins. One might recall here from Chapter 2 that at that time, India was primarily engaged in exporting raw and semi-

finished leather and there were very few units doing secondary stage of tanning. This policy of reserving the primary phase of tanning to the SSI sector exists even today.

Since a key point of entry of PCP into the production chain was during the primary phase of tanning and many exporters are dependent on these “primary” tanners for purchase of semi-finished leather, small firms had to be included by exporters in any strategy of compliance to the German bans. This was one way in which an old government regulation influenced the options leather exporters had in the context of the German bans.

(b) A second policy that constrained leading exporters was the licensing policy for DGTD units adopted by the central Government in 1973. Briefly, the government introduced this policy to encourage forward integration by setting up tanneries in the DGTD sector that exclusively processed semi-finished leather to finished leather.¹³ Since tanning, especially the secondary stage of tanning is a capital-intensive process, the idea was that the policy would encourage investment in this stage of processing. The policy however required that DGTD tanneries get a license to process leather from raw to semi-finished since the “primary” phase of tanning was reserved for the small-scale sector. Further, in order to get a license DGTD units had to export 95% (75% since 1984) of their production.

This licensing policy has been criticized for impeding the modernization of tanneries. Unlike what was intended by the policymakers, in order to avoid licensing requirements (such as quota requirements for export), the “finishing” units stayed small

¹³This was consistent with the government’s policy to phase out exports of semi-finished leather and diversifying into the production of finished leather for exports.

and multiplied by setting up feeder units doing “primary” phase of tanning in close proximity. The new “finishing” units often understated their investment on plant and machinery or acquired only part of the machinery to keep investment below the ceiling limit. Since setting up modern “finishing” units requires extensive investment in machinery, chemicals and process technologies, staying small was an impediment to modernization. Thus instead of the emergence of DGTD units, this policy led to an increase in small-scale units doing “secondary” stage of tanning. For instance in 1988, 23% of the small-scale tanneries processed semi-finished leather to finished leather (CLRI, 1990, p. 16).

Despite being criticized for slowing down the modernization of tanneries, the licensing policy had a surprising effect in the context of the German ban on azo dyes. Since azo dyes enter leather processing primarily during the secondary (specifically dyeing) stage of tanning, these small-scale “finishing” units could not be excluded by leather product exporters (especially the one’s who did not own any tanneries) in successfully complying with the azo dye ban. This was the impact of the central government’s licensing policy for DGTD units. This was another way in which an old government policy influenced leather exporters in seeking a collective solution to the German bans.

(iii) Thirdly, for Tamil Nadu exporters of leather and leather products, identifying, informing and monitoring small firms was difficult because of the inter-regional trade of leather. Raw hides and skins for the Tamil Nadu leather clusters are obtained from various states including West Bengal, Andhra Pradesh and Kerala. There are for instance, long

standing links between tanneries in Calcutta and Chennai (Banerjee & Nihila, 1998). The reason for inter-regional trade of leather is because, although Tamil Nadu is very strong in leather tanning and export oriented product manufacturing, it does not have a very strong base in hides and skins. Of the total amount of raw skins and hides processed in Tamil Nadu, less than 10% is obtained from within the State (Hashim, no date). This often influences trade in semi-finished leather because raw hides and skins have to be processed to semi-finished or an intermediary stage in tanneries close to where the hides and skins have been obtained to prevent decay and avoid damage during transportation. From the perspective of doing quality control, the problem for leather exporters in obtaining raw or semi-finished leather from other regions is that it is extremely difficult to inform small tanneries located elsewhere about specific regulations and monitor what chemicals they are using.

(iv) Fourth, because of the informal nature of leather trade it is impossible for exporters to prevent leather tanned in the informal sector in regions inside and outside of Tamil Nadu from entering the export market. In India, raw hides and skins are obtained mainly from rural areas. Raw hides and skins, and also locally tanned semi-finished or finished leather are bought and sold in weekly market places known as *mandies*. Tanners in Tamil Nadu have agents all over India who have the technical ability to sort, judge the quality of raw material and negotiate the price. This is an extremely important expertise and decisions made about raw or semi-finished leather eventually influence the quality and price of finished leather. These traders often obtain raw and semi-finished leather from the open market and sell it to tanneries in Tamil Nadu. This in turn can end up being used in

product manufacturing for exports. Given this difficulty in insulating the export market from leather traded informally, leather exporters had to search for a strategy that was broad-based and crosscutting.

It is important to point out that all of these factors may not have been at play simultaneously for every “leading” exporter. For instance, a “leading” exporter of finished leather owning an integrated tannery was not necessarily affected by small-scale “finishing” units switching over to alternative dyes or not. However, this may have been crucial for a “leading” garment exporter who does not own any tannery but buys semi-finished leather from the open market in Karnataka and subcontracts out finishing to feeder units in Tamil Nadu. Leading exporters are a heterogeneous group, whose different and perhaps conflicting interests coalesced together in these moments of crisis to find a common solution to the German standards.

