

1 Chapter 6 1  
2 Understanding Incentives for Clustered 2  
3 Firms to Control Pollution: 3  
4 The Case of the Jeans Laundries in Toritama, 4  
5 Pernambuco, Brazil 5  
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14 **6.1 Introduction**<sup>2</sup> 14  
15

16 There is a strong concern about how the public sector can enforce that small and 16  
17 medium enterprises (SME) located in clusters comply with the environmental 17  
18 standards, tax and labor legislation without hurting the firms' competitiveness. 18  
19 *On the one hand*, it is a well-known fact that small firms' owners in developing 19  
20 countries face constraints (low level of education, lack of capital, focus on short- 20  
21 term profits, low-priced products, etc.) that make it difficult for these firms to 21  
22 comply with the labor, environmental and tax legislation (Dasgupta, 2000). *On the* 22  
23 *other hand*, there are examples of firms located in clusters that once they upgraded 23  
24 and started to comply with the environmental, tax and labor legislation, became 24  
25 more and not less competitive (Tendler, 2002). However, it is still not clear under 25  
26 what circumstances the public sector can push SME to comply with labor, tax or 26  
27 environmental legislation without harming firms' survival and competitiveness. In 27  
28 this chapter, I want to address this question by focusing on a program of pollution 28

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1 control in a cluster located in the poorest region in Brazil, where for years informal 1  
2 firms flourished, local entrepreneurs did not cooperate and pollution was common. 2  
3 If we understand how this program succeeded under such adverse circumstances, 3  
4 we might draw some lessons to replicate this program elsewhere. This is the main 4  
5 challenge of this chapter. 5

6 There was a strong turn in the Brazilian government at the end of the 1990s 6  
7 toward promoting small and medium enterprises (SME) located in clusters<sup>3</sup>. 7  
8 In Brazil, policymakers, politicians and academics alike seem to believe that 8  
9 promoting small firms in clusters will necessarily trigger a developmental process 9  
10 with positive outcomes for poor regions and for local workers. But does any 10  
11 policy toward promoting small firms in clusters necessarily lead to economic, 11  
12 social and environmentally sound development? The answer is no. Sometimes, 12  
13 the way policymakers choose to promote SMEs might harm instead of helping 13  
14 these firms to develop in a sustainable way. This seems to be the case of garment 14  
15 firms in Sulanca<sup>4</sup> at the state of Pernambuco in Brazil, where for years the 15  
16 government avoided enforcing labor, environmental and tax legislation. Since no 16  
17 taxes were collected, the government did not feel obliged to improve the local 17  
18 infrastructure nor to adopt developmental policies targeted at improving local 18  
19 firms' competitiveness. This kind of unspoken agreement was labeled by Tendler 19  
20 (2002) as the devil's deal<sup>5</sup>; a deal whose major outcome was to endorse firms to 20  
21 stay at the informal level, where competition is based mostly on cutting wages and 21  
22 avoiding paying taxes. 22

23 The peculiar point about this deal is that even at the end of the 1990s, when 23  
24 the state government decided to have a more active role in promoting small and 24  
25 medium firms in Sulanca, policymakers seemed reluctant to enforce the labor, tax 25  
26 and environmental legislation, fearing to disrupt the economic dynamism of the 26  
27 garment sector. In other words, even when the state officials in Pernambuco had to 27  
28 recognize that there was some economic dynamism in Sulanca, they were inclined 28  
29 to see this economic growth as the unique result of competitive advantages of not 29  
30 paying taxes and not complying with the labor and environmental legislation. 30

31  
32 3 I will use the term cluster in this paper in a very broad way. I mean by cluster an 32  
33 agglomeration of firms where there is a significant number of small firms producing the 33  
34 same product and these firms are located close to each other. This broad definition is quite 34  
35 different from the one used in the literature based on the industrial districts in Italy, but it is 35  
36 the most appropriate one to capture the way this term is used by policymakers in Brazil. 36

37 4 Sulanca is a region in the Brazilian Northeastern State of Pernambuco, 150 km 37  
38 away from the capital of the state, where there is a cluster of garment firms formed by three 38  
39 cities: Toritama, Santa Cruz do Capibaribe and Caruarú. 39

40 5 According to Tendler, J. (2002), the devil's deal involves an unspoken agreement 40  
41 between politicians and small firms' owners. This deal works in the following way: "if 41  
42 you vote for me, I won't collect tax from you and I will not make you comply with tax, 42  
43 environmental and labor legislation. The interesting point about this tacit deal is that, in 43  
44 many cases, politicians and policymakers alike think that they are truly helping SME to 44  
45 survive. 45

1 This is also the common view among many economic development officials 1  
2 who work with SMEs in Brazil in lagging regions. They tend to believe that burden- 2  
3 relieving policies (tax exemptions, subsidized credit, etc.) are the right ones to 3  
4 promote SMEs that produce low-quality products in regions where cooperation is 4  
5 not common, and the local labor force lacks schooling and training. Therefore, the 5  
6 unspoken agreement of not enforcing tax, labor and environmental legislation in 6  
7 exchange for political support named by Tendler (2002) as the devil's deal might 7  
8 work under two quite different circumstances. In one case, it might reflect the 8  
9 absence of the state in supporting the economic development of a region and, in 9  
10 the other; it takes the form of a second-best strategy to promote SMEs in lagging 10  
11 regions. 11

12 In this last form, policymakers claim that it is better to have some local 12  
13 economic growth going on than having to face the local economic disruption that 13  
14 would result from trying to enforce tax, labor and environmental laws on firms that 14  
15 barely produce to survive. Since policymakers focus on the "burdens" (the costs 15  
16 of formalizing and observing tax, environmental and labor legislation) themselves 16  
17 as the source of the problem, they advocate reforms that grant special relief from 17  
18 these burdens to small firms in the form of exemptions from taxes, and from labor 18  
19 and environmental codes (see Tendler, 2002: 3). 19

20 Once we recognized that in many places policymakers see the devil's deal 20  
21 as a second best strategy to promote clusters, we need to understand why the 21  
22 government should have a more active role in supporting SMEs that sell to 22  
23 low-quality demand markets. Some entrepreneurs in poor regions or countries 23  
24 intentionally target low-quality markets and try to "innovate" in product and 24  
25 process to reach these markets, in which they perceive a strong opportunity to 25  
26 succeed. Under these circumstances, policymakers find it extremely hard to push 26  
27 these firms to innovate to sell to more high-quality demanding markets and it is 27  
28 not even clear if the government should push firms to move from one strategy 28  
29 (selling to low-quality demanding markets) to another (high-quality ones). But the 29  
30 case of garment firms in Sulanca is not that simple. In Sulanca, there is a problem 30  
31 of coordination similar to the prisoner's dilemma in the game theory<sup>6</sup>. Since the 31  
32 majority of local firms do not comply with tax, labor and environmental legislation 32  
33 and the economic policy is designed to support this strategy, informality becomes 33  
34 the most attractive option. The challenge for the government is to push firms to go 34  
35 from this bad equilibrium to the good one, where competition is based mostly on 35  
36 innovation; firms comply with tax, labor and environmental legislation and get in 36  
37 exchange a higher provision of public goods by the government. 37

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6 The prisoner's dilemma describes a situation where two prisoners are known to have  
committed a crime and each are held in separate cells to be interrogated. The "dilemma"  
faced by the prisoners here is that, whatever the other does, each is better off confessing  
than remaining silent. But the outcome obtained when both confess is worse for each than  
the outcome they would have obtained had both remained silent.

1 Once we understand the right mix of incentives that leads entrepreneurs to 1  
2 cooperate and compete based on innovation instead of cutting wages, we need 2  
3 to ask how the government can change the incentives to push entrepreneurs to 3  
4 go to this high-road path. What are the factors under the direct control of the 4  
5 government that might lead firms to invest on upgrading and innovation? What 5  
6 kind of incentives must the government adopt that makes formalization the most 6  
7 attractive option to SMEs? How can the government push firms to comply with the 7  
8 environmental legislation without harming small firms' survival? 8

9 In this chapter, I want to answer these questions based on the case of the 9  
10 laundries in Toritama, one of the municipalities at Sulanca, where there are 10  
11 2,000 small and medium firms producing jeans and 60 establishments that do the 11  
12 laundering for local jeans producers. The majority of these firms in Toritama are 12  
13 informal and for years the laundries avoided paying taxes, fringe benefits, and did 13  
14 not take any action to control water pollution, polluting the only local river in the 14  
15 city: the Capibaribe River. The pollution of the local river made it useless for local 15  
16 consumption. This situation has changed recently due to a set of economic and 16  
17 political factors. On the economic side, the soaring prices of water led the owner 17  
18 of the largest local laundry to seek for a technology to use recycled water to wash 18  
19 jeans. On the political side, the public sector got directly involved to push other 19  
20 laundries to do the same once a low-cost technology to control for water pollution 20  
21 was made available. In less than two years from 2003 to 2005, all the laundries in 21  
22 Toritama made investments to control water pollution, all of them turned to the 22  
23 formal sector and entrepreneurs started a business association. 23

24 How can we explain why the laundries, located in a place where informal firms 24  
25 flourish, local entrepreneurs hardly cooperate and pollution has been common, 25  
26 decided to invest in a new technology of pollution control? I claim that the answer 26  
27 to this question lies in three aspects: (a) the clear link between the benefits of 27  
28 upgrading (water recycling) and profits; (b) the development of a customized and 28  
29 less advanced technology that fits the need of small and medium laundries; and 29  
30 (c) the direct involvement of the government in enforcing the environmental law 30  
31 and actively helping firms to upgrade. All these factors together are important to 31  
32 explain why informal laundries in Toritama turn to the formal market, started to 32  
33 comply with both the environmental law and, partially, with the labor legislation. 33  
34 More striking, the new laundering technology adopted by firms in Toritama is 34  
35 quickly spreading to the other jeans cluster in the region (Caruarú). 35