3.3 Agency and government

Given the difficulties in preventing PCP and azo dyes from entering the production chain, leading members of the Council for Leather Exports, in alliance with CLRI and other smaller exporter’s associations, jointly requested the central government to ban the production of PCP and azo dyes. After a period of almost a year after the German bans on PCP and three years after the initial azo dye ban had been announced, the Indian Ministry of Commerce and the Ministry of Environment and Forests respectively announced blanket bans on the production and handling of these chemicals.

In tracing the role of the Government in the adjustment of the Tamil Nadu leather clusters to the German bans, it is important to emphasize that the two Central government

ministries involved and the CLRI were not simply passive actors responding to demands made by the Council for Leather Exports (CLE). The government mediated in this case because of the importance of the leather sector in the Indian economy and the importance of Germany as a trading partner. Further, there is a close connection between the Ministry of Commerce and the Council for Leather Exports (CLE), both because it was founded by the Ministry of Commerce and because of its leadership structure. Hence, it is not surprising that there is frequent and close interaction between the government and industry and that the government would be receptive to problems faced by leather exporters. The blanket bans issued by the Indian government ministries were a result of a process of negotiation between several government ministries, agencies and representatives from the industry. The case of the azo dye ban illustrates this issue well.

In the period after the announcement of the azo dye ban, CLE and CLRI as I have discussed allied together to find a technical solution to the German bans. While CLRI was upgrading itself to provide technical assistance to the industry, leather exporters faced serious problems in controlling for azo dyes in finished leather samples for reasons discussed above. Because of this and also because of time needed to standardize the testing procedures, the Indian government requested the German government to phase out the ban. This was done through regular diplomatic channels involving trade ambassadors of both countries. The German government also came under pressure from international associations such as the Ecological and Toxicological Association of the Dyes and Organic Pigment Manufacturers (ETAD) whose members were also affected by the German ban. Representatives of ETAD argued that a minimum detectable limit and

adequate test method for detecting the banned amines needed to be specified by Germany. German lawmakers realized that they needed several amendments to make the legislation workable. As such they amended the ban several times and phased out the date it would become effective. After a period of almost 2 years the Indian Ministry of Environment and Forest issued notification of a blanket ban on 74 different azo dyes.

The Ministry of Environment and Forest's decision to pass a blanket ban on 74 different azo dyes was not a response to requests made by Indian leather exporters alone. For instance, the steering committee whose formation was initiated by CLRI comprised of members representing the leather industry and various government agencies including the Ministry of Environment and Forests. It is likely then that the Ministry's decision was influenced by discussions between various members of the steering committee. Further, although my fieldwork was limited to the leather clusters in Tamil Nadu, there is evidence that the Indian Ministry of Textiles had formed a Textile committee which like the steering committee initiated by CLRI, included representatives from several central government ministries including representatives from the Ministry of Environment and Forests, industry associations and organizations (Singh & Phalgumani, 1995). The Ministry of Textiles took this initiative because the German azo dye ban had serious consequences for the Indian textile industry since 38% of India's textile exports are sold to Germany. Moreover, the textile industry is the largest consumer of dyes in India accounting for 70 percent of total consumption (Financial Express Investment Week, 1996). The Ministry of Environment and Forests' decision to announce a ban on 74 azo dyes was therefore a result of a number of influences that included various levels of negotiations and feedback

from the textile sector and went beyond requests made by the Council for Leather Exporters (CLE).

Further, in the case of the azo dye ban, the Ministry of Environment and Forests had initially released a draft notification in March 1996, that is two years after the announcement of the German ban on azo dyes. This draft notification was widely resisted by the Dye Manufacturers Association of India (DMAI). DMAI argued that the Indian ban on production of 74 azo dyes was much broader than the German ban (which had banned import and sale of only 22 azo amines) and no other country besides India was proposing to ban *production* of these dyes. Further, they argued that the Indian government was planning to ban production without proper risk assessment and that there was not enough evidence that all 74 amines had actually proven to be carcinogenic. However, despite the resistance, the Ministry of Environment and Forests made the ban official a year later in March 1997. Thus, though the Ministry's decision to issue the ban was informed by CLE and exporters dominating it, the Ministry's decision seems to have been a result of a broader process of negotiation that persisted even in the face of resistance from specific interest groups.

To sum up, in this Chapter I have shown (i) first, how two Indian government ministries and a central government research and development institute actively mediated the crisis faced by the Tamil Nadu leather clusters and the conditions under which they did so. This is important because as the literature (1999) suggests, governments do not necessarily mediate crises faced by industrial clusters. (ii) Secondly, analysis of why leather exporters searched for a collective strategy of compliance fills an important gap in the

literature which has often focused on the nature of collective action and not the conditions that make it possible (cf. Kennedy, 1999). (iii) Thirdly, analysis of the conditions of collective action highlighted another important lacuna in the literature, namely the role of government's past policies in mediating future crisis by influencing what actions firms can or cannot take, in unexpected ways. The difficulty of leather exporters in excluding small tanners engaging in "primary" phase of tanning because of the central government policy of reserving this phase of tanning to the small-scale sector, is one example of that.