36 In addition to this introduction, this chapter is divided into four sections. In 36  
37 the next section, I will show the pollution problem in Toritama and explain why 37  
38 the standard policies of pollution control would not work there. In the following 38  
39 section, I will focus on the history of the laundries in Toritama, trying to explain 39  
40 how these firms started to comply with the environmental law recently, stressing 40  
41 the three factors that made it possible for the laundries to upgrade. The fourth 41  
42 section explains the institutional cooperation within the public sector to foster the 42  
43 upgrading of the laundries. In the last section, I summarize the major conclusions 43  
44 of this chapter. 44

## 1 6.2 The Informal Sector, Pollution and Policy Options in Toritama 1

2  
 3 Toritama is a city in Sulanca, a region in the state of Pernambuco located 150 3  
 4 km away from the capital Recife, and is the major garment cluster in this state. 4  
 5 The name “Sulanca” is a combination of “Sul”, or South, where most of the cloth 5  
 6 came from, and “helanca”, which refers to the type of material (knitted cloth like 6  
 7 lycra) used the most in the 1970s. The name in the 1990s had come to symbolize 7  
 8 the cheap and low-quality product that dominated production at Santa Cruz do 8  
 9 Capibaribe, Toritama and Caruarú, the three cities where the majority of garment 9  
 10 production takes place. 10

11 Sulanca’s image as a place where someone can find cheap products continues 11  
 12 basically the same, but the stigma of “low-quality products” that has characterized 12  
 13 the garment firms in Sulanca for years started to change. Nowadays, it has become 13  
 14 common for middle-income consumers to travel from Recife to shop at Sulanca and, 14  
 15 especially, in Toritama, a city of 20 000 inhabitants where 2,000 firms accounted 15  
 16 for 15% of the jeans produced in Brazil in 2005 according to SEBRAE. 16

17 The last stage of producing jeans is the laundering phase, where the jeans 17  
 18 is washed using from 60 liters to 100 liters of water for each pants or jeans<sup>7</sup>, 18  
 19 detergents, fabric conditioners and chemical products to get different tones of 19  
 20 blue and colors. The daily consumption of water by a laundry in Toritama goes 20  
 21 from 50,000 to 400,000 liters depending on the size. The effluent pollution in 21  
 22 Toritama caused by laundries amounted to a biochemical oxygen demand (BOD) 22  
 23 of 600 milligrams per liter of water<sup>8</sup>, while the Brazilian environmental legislation 23  
 24 requires a BOD of only 50 milligrams per liter. 24

25 Local entrepreneurs and state officials estimate that one million (1,000,000) 25  
 26 pieces of jeanswear are washed each month in Toritama, which represents a joint 26  
 27 consumption of 80,000,000 liters of water (or 21.1 million gallons) per month for 27  
 28 all the 60 laundries in Toritama. Since the majority of the water used for laundering 28  
 29 is transported by water trucks, this is equivalent to nearly 7,000 water trucks<sup>9</sup> 29  
 30 per month loaded with water to wash jeans in Toritama. All this amount of water 30  
 31 used to be discharged directly into the only river in the city, the Capibaribe river, 31  
 32 without any previous treatment to clean the water from the chemical products used 32  
 33 during the laundering, which made the contaminated water dark blue. Some local 33  
 34 34

35 35  
 36 36

37 <sup>7</sup> All the technical information reported in this section comes from an interview with 37  
 38 Jefferson Silva, a chemical engineer from the Pernambuco Institute of Technology (ITEP). 38

39 <sup>8</sup> Biochemical oxygen demand (BOD) is the amount of oxygen required by aerobic 39  
 40 microorganisms to decompose the organic matter in a sample of water, such as that polluted 40  
 41 by sewage. It is used as a measure of the degree of water pollution. Also called *biological* 41  
 42 *oxygen demand*. 42

43 <sup>9</sup> A typical water truck’s capacity goes from 2,000 to 4,000 gallons of water. Taking 42  
 44 an average of 3,000 gallons per truck, 21 million gallons of water would fit into 7,000 water 43  
 44 trucks. 44

45

1 entrepreneurs used to say proudly that they were helping the flow of the river by 1  
2 releasing individually over 50,000 gallons of blue water daily into the river. 2

3 In addition to the pollution of the river, the laundries caused three other 3  
4 environmental problems. *First*, the chemical products used by the laundries were 4  
5 packaged in plastic packages, which used to be discarded directly in the streets. 5  
6 *Second*, the fuel used by laundries in Toritama to feed the furnace is wood. The use 6  
7 of burned wood to produce energy had two unwelcome environmental impacts: 7  
8 (a) the growing deforestation of the scarcely green fields near the city, and (b) the 8  
9 strong odor produced by the smoke released from laundries' chimneys. *Third*, the 9  
10 laundries did not have access to sanitary sewers and they did not have individual 10  
11 septic tanks, meaning that all the liquid and solid waste used to be discharged 11  
12 directly on the streets and into the river. *Finally*, the working conditions in the 12  
13 laundries were extremely poor and dangerous, especially for those workers 13  
14 operating the furnaces<sup>10</sup>. 14