As I have discussed, the Ministry of Commerce and the Ministry of Environment and Forests passed blanket regulations banning the production of the PCP and azo dyes. However, simply banning their production did not automatically imply that they would not be used. Tanners have a "kitchen psychology with respect to the use of chemicals" (Dr. Sundar Rao, interview). If they have stock of the banned chemicals, they would tend to use it up rather than throwing it away (ibid). Hence, in order to explain how and why small firms complied with both the bans, we need to look at the mechanism of compliance and certification underlying State action and how it enabled broad-based adjustment to the German bans. I discuss this in the next chapter.

4 The Processes of Long-Term Compliance

Even though the literature on industrial districts provides evidence that small firm clusters do respond to external pressures collectively in some instances (Nadvi, 1999), other studies have shown that it is often difficult to sustain compliance over the long term (Blackman & Bannister, 1998; McCormick, 1999). For example, as the case of informal brickmakers in Cd. Juarez (Mexico) shows, even though 70% of brickmakers switched over to propane instead of highly polluting fuels such as used tires and scrap wood, most of this progress was eventually reversed due to nationwide reduction in propane subsidies (Blackman & Bannister, 1998). This shows that often, successful initial response to external pressures dissipates soon after the crisis is over. What is important therefore is not just the ability of a cluster to respond successfully through collective action, but to be able to *sustain* compliance. The issue then is under what conditions can compliance to external pressures be sustained and what role can the State play in this context. In this chapter, I address this issue. Specifically, I look at the impact of regulatory actions taken by two different Indian government Ministries and technical assistance provided by the Central Leather Research Institute in enabling and sustaining compliance by the Tamil Nadu leather clusters to the German bans.

In particular I will show how the Indian government's regulatory act of banning the *production* of PCP and azo dyes nationwide, created incentives for chemical and dye manufacturers to cooperate with small tanners and provide them with the necessary assistance. Chemical and dye firms cooperated with small tanners because 90% of the leather processing in

the Tamil Nadu leather clusters is in the small scale-sector and it was in the chemical and dye firms' interests to see that the small tanners use the substitute chemicals. One surprising impact of the cooperation between dye manufacturers and small tanners in the case of the azo dye ban was innovation in the process of dyeing that helped small tanners to comply by keeping costs of using substitute chemicals down.

However, whether small firms were actually using and switching over to substitute chemicals needed to be verified by “leading” exporters. This service for testing and certification at the regional level was provided by the Central Leather Research Institute (CLRI) in response to requests made by leather exporters. As I have discussed in Chapter 3, CLRI did so by standardizing testing procedures and upgrading its own capacity to do in-house testing and provide certification to exporters of leather products and finished leather.

Thus, the role of the Indian government involved a combination of national and regional level strategies to enable the Tamil Nadu leather clusters to adjust successfully to German quality standards. In what follows, I discuss how the two pronged mechanism underlying the Indian central government's actions worked and how it unexpectedly created conditions for widespread and long-term compliance.

4.1 Impact of two tier government regulations: Cooperation, learning and innovation between tanners and manufacturers of leather chemicals and dyes

When the German bans on PCP and azo dyes were announced, the constituency most effected were “leading” exporters of finished leather and leather products. They needed to

ensure that the products they were exporting did not exceed the permissible limits of the banned chemicals. However, after the German bans were announced, small tanners did not immediately start using substitute chemicals. Neither did all leather chemicals and dye manufacturers immediately start manufacturing substitute chemicals on a large scale. It was only when the Indian government announced the blanket ban on PCP and azo dyes prohibiting the production and handling of these chemicals, chemical manufacturers were forced to cease production of the banned chemicals.

Interviews with exporters suggested that given the small tanners' inability/reluctance to switch over to substitute chemicals, the only way they would do so was if they were under pressure to do so. In some instances, exporters bought the substitute chemicals and gave it to their subcontractors. This was especially true when relationships between exporters and subcontractors tended to be long-term. However, this did not avoid the need for monitoring because the small tanners could still use the banned chemicals. In other cases however, exporters of leather products and finished leather had to put pressure on small tanneries to switch over to substitute chemicals. In either case however, small tanners still needed assistance in terms of what quantities of substitute chemicals they needed to use, how to get the desired effect with the alternative chemicals, how to use chemicals so as to minimize costs and so on. Chemical and dye manufacturers played a crucial role in this regard.

Once the chemical suppliers were forced to stop manufacturing the banned chemicals and undertook manufacturing substitute chemicals, they also had an incentive to see that small tanners switch over to the substitutes. This was the case, because small tanners comprise a large percentage of their market in the leather industry. Thus, with assistance from chemical

manufacturers and suppliers and pressured by their customers, small tanners began to switch over to alternative chemicals.

The resulting cooperation between small tanners and chemical manufacturers needs to be seen in the context of their pre-existing relationship. Interviews with chemical manufacturers/suppliers and tanners suggested that the relationship between them and tanners is one of long-term collaboration that serves the interests of both. All chemical suppliers give tanners chemicals on credit and also give them technical assistance (Maitra, interview; Ashok, interview). As a matter of course, they make leather samples using different chemicals and chemical combinations and show it to tanners. The chemical company's representatives get in touch with them and give them guidance in how to apply the chemicals (Marimuttu, small tanner, interview). For instance, in 80-90% of the cases, BASF employees go to the tanners and get orders from their buyers (Maitra, interview). Since most tanneries in Tamil Nadu are located in clusters, it is easy for the representatives of these chemical companies to reach small tanners. If they are located in remote places, these tanneries call the chemical company. Representatives of the chemical companies are there in all regions and interact with tanners on a daily basis (Maitra, interview).