15 The continuing pollution of the river in a region where shortage of water is 15  
16 the rule together with the strong odors emanated from the smoke released by the 16  
17 laundries' chimneys pushed the population to demand some action from the new 17  
18 public state attorney appointed to the city in 2001<sup>11</sup>. The new attorney at the city, 18  
19 however, felt powerless to solve this problem. On the one hand, the local population 19  
20 was demanding control on the pollution originated from the laundries. On the other 20  
21 hand, laundries' owners were reluctant to take any action to control the pollution 21  
22 because the technology to do that was expensive and also because they had been in 22  
23 the laundering business for over 10 years without having to control the undesirable 23  
24 pollution. The key dilemma faced by the local state attorney was how to enforce 24  
25 the law without disrupting the economic dynamism of the city. This is not a simple 25  
26 dilemma to solve and many cases reported in the literature shows many programs 26  
27 adopted worldwide to enforce environmental legislation that ended up producing 27  
28 thousand of unemployed workers (Dasgupta, 2000) or failed to produce lasting 28  
29 results (Blackman, 2000). 29

### 30 31 *6.2.1 Why Sanction and Coercion Would Not Work in Toritama* 31

32 33 There are many different approaches for governments to enforce firms to comply 33  
34 with the environmental standards (see Dasgupta, 2000). One approach is to impose 34  
35 35

36 \_\_\_\_\_ 36  
37 10 One of the most common problems has to do with the lack of equipment and 37  
38 training of those workers who operate the furnaces. This person is supposed to work 38  
39 wearing special clothes to protect from the heat and from the fire in case of explosion, but 39  
40 no one received special clothes or adequate safety training. 40

41 11 The current state attorney at Toritama, Sérgio Gadelha, told me that it is very 41  
42 common in the Northeastern Brazil countryside for the local population to seek the new 42  
43 attorney nominated to a city to update him about the major problems of that city. That is 43  
44 exactly what happened to him, when he was nominated to be the state public attorney in 44  
44 Toritama in 2001. 44

1 on the polluter the cost of pollution (the polluter-pays-principle) and push firms 1  
 2 to do a cost-benefit analysis. The industry decides to produce only if the benefits 2  
 3 of producing and controlling for pollution outweigh the cost. This approach uses 3  
 4 economic or *market-based instruments* to control the pollution<sup>12</sup>. 4

5 A second way to enforce the environmental law is the *sanction-based* 5  
 6 *approach* (or command-and-control approach). The government tries to enforce 6  
 7 the environmental regulation by compulsion and coercion, setting fines for those 7  
 8 firms that deviate from the environmental standards and issuing judicial orders to 8  
 9 close down polluting industries. This approach was used extensively together with 9  
 10 market-based instruments by developed countries in the 1970s. This approach 10  
 11 is also known as the technocratic approach, since it assumes that the lack of 11  
 12 compliance with the environmental legislation is solely a technical problem and 12  
 13 firms have the ability to do the required investments for pollution control if proper 13  
 14 coercion is set by the government. 14

15 The third approach to enforce the environmental law is named the *compliance-* 15  
 16 *based approach*. In this approach, the environmental agencies recognize that some 16  
 17 firms are not complying with the environmental legislation because the firms' 17  
 18 owners do not understand the legislation; they perceive environmental investment 18  
 19 as being unproductive, and the high-cost small and medium firms face to adopt 19  
 20 existing technologies of pollution control. In this approach, the public sector 20  
 21 adopts a proactive action of disseminating information about pollution controls 21  
 22 and working closely with the private sector to reduce pollution with the least social 22  
 23 and economic costs. 23

24 In general, in the last two decades, developed countries have increasingly 24  
 25 evolved from using solely the command-and-control approach to combine the three 25  
 26 approaches above. But many developing countries still rely on the sanction-based 26  
 27 approach and try to enforce the environmental legislation only by compulsion and 27  
 28 coercion. In general, the programs to control the pollution in these countries based 28  
 29 only on sanction and coercion have failed. 29

30 In 1996, for instance, the Delhi government and its Delhi Pollution Control 30  
 31 Committee adopted a wide program to control the pollution caused by firms of 31  
 32 different sizes and in different sectors in Delhi (see Dasgupta, 2000). The firms 32  
 33 were hit by a series of court orders requiring them to take three different measures: 33  
 34 (a) closure and relocation outside the national capital of those industries classified 34  
 35 as highly polluting; (b) relocation of nearly 90,000 firms from the places classified 35  
 36 as nonconforming areas; and (c) joint construction of Central Effluents Treatment 36  
 37 37

38 \_\_\_\_\_ 38  
 39 12 It is interesting to note that in a wide survey about the use of market-based 39  
 40 instruments (MBI) in pollution control programs in Latin America (LA), the authors 40  
 41 conclude that, on paper, LA countries had everything in place to use MBIs. But institutional 41  
 42 weaknesses (underfunding, inexperience, lack of political will, etc) limited the effective 42  
 43 implementation of MBIs in pollution control programs. In other words, the problem in LA 43  
 44 countries is not the lack of legislation but the lack of institutional capacity to enforce the 44  
 45 law. See Huber, R. M., J. Ruitenbeek, et al. (1998). 44  
 45