Switching over to PCP-free preservatives did not involve significant process changes. However, tanners are often not aware of the constituents of chemicals. In the case of PCP, many did not know through which chemicals PCP entered the production chain. For instance a particular chemical may not be a preservative but may contain PCP for preservation. For instance, fat liquor is not a preservative but may contain PCP for preservation. Thus, even though switching over to PCP did not involve process changes or innovation, it involved a

great deal of learning on the part of tanners. The chemical manufacturers provided this crucial assistance.

However, when tanners first started using the substitute dyes, they ran into two crucial problems (Maitra, interview). (a) First, dyes used previously gave better depth of color at lesser percentage compared to the substitute dyes. Hence, when they used substitute dyes in the same amount as the dyes used before, the substitute dyes did not give the same depth. Tanners had to use larger quantities of the substitute dyes in order to get the same depth as the banned dyes. Hence, even though the unit cost of the alternative dyes was not significantly higher, the total cost of using substitute dyes became higher because larger quantities had to be used. For many smaller tanners, this was a crucial problem because their buyers were not willing to give them higher prices.

The key factor that enabled small tanners to keep prices down and sustain using substitute dyes was the process of innovation that resulted from close cooperation between chemical and dye manufacturers and small tanners. In response to the problems that the tanners were facing, the chemical companies experimented with existing dyes and dyeing auxiliaries in many ways and introduced what one representative of a chemical company referred to as the “economic dyeing system” (Maitra, interview). This involved experimenting with different dyeing auxiliaries, before and/or after dyeing so as to get better results, or varying the quantity of different dyes and dyeing auxiliaries used.

The chemical companies also had an incentive to experiment with different chemical combinations and keep costs down. This was because in 1994, when the German ban on azo dyes was announced, only a few companies were producing azo free dyes. However, by 1999

many chemical firms were producing them so the price could not be increased. This increased competition for market share for the substitutes helped both the chemical companies and the small tanners.

(b) A secondly problem that small tanners faced with respect to the complying with the azo dye ban was that even after switching over, the tests were not entirely reliable and were giving contradictory results. This was due to problems with standardizing the testing procedure. For instance, PFI sometimes certified the same dye as negative and the next time as positive. The problems with controlling for azo dyes were that (i) that certain groups of amines that had not been banned may combine to form banned amine. So even if one of the banned amines was not being used in the manufacture of dyes, the dye could still test positive for one of the banned amines. (ii) Further, testing procedures took a long time to get standardized. Different testing facilities sometimes gave different test results. (iii) In addition, the process of testing itself created problems. For example, the testing process for azo dyes involves extracting dyes from the leather and then reducing it. If the reaction conditions are suitable, even during testing amines might combine in ways that result in the production of a banned amine. Hence, this process can also show a false positive.

The main factor that helped small tanners overcome this problem was that the German government introduced several amendments to the azo dye ban and changed the minimum permissible limit of the banned amines from 0mgs to 30mgs of each banned chemical.

4.2 Role played by Certificates

Even after small tanners started switching over to substitute chemicals, it was important for leather exporters to verify whether they had actually done so. Hence, they started randomly

selecting leather samples manufactured by their small firm suppliers and sending it to CLRI¹⁴ or PFI for testing. For example, one exporter owns a medium sized tannery and two shoe upper manufacturing units and obtains raw hides from Kerala and Karnataka. He claimed that he randomly selected samples to CLRI and PFI for testing and only after the samples have been cleared, he gets into full production (interview). Another leading exporter who gets semi-finished leather processed to finished leather in 2 feeder units, said that he tells the small tanners that he will randomly select leather samples and get them tested. This puts pressure on small firms to comply.

Since CLRI's main office is located in Chennai, getting leather samples tested and certified there is relatively quick. All tests are done in CLRI's lab in Chennai, and test results can be faxed to exporters within 5 working days (Dr. Ganga Radhakrishnan, interview). In contrast, it takes longer to get leather samples tested at PFI (Germany) because of its distance from Tamil Nadu. Both institutes test the leather samples and provide a certificate to confirm whether or not the tested samples complies with the German requirements.

The availability of testing and certification enabled leather exporters to reduce costs to getting the leather samples tested randomly. In the absence of certificates, the exporters would have to hire people to go to their supplier's tanneries and monitor the process of tanning to

¹⁴ CLRI was by no means the only institute providing this certificate. Exporters could also send leather samples for testing to PFI in Germany. However, test results from CLRI could be obtained more quickly because of its close proximity. In mid-1997, a Swiss Company known as *Societe Generale de Surveillance* (SGS) also started product certification of leather and leather articles (*Leathers*, April, 1997). According to exporters, sometimes German buyers insist on seeing SGS or CLRI before their consignments leave India (*ibid.*). However, my interviews suggest that tanners in Chennai had contradictory opinions about the quality of testing done at SGS. Several exporters in the Tamil Nadu leather cluster considered CLRI in India and PFI in Germany to be much more reliable. A UNIDO official pointed out that in India, CLRI

ensure that the small tanners were following the German regulations. These transaction costs can be considerable especially in cases where the suppliers are located in other regions of the country. At CLRI, the cost for a test for PCP is \$29. For azo dyes, it is \$ 46 /test for a CLE member and \$58 for a non-CLE member. Sometimes exporters even share these costs with small tanneries. One leading exporter claimed to do so because he wanted small firms to share certain responsibilities (Ahmed, interview). Thus, the ability of leather exporters to randomly get leather samples tested and certified, enabled them to avoid the need to directly monitor small firms while at the same time pressure them to switch over to substitute chemicals.