1 Plants (CETP) by those firms that produce waste water. The results of this 1  
 2 program were unpleasant: firms that relocated continued to use the same polluting 2  
 3 technologies in the new sites where they had chosen to locate; 1,328 factories 3  
 4 were closed and 125,000 workers lost their jobs; and only few CETPs were built. 4  
 5 According to Dasgupta (2000), this program took the view that pollution in Delhi 5  
 6 could be solved solely by sanction and coercion —the sanction-based approach. It 6  
 7 failed to understand that small firms have distinguishing characteristics (short-term 7  
 8 perspective, diversity of size and products, the use of cheap and not necessarily 8  
 9 the most efficient technology, low level of education among owners and workers, 9  
 10 etc.)<sup>13</sup> and constraints that need to be addressed in any program of pollution control. 10  
 11 The plan in Delhi ended up creating a social problem and failed to push firms to 11  
 12 adopt cleaner technologies. 12

13 In sum, there are many case studies that show that governments will not succeed 13  
 14 to control the pollution caused by small-scale industries if they try to do that 14  
 15 relying solely on enforcement and sanction; the command-and-control approach<sup>14</sup>. 15  
 16 Policymakers need to understand the constraints under which small firms operate 16  
 17 and try to address each of these constraints that might limit the adoption of green 17  
 18 technologies. Next, I show that the plan to control the pollution in Toritama is 18  
 19 succeeding precisely because the public sector is taking into account the constraints 19  
 20 small firms face to invest in “green technologies”. When confronted with the 20  
 21 problem of pollution, the public officials in Pernambuco felt co-responsible for 21  
 22 the problem and decided to work closely with local laundries’ owners to find a 22  
 23 common solution. In doing that, public officials designed a program that involves 23  
 24 both penalties and incentives; and adopted a participatory approach to control the 24  
 25 pollution. 25

26 26  
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### 28 **6.3 The Upgrading of Laundries in Toritama to Control Pollution** 28 29 29

30 The success of the public sector to push laundries in Toritama to comply with 30  
 31 the environmental law was possible through a process that blends together three 31  
 32 elements: (a) a clear link between upgrading and profits, once a private firm got 32  
 33 involved in searching for a technology to recycle water in laundering jeans; (b) the 33  
 34 public sector role in enforcing the law and helping firms to implement the changes 34  
 35 (stick-and-carrot policy); and (c) the development of a customized technology 35  
 36 that fits the need and constraints of the local firms, especially, small and medium 36  
 37 ones. 37

38 By December 2004, all the laundries in Toritama had signed and presented 38  
 39 to the state government a proposal to implement the process to control water 39  
 40 40

41 13 About the special characteristic of small firms in informal sectors see also Frijns, 41  
 42 J. and B. V. Vliet (1999). . 42

43 14 See Dasgupta, N. (1997), Scott, A. (1998); Frijns, J. and B. V. Vliet (1999); 43  
 44 Blackman, A. (2000); and Dasgupta, N. (2000). 44



1 pollution. The largest ten laundries were ahead of the schedule to implement the 1  
 2 process of pollution control. Every laundry had turned from the informal to the 2  
 3 formal market; each had started partially to comply with the labor legislation<sup>15</sup>, and 3  
 4 the entrepreneurs had started a business association to demand further action from 4  
 5 the local public sector in the provision of public goods in Toritama. In addition, in 5  
 6 exchange for entrepreneurs' efforts to comply with the environmental legislation, 6  
 7 the public state attorney mediated a proposal to improve the water system and to 7  
 8 build a sewer system in the city. 8

9

### 10 6.3.1 A Clear Link between Upgrading (Pollution Control) and Profits 10

11

12 Toritama is a place where firms prospered targeting low-quality demanding 12  
 13 markets. Informality was never a problem until recently, when successful firms 13  
 14 decided to target the high-quality market segment and the economic growth 14  
 15 attracted the undesirable attention of tax authorities. However, the major stimulus 15  
 16 for local laundries in Toritama to upgrade came at first not from the punitive action 16  
 17 of the government, but from the active search of a local entrepreneur for a low-cost 17  
 18 technology to recycle water. 18

19 Mr. Edilson Tavares, the owner of the largest local laundry (Mamute), did not 19  
 20 have any special interest in controlling water pollution. He was interested in an 20  
 21 economic solution to the high costs of water, the most important input in a laundry. 21  
 22 The water was not a problem in the past, since both the number of laundries and 22  
 23 the population were smaller; meaning that demand for water was not too high even 23  
 24 during droughts. However, the growth of Toritama (population and the number 24  
 25 of laundries) made the lack of water acute during the drought in 1999 and the 25  
 26 laundries' owners had to pay soaring prices to buy water transported by trucks 26  
 27 from nearby cities<sup>16</sup>. 27

28 Mr. Tavares was near bankruptcy and got involved with the Garment 28  
 29 Association in Recife (SINDIVEST), which was making a strong effort to recruit 29  
 30 new members in the "Pólo do Agreste" to the association. In one of the meetings 30  
 31 of the association in Recife, Mr. Tavares asked for help to develop a process to 31  
 32 recycle water in the laundering. At first, no one could help him, but the association 32  
 33 put him in contact with the German institution BFZ<sup>17</sup>, which was interested in 33

34

35

36 15 I mean by partially comply with the labor legislation the fact that at this stage, the 36  
 37 laundries were required to solve quickly only the problem regarding the safety condition 37  
 38 and the training of those workers who work directly managing the furnaces. The full 38  
 39 compliance with the labor legislation is still due. 39