To summarize then, the Indian government took two specific actions that enabled widespread and sustained compliance by the small firm leather clusters in Tamil Nadu to German quality standards. (a) First, the Indian Ministry of Commerce, and the Ministry of Environment and Forests respectively passed blanket regulations on PCP and azo dyes at the national level. (b) Secondly CLRI, a central government research and development institute working at the regional level, upgraded itself to provide testing and verification services to the leather industry. The Indian government's regulations created a two-tier regulatory structure that cut-off production of the banned chemicals and inadvertently resulted in cooperation, learning and innovation. Innovations in the process of dyeing leather in turn enabled small tanners to cope with costs involved with switching over to substitute dyes and sustain compliance. Further, CLRI provided testing facilities and certificates that enabled Indian leather exporters to verify whether small tanners had actually switched over to substitute chemicals.

was more reliable and that there were lots of problems with SGS (Hannak, interview). However, Maitra at BASF pointed out that tanners accepted certificates from PFI, CLRI or SGS.

These intended and unintended consequences of government action together created the conditions for long-term compliance by the small firm leather clusters in Tamil Nadu.

The above discussion suggests that at least four factors contributed to widespread and long-term compliance. First, the two-tier regulatory structure that targeted both the polluting industry and the input suppliers. While pressure on the polluting industry (specifically exporters) drove them to seek government assistance, pressure on input suppliers (leather chemical and dye manufacturers) prohibited them from producing the banned chemicals and undertake (or expand) production of substitutes. Second, small tanners constitute a major chunk of the market for leather chemical and dye manufacturers because small-scale tanneries do the 90% of leather processing. This created incentives for leather chemical and dye manufacturers to cooperate with small tanners since it was in their interests to see that small tanners switched over to the substitutes that they were manufacturing.

Third, availability of technical assistance in close proximity was another crucial factor that enabled exporters to randomly select leather samples manufactured by small tanners and send them for testing to CLRI. This reduced monitoring costs and also worked in putting pressure on small tanners to switch over to substitutes or lose their customer. Finally, innovation that resulted from cooperation between input suppliers and small tanners kept the costs of switching over to substitute chemicals down. This was another factor that facilitated long term compliance. Although innovation in the process of dyeing leather was unexpected and surprising, it does elicit an important condition under which small-firm clusters might be able to sustain compliance.

5 Conclusion

The empirical literature on industrial districts has mostly focused on cooperation and collective action between firms organized as clusters. While some studies have pointed out how State mediation could have prevented collective failure in responding to crisis facing clusters (Schmitz, 1999), few studies have actually analyzed the important and at times surprising role that the State can play in creating the conditions for collective action. The implicit assumption is that clusters of firms can act endogenously. It is unclear what role the State plays or can play¹⁵ and under what conditions it may mediate in crisis facing industrial clusters and enabling collective action.

In this thesis, I have argued that the State can play a crucial role in creating the conditions for collective action. In particular, I have shown precisely what kind of government role can be important in enabling small firm clusters to comply successfully to external quality pressures and to sustain compliance. In the case of the small firm leather clusters of Tamil Nadu, the mechanism underlying central government intervention had two main elements, one deployed at the national and the other at the regional level.

While the German bans primarily affected the leather industry particularly exporters of leather products and finished leather, the Indian government targeted input suppliers, namely leather chemicals and dye manufacturers and prohibited them from manufacturing the banned chemicals. In other words, in order to reduce the threat of banned chemicals from entering the

¹⁵ One exception is Tendler and Amorim's (1996) discussion of demand driven assistance to small and medium enterprises. The authors show that small enterprise favoring procurement by government can reduce the costs of running government and can be done without running into problems typical of supply driven assistance.

production chain, the Indian government regulated an upstream industry instead of the one that was under scrutiny by foreign buyers. Given that small tanners constitute a large percentage of the market for leather chemicals and dyes, the Indian government regulations provided incentives to chemical and dye manufactures to cooperate with small tanners. One surprising outcome of this collaboration in the case of the azo dye ban was innovation in the use of chemicals to process leather that kept the costs of switching over to substitute chemicals down.

At the regional level, a central government research institute upgraded itself to provide quick access to testing and certification services to the industry. This enabled leather exporters to randomly test leather samples processed by small tanners and verify whether they had actually switched over to substitute chemicals.