40 16 Entrepreneurs estimate that the price of water increases by over 50% in 40  
 41 droughts. 41

42 17 BFZ – Training and Development Centers of the Bavarian Employers' Associations 42  
 43 – is a business association with 1,800 employees, which develops many projects through 43  
 44 partnerships in Central and Eastern Europe, China, India, Brazil, Mozambique and 44  
 45 Mexico. 45

1 developing an economic program in Northeast Brazil and had donated some funds 1  
2 to SINDIVEST. 2

3 The BFZ representatives brought a group of German researches to visit the 3  
4 laundry Mamute in Toritama with the challenge to develop a technology to control 4  
5 for water pollution and to recycle water using only local resources. The researches 5  
6 succeeded in developing technology, which was less advanced than the existing 6  
7 one, but 70% less expensive because it used only cheap materials easily available 7  
8 in Northeast Brazil countryside. 8

9 The BFZ officials agreed to make the technology available free of charge 9  
10 to Mamute if its owner invited all the other laundries' owners to show how the 10  
11 process of water treatment works once it was implemented. Mr. Tavares agreed to 11  
12 do that, but he did not convince his competitors at first of the benefits in adopting 12  
13 the new technology. In fact, Mr. Tavares was accused by his peers as the one 13  
14 responsible for attracting the undesirable interest of the public sector and the state 14  
15 public attorney to the problem of informality and unsafe working condition of 15  
16 the laundries, since the public attorney became interested in knowing this new 16  
17 technology of water recycling and water pollution control. 17

18 It is important to notice that Mr. Tavares through his firm, Mamute, was the 18  
19 pioneer in implementing the technology developed with the support of the German 19  
20 institution BFZ not because of his environmental concern, but rather because he 20  
21 saw a clear link between the adoption of the new technology and higher profits. 21  
22 The water pollution control was a positive side effect in the search for a technology 22  
23 to decrease costs by recycling water. 23

24 The active search by private firms for technology to drive down costs is, however, 24  
25 a legitimate source of innovation and upgrading. Rodrick (2004), for instance, 25  
26 claims that in third world countries innovation is undercut not because the lack of 26  
27 trained scientists and engineers, but instead by lack of demand from its potential 27  
28 users in the real economy—the entrepreneurs. And the demand for innovation is 28  
29 low because entrepreneurs perceive new activities or new technologies to be of low 29  
30 profitability. The point of Rodrick (2004) is that if let by themselves, entrepreneurs 30  
31 will under-invest in the search for new technologies and new activities since they 31  
32 bear the full cost of their failure and have to share with others the benefits of one's 32  
33 discovery. It is based on this view that Rodrick (2004) states that “the industrial 33  
34 policy of the 21<sup>st</sup> century” should involve a public-private collaboration in this 34  
35 random self-discovery of new technologies and new profitable activities. 35

36 The active search by a private firm for a new technology to recycle water 36  
37 together with the support from BFZ to develop this technology fits into this process 37  
38 of self-discovery that blends together the private and public sector. I turn next to 38  
39 the role of the public sector in pushing the spillover of the new technology and the 39  
40 enforcement of the law. 40

41 41

42 42

43 43

44 44

1 6.3.2 *The Direct Involvement of the Public Sector in Enforcing The* 1  
2 *Environmental Law and Helping Firms to Upgrade* 2

3 3  
4 A new public attorney was nominated to Toritama in 2001. Mr. Sérgio Gadelha de 4  
5 Souto was a young male in his 30s who was strong influenced by the education 5  
6 he received from the state attorney's office ("Ministério Público Estadual") about 6  
7 the importance of the environmental law for sustainable development. The state 7  
8 attorney's office in Recife, the capital of Pernambuco, has a special department 8  
9 responsible for educating attorneys about environmental issues, although the 9  
10 attorney has to work with many different subjects once he is designated to work 10  
11 in a city in the countryside. When Mr. Gadelha arrived in Toritama, he was 11  
12 shocked by the lack of compliance of local firms with the labor legislation and the 12  
13 environmental law. 13

14 At the same time, the state agency for environment and water resources 14  
15 (CPRH) had received a complaint about the pollution in Toritama and had sent a 15  
16 team to the city to investigate its extent. The CPRH staff did not know the number 16  
17 of laundries, neither the amount of water used by these firms in Toritama. The staff 17  
18 of CPRH had heard about the cluster of small and medium garment firms in that 18  
19 region, but never had they thought that a cluster of small and medium firms could 19  
20 be the source of a serious environmental problem. Therefore, at the same time that 20  
21 the new state attorney arrived in the city and got involved with the pollution issue 21  
22 caused by the laundries, CPRH had started an investigation to assess the extent of 22  
23 the situation in Toritama. 23

24 At the beginning, the new state attorney felt powerless to enforce the 24  
25 environmental law since he thought that small and medium firms could not comply 25  
26 with the legislation under the current technology. In fact, the public attorney 26  
27 together with CPRH considered relocating all the laundries away from residential 27  
28 areas to a specific industrial site to be settled by the city council, where a common 28  
29 effluent treatment plant would be built. However, the case of one local laundry 29  
30 (Mamute) that had implemented a process to recycle water changed the attorney's 30  
31 perception about the cost of adopting cleaner technologies instead of relocating. 31

32 Once the attorney came to know the low-cost technology implemented by 32  
33 Mamute and that the technology could be easily customized to small and medium 33  
34 laundries, he started together with CPRH and other institutions in Toritama 34  
35 (especially SEBRAE and SINDIVEST) an educational program to convince local 35  
36 laundries to control water pollution. Once their efforts proved to be useless, they 36  
37 decided to work together to enforce the environmental law as a means to start a 37  
38 dialogue with the laundries' owners. 38

39 In August 2003, with the back up of the local state attorney, CPRH promoted a 39  
40 wide operation to check whether laundries were complying with the environmental 40  
41 legislation. In just one day, 10 out of 60 laundries were closed and the laundries' 41  
42 owners opened a dialogue with CPRH and the public attorney to build a plan to 42  
43 comply gradually with the environmental law. The objective of both the attorney 43  
44 and CPRH with the inspections and the temporary closure of some laundries was 44

45

1 not to order the laundries to install pollution abatement equipment in a short period 1  
2 or face closure. Their objective was to start a dialogue with entrepreneurs in order 2  
3 to debate the gravity of the pollution in the city and to find out how the public 3  
4 sector could help the firms' owners to make investments to control the pollution. 4  
5 In other words, the sanction strategy was used as a means to start a dialogue with 5  
6 the private sector to build together a common plan of pollution control. 6

7 The public attorney and the staff of CPRH signed together with each laundry's 7  
8 owner a plan named "Termo de Ajustamento de Conduta" (TAC) in which the 8  
9 firm's owner recognized that his firm was not complying with the environmental 9  
10 law and he would start to adopt the necessary steps to control for the emission of 10  
11 gases, to manage the solid waste, to build the septic tanks and to clean the water 11  
12 before discharged it into the river. When firms' owners signed this statement of 12  
13 confession and purpose, they received temporary permission to operate with from 13  
14 8 (medium and large laundries) to 12 months (small laundries) to implement the 14  
15 water pollution control, and they agreed to send a report in every three months to 15  
16 CPRH, showing the progress in implementing the investments required to control 16  
17 the pollution. If a firm fails to meet the schedule it had presented to the state, its 17  
18 temporary permission to operate will be canceled and the firm closed. 18

19 The state government and the public attorney also acted together to market the 19  
20 new plan signed with laundries' owners and to attract private firms to Toritama 20  
21 to sell the necessary equipment for the laundries to do the investments. The state 21  
22 attorney, CPRH, the Brazilian Office to Support Small and Micro Enterprises 22  
23 (SEBRAE) and other local institutions also organized many workshops with banks 23  
24 to show to entrepreneurs in Toritama the requirements to apply for investment 24  
25 capital. In addition, the local state attorney negotiated directly with laundries' 25  
26 suppliers of chemical products for them to collect back the plastic packaging of the 26  
27 chemicals used by the laundries. In doing that, the public sector helped the local 27  
28 laundries to control for the solid waste pollution with no extra cost to these firms. 28

29 However, the most important and the most difficult part of complying with the 29  
30 environmental law, the treatment of the water, was solved quickly by private firms 30  
31 and public agencies that acted quickly to replicate the technology developed by 31  
32 BFZ to sell to laundries in Toritama. Once BFZ-associated researchers developed 32  
33 and implemented the project with Mamute, SINDIVEST invited workers from 33  
34 the Pernambucan Institute of Technology (ITEP)<sup>18</sup> to go to Toritama to study the 34  
35 process installed at Mamute. ITEP's workers moved fast to learn the technology 35  
36 developed by the German researchers and they built a program with SEBRAE to 36  
37 promote the diffusion of the new technology among small and medium laundries 37  
38 in Toritama, once the state made clear that all the laundries would have to comply 38  
39 with the environmental legislation. 39

40 The cooperation between ITEP and SEBRAE led these institutions to 40  
41 implement SEBRAETEC in Toritama, which is a program of SEBRAE to subsidize 41

42 \_\_\_\_\_ 42  
43 18 ITEP is a quasi-public agency linked to the state government. Its revenue comes 43  
44 from selling many different services to the private sector. See <http://www.itep.br>. 44

1 innovation by small firms. However, instead of subsidizing individual firms, any 1  
2 firm interested in getting subsidies to have a customized project to install the tanks 2  
3 to control water pollution and to recycle water had to join at least three other firms, 3  
4 despite the fact that the projects for each firm would be individual and tailored to 4  
5 the needs of each one. 5

6 In September 2004, one year after the operation carried out by CPRH to 6  
7 inspect firms' compliance with the environmental law, 50 laundries out of 60 in 7  
8 Toritama had signed and presented to the government the action plan to comply 8  
9 with the environmental standards<sup>19</sup>. By December 2004, all the firms had installed 9  
10 gas filters in laundries' chimneys to control for the emission of gases; ten laundries 10  
11 were ahead of schedule in controlling water pollution,. Chemical suppliers had 11  
12 started to collect and recycle the plastic packages and every laundry had adopted 12  
13 safety procedures for those workers responsible for operating the laundries' 13  
14 furnace and these workers had been adequately trained and certified to perform 14  
15 this task. In sum, the plan to comply with the environmental law was moving 15  
16 ahead as expected. 16