In addition to the Indian government's regulatory actions in the aftermath of the German bans, two old central government policies surprisingly created pressures on "leading" exporters in ways that the problem for "leading" exporters in complying with the German bans became a collective action problem. That is, "leading" exporters could not successfully comply with the German bans unless the small tanners also complied with those bans. (a) The first of these two policies was the central government policy of reserving the "primary" phase of tanning to the small-scale sector. This made it necessary for "leading" exporters to look for a strategy of compliance that included small-scale "primary" tanners in the case of Germany's ban on PCP. This was because "leading" exporters are a heterogeneous group and several of them are dependent on small "primary" tanners for the supply of semi-finished leather. (b) Second, the licensing policy for "finishing" units similarly compelled "leading" exporters to include small-scale "finishing" units in their strategy of compliance to the German regulation

on azo-dyes. In different ways therefore these old central government policies unexpectedly created the conditions for collective action almost two decades later.

This study suggests several policy lessons. First, it shows that the regulatory history that is, the past policies of a State in regulating a sector can shape firm responses in the context of future crisis, in unexpected and often surprising ways. This issue has been neglected in the collective action literature. For policymakers, therefore, it is important to consider how old, often discredited policies may have beneficial effects at a later point in time. In making this argument, my suggestion is not that the Indian government should let the licensing policy for DGTD units continue in its present form. Rather, my suggestion is that we need to see whether old policies may have aspects that could be usefully reworked into current policy frameworks.

Secondly, my study shows that small firms can successfully cope with costs related to complying with environmental regulations, and that the State can play a vital role in creating the conditions for them to do so. A common assumption in the literature is that there is a trade-off between small firms meeting environmental regulations and remaining competitive, that is, incurring costs related to meeting environmental regulations may render small firms uncompetitive. Based on this assumption, regulatory agencies often neglect or exempt small firms from complying with environmental regulations. In addition, policy makers sometimes assume that small firms are dispersed and hence difficult to monitor. By contrast my study shows that even highly dispersed, traditional small-firm clusters can successfully meet strict environmental standards in a relatively short period of time and stay competitive. In the case of the Tamil Nadu leather clusters, the central government's action helped small firms to adjust in two ways. (i) First, its regulatory action encouraged further collaboration between small firms and input

manufacturers, thus indirectly providing small tanners with learning and information from the latter. This reveals the conditions under which input suppliers can become agents of development. (ii) Second, by collaboratively standardizing methods for testing micro-quantities of the banned chemicals and upgrading its regional offices, the Central Leather Research Institute was able to verify and certify (to Indian exporters) whether or not small firms were complying with the German regulations.

Thirdly, my study adds to the industrial districts literature by throwing light on the conditions under which central government ministries might chose to mediate. My study elicited three such conditions. First, (i) the State might mediate if there are preexisting political connections between government agencies and representative industry associations. For instance, the leadership structure of the Council for Leather Exports provided an important context for the exchange of information between government and industry. In addition it provided valuable access to central government ministries, not easily or automatically available to local industry associations. Second, (ii) the State might mediate in the context of external crisis if the sector affected by it is an important export sector, specifically in relation to the country that introduces environmental standards as Germany did in this case. In my case, the State mediated because leather exports are the 4th largest foreign exchange earner in India. Further Germany is India's leading market for leather exports with more than 22% of leather exports being sold to Germany. Third, (iii) the State might mediate if other important export sectors are also seriously effected by the same crisis. In my case, Indian textile exports, 38% of which are sold to Germany, were also affected by the German bans, especially the ban on azo dyes. For example, the

textile industry consumes almost 70% of dyes manufactured in India (Financial Express Investment Week, 1996).

Finally, my study adds to the literature on clustering and industrialization by highlighting the conditions under which small firm clusters can *sustain* compliance. My case underscores four such conditions. First, (i) use of a two-tier regulatory structure one targeting the polluting industry and the other targeting the polluters. In my case the German ban affected the polluting industry (leather exporters) while the Indian bans affected input suppliers (local leather chemical and dye manufacturers). While pressure on the former drove them to seek government assistance, pressure on input suppliers prohibited them from producing the banned chemicals and start manufacturing (and in some cases expand production of) substitutes. Second, (ii) the importance of the polluting industry to input suppliers in terms of market share is another important factor. The fact that small tanners constitute a major portion of the market for leather chemical and dye created incentives for leather chemical and dye manufacturers to cooperate with small tanners since it was in their interests to see that small tanners switched over to the substitute chemicals. Third, (iii) availability of technical assistance in close proximity can also contribute in sustaining compliance. In my study, access to CLRI's testing and certification facilities was crucial for leather exporters to be able to randomly select leather samples manufactured by small tanners, get them tested quickly and determine whether or not small tanners were complying. Fourth, process innovations can also play an important role in enabling small firm clusters to sustain compliance. In my case innovation in the use

of dyes though surprising and unexpected, enabled small tanners to keep costs of switching over to substitutes down, thus facilitating long-term compliance.

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Appendix

Table 1: Major Customers for Indian Leather and Leather Products (1996-1997) Fig. In Million US \$.

Country	Semi Finished Leather	Finished Leather	Leather Footwear	Footwear Components	Leather garments	Leather Manufacturing	Leather goods	Sports Goods	Total	% share of total
West Germany	0.21	23.88	53.18	46.10	120.62	18.57	58.14	1.79	322.50	22.2
USA	0.03	18.03	95.99	14.56	66.16	9.94	67.92	1.86	274.24	18.9
UK	0.15	11.58	58.22	38.85	39.10	5.21	24.08	5.37	182.55	12.6
Italy	0.64	50.59	7.43	45.63	47.93	7.50	1.81	3.00	164.75	11.4
France	0.15	12.64	7.46	4.69	27.71	6.61	5.60	0.52	65.38	4.5
Total of above	1.18 (40.2%)	116.95 (44.3%)	222.02 (75.9%)	149.84 (76.3%)	301.52 (79.8%)	47.83 (63.2%)	157.55 (70.7%)	12.54 (70.0%)	1009.41 (69.6%)	69.6
Other Countries	1.76 (59.8%)	147.10 (55.7%)	70.54 (24.1%)	46.61 (23.7%)	98.68 (20.2%)	27.86 (36.8%)	65.28 (29.3%)	5.38 (30.0%)	440.70 (30.4%)	30.4
Total Exports from India	2.94 (100%)	264.05 (100%)	292.55 (100%)	196.45 (100%)	377.69 (100%)	75.68 (100%)	222.82 (100%)	17.93 (100%)	1450.11 (100%)	100

Source: Monthly Statistics of the Foreign Trade of India. Vol. 1, Exports and Re-exports, March 1997.

Compiled by: Economics Research Division, CLRI. I have used Rs.40 = \$1 (US) as the conversion factor.

Table 2: India's Export Performance of Leather and Leather Products (1975-76 to 97-98). In Millions US

\$.

Year	Semi-Finished Leather	Finished Leather	Leather Footwear	Footwear components	Leather goods	Leather Garments	Leather Manufacturers	Sports Goods	Total
75-76	360	137.5	47.5	2.5	20	2.5	4.5	6	580
76-77	375	262.5	65	15	25	7.5	6.5	15.25	772.5
77-78	305	270	47.5	37.5	27.5	15	8.5	17.5	730
78-79	277.5	480	57.5	45	47.5	20	12	26.75	967.5
79-80	282.5	802.5	75	92.5	52.5	20	34.5	23	1382.5
80-81	127.5	567.5	85	112.5	62.5	12.5	34.5	25.5	1027.5
81-82	135	565	75	192.5	72.5	17.5	30	21.75	1110
82-83	115	525	72.5	217.5	65	25	41	24	1085
83-84	130	587.5	77.5	305	80	30	48.75	18.75	1277.5
84-85	162.5	902.5	112.5	437.5	122.5	55	61	16.5	1870
85-86	170	835	102.5	560	147.5	70	50.75	12.75	1947.5
86-87	147.5	1020	172.5	572.5	177.5	172.5	83.5	12.5	2357.5
87-88	140	1345	307.5	737.5	270	300	108.75	13.25	3222.5
88-89	75	1625	350	952.5	325	455	155.75	10.75	3950
89-90	40	1822.5	497.5	1097.5	487.5	902.5	233.25	17.5	5097.5
90-91	32.5	1997.5	757.5	1432.5	632.5	1392.5	294	24.25	6562.5
91-92	27.5	1792.5	1062.5	1750	977.5	1902.5	399.75	20.75	7932.5
92-93	-	2017.5	1387.5	1505	1387.5	2610	464	23.5	9395
93-94	-	1882.5	2007.5	1647.5	1485	2522.5	417.75	32	9995
94-95	-	3002.5	2500	1630	1857.5	3060	657.25	74.75	12782.5
95-96	-	3102.5	2757.5	2035	2532.5	3467.5	803.5	120.25	14820
96-97	-	2670	2925	1965	2227.5	3777.5	756.75	179.25	14500
97-98	-	2662.5	2655	2132.5	3445	3867.5	@	@	14762.5

Source: Monthly Statistics of the Foreign Trade of India-Volume I-Exports and Re-exports-March issues of 1976 to 1997. Published by DGIS, Calcutta. (Compiled by CLRI, Chennai). I have used a Rs.40 = \$1 (US) conversion factor for these numbers.

Table 3: Exports of Leather and Leather Products: Tamil Nadu .

Item	1992-1993	1993-1994	1994-1995	1995-1996	1996-1997
Percentage Shares					
Finished leather	40.51	31.99	37.93	34.05	29.65
Leather footwear	13.28	14.42	12.96	14.57	16.94
Footwear components	20.78	22.56	20.28	22.36	23.79
Leather garments	18.84	22.95	21.33	21.54	20.97
Leather goods	6.59	8.06	7.50	7.48	8.64
Total (US\$ million)	420.8	514	609.8	687.9	644.4
Tamil Nadu's Shares in India' Exports					
Finished leather	83.89	77.57	77.02	75.44	71.59
Leather footwear	47.01	46.29	33.33	35.21	35.87
Footwear components	49.09	58.36	63.72	75.69	76.88
Leather garments	33.63	43.95	42.86	42.83	35.89
Leather goods	14.68	23.06	19.96	16.03	22.94
Total	45.50	50.43	48.24	46.95	46.36

Source: Central Leather Research Institute

Table 4: Statistical Data of PCP Content in Leather Samples

Period	1990 Jun-Dec	1991 Jan-June	1991 July-Dec	1992 Jan-Dec	1993 Jan-May
No of Samples	310	483	169	745	232
% samples with more than 5 mg/kg of PCP	46	42	20	15	7

Source: Murlidharan et al. (1993)

Table 5: Trend analysis for azo dyes

Period	Azo dyes	
	Total number of tests conducted	Number of Samples that failed the test
Jan (1997)	67	4
Feb	46	5
March	92	11
April	75	4
May	57	8
June	40	7
July	45	7
Aug	31	4
Sept	44	7
Oct	47	3
Nov	40	1
Dec	17	0
Jan (1998)	14	0
Feb	26	4
March	34	2
April	28	1
May	35	0
June	39	5
July	28	4
Aug	91	4
Sept	78	4
Oct	92	5
Nov	113	2
December	129	1

Source: Central Leather Research Institute: Expertise Center for Eco-Testing

Figure 1: Schematic diagram of the supply chain of the leather industry.

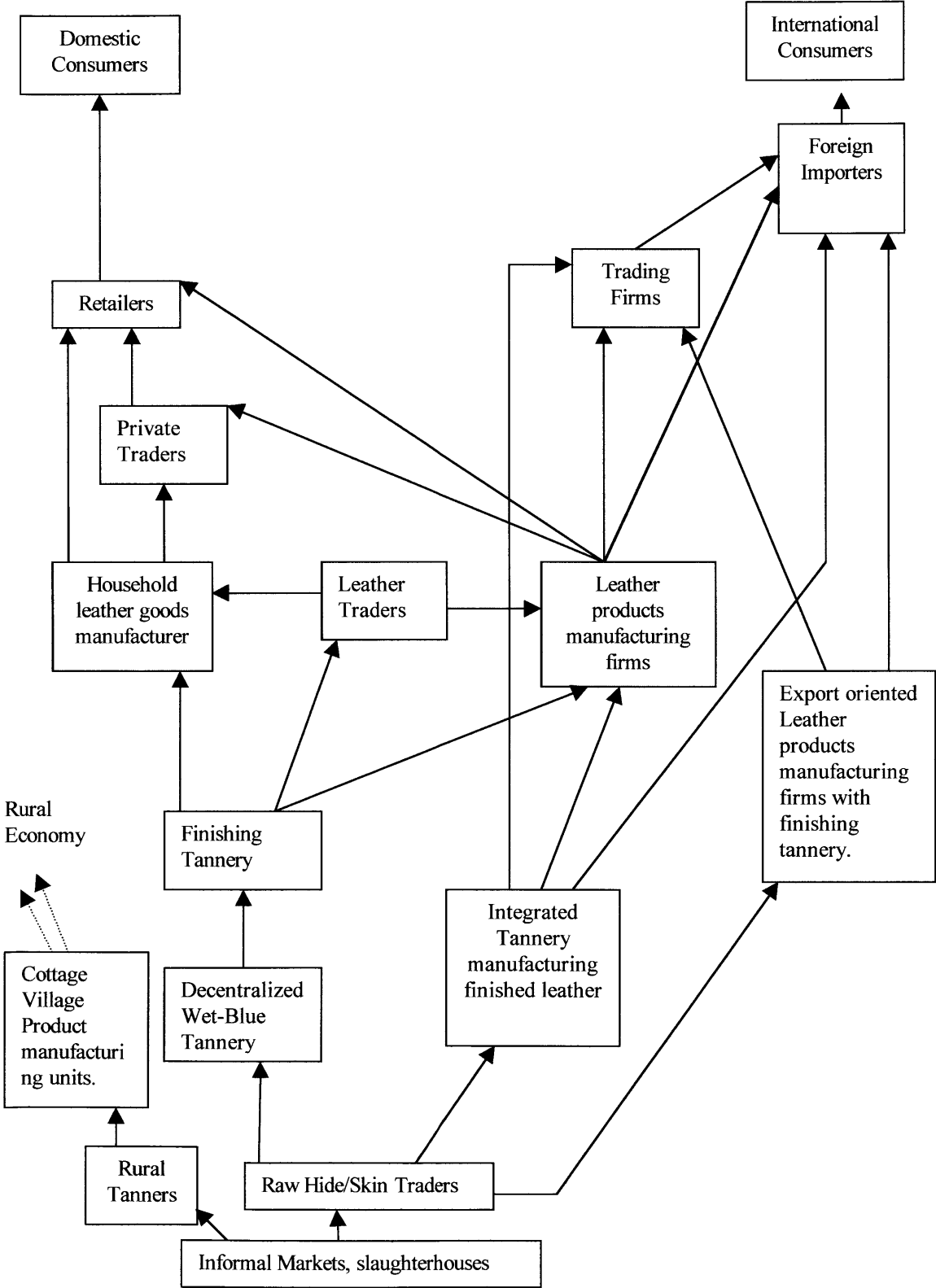


Figure 2: Different Stages of leather processing, from raw to finished.