17 One important point about the role of the public sector in enforcing the law is 17  
18 the key role the local state attorney in Toritama had in building the cooperation 18  
19 between the public and private actors. Based on this fact, someone might ask 19  
20 whether the firms' compliance with the environmental law was the unique result of 20  
21 a brilliant young attorney's accomplishment. If this was the case, the upgrading of 21  
22 laundries in Toritama for pollution control would be less interesting than otherwise 22  
23 since it would result from personal characteristics of a young attorney who had a 23  
24 special interest in environmental issues. *But this was not the case.* 24

25 *First*, the attorney was aware of the importance to protect the environment 25  
26 because he received specific training on this subject in the "Ministério Público" 26  
27 and he was also demanded by both local population and his supervisor to pursue 27  
28 continuous action on this subject. *Second*, the local attorney in Toritama was 28  
29 acting together with CPRH and he was strong influenced by this state agency 29  
30 to push firms to control the pollution. CPRH had a key role at the beginning to 30  
31 convince the attorney about the problem of the pollution caused by the laundries 31  
32 and this public agency became responsible to check whether firms were meeting 32  
33 the schedule they had agreed to follow to install the equipments to control the 33  
34 pollution. 34

35 Last, one important point to understand is why CPRH and the state attorney's 35  
36 office decided to cooperate to push laundries to comply with the environmental 36  
37 law only recently and not before. In the case of CPRH, as I have showed above, 37  
38 this state institution did not know of the existence of the laundries and the pollution 38  
39 problem in Toritama. Only after CPRH received a formal complaint about the 39  
40 pollution in Toritama in 2000, did this institution started to evaluate the extent of 40  
41 the problem there. It seems strange that a state agency responsible for supervising 41

42 \_\_\_\_\_ 42  
43 <sup>19</sup> The deadline for all laundries to comply fully with the environmental law goes 43  
44 from July to September, 2005. 44  
45 45

1 firms' compliance with environmental legislation did not know a famous cluster 1  
 2 of garment firms well known in Northeast Brazil. But this lack of knowledge was 2  
 3 common among policymakers in the state of Pernambuco, where for years the 3  
 4 state government denied any direct support to firms in Sulanca, believing that 4  
 5 those firms could not compete with low-priced Chinese products neither could 5  
 6 they upgrade. 6

7 On the part of the state attorney's office, the former local state attorney did 7  
 8 not take any action to enforce the environmental law because he was not aware 8  
 9 of the extent of the pollution, since CPRH only conducted a wide survey in 2002 9  
 10 to measure the pollution in Toritama. Only after CPRH got involved with the 10  
 11 pollution problem in Toritama did the state attorney's office in Recife start to 11  
 12 look carefully at this problem, instructing the local attorney in Toritama to act to 12  
 13 solve this problem. Therefore, the action to control the pollution in Toritama did 13  
 14 not happen before because there was no formal evaluation on the extent of the 14  
 15 pollution and no pressure over the local state attorney to focus on this problem 15  
 16 rather than on the others in that city<sup>20</sup>. 16

17 In sum, the diffusion of the technology to recycle and to clean the water used 17  
 18 by laundries was made possible by the institutional cooperation between public 18  
 19 (state attorney's office, CPRH, the state secretary of science, technology and 19  
 20 environment—SECTMA, etc.) and nonpublic (SEBRAE, BFZ, SINDIVEST, etc.) 20  
 21 agencies, and the cooperation among these institutions and private entrepreneurs. 21  
 22 The state attorney's office acted together with CPRH to enforce the environmental 22  
 23 law; these agencies had a double role in enforcing the law and in tutoring local 23  
 24 laundries' owners on how to meet the environmental standards. 24

25

### 26 6.3.3 *The Development of a Customized Technology* 26

27

28 One point that we need to have in mind is that the technology to control for water 28  
 29 pollution already existed in other places in Brazil. However, this technology did 29  
 30 not fit the specific need of the laundries in Toritama for the following two reasons: 30  
 31 (i) the laundries in Toritama are located far away from each other, that made it 31  
 32 impossible to build a unique physical structure to control the joint pollution; and 32  
 33 (ii) the technology available to control for water pollution adopted by the laundries 33  
 34 in South and Southeast Brazil was too expensive for the small and medium 34  
 35 laundries in Toritama<sup>21</sup>. 35

36

37

38 20 Another fact that could have triggered the public officials' concern over the 38  
 39 pollution problem in Toritama was the increasing media attention this cluster was getting 39  
 40 at the beginning of the 2000s. For instance, a high ranked state official in Pernambuco told 40  
 41 me that the governor of the state only came to know of the problem in Toritama when he 41  
 42 saw a report about the garment cluster in this city on the news in one of the major Brazilian 42  
 TV networks.

43 21 According to Jefferson Silva from ITEP, the most common methods of purifying 43  
 44 water used by laundries in Brazil are the following three: activated sludge process, the use 44

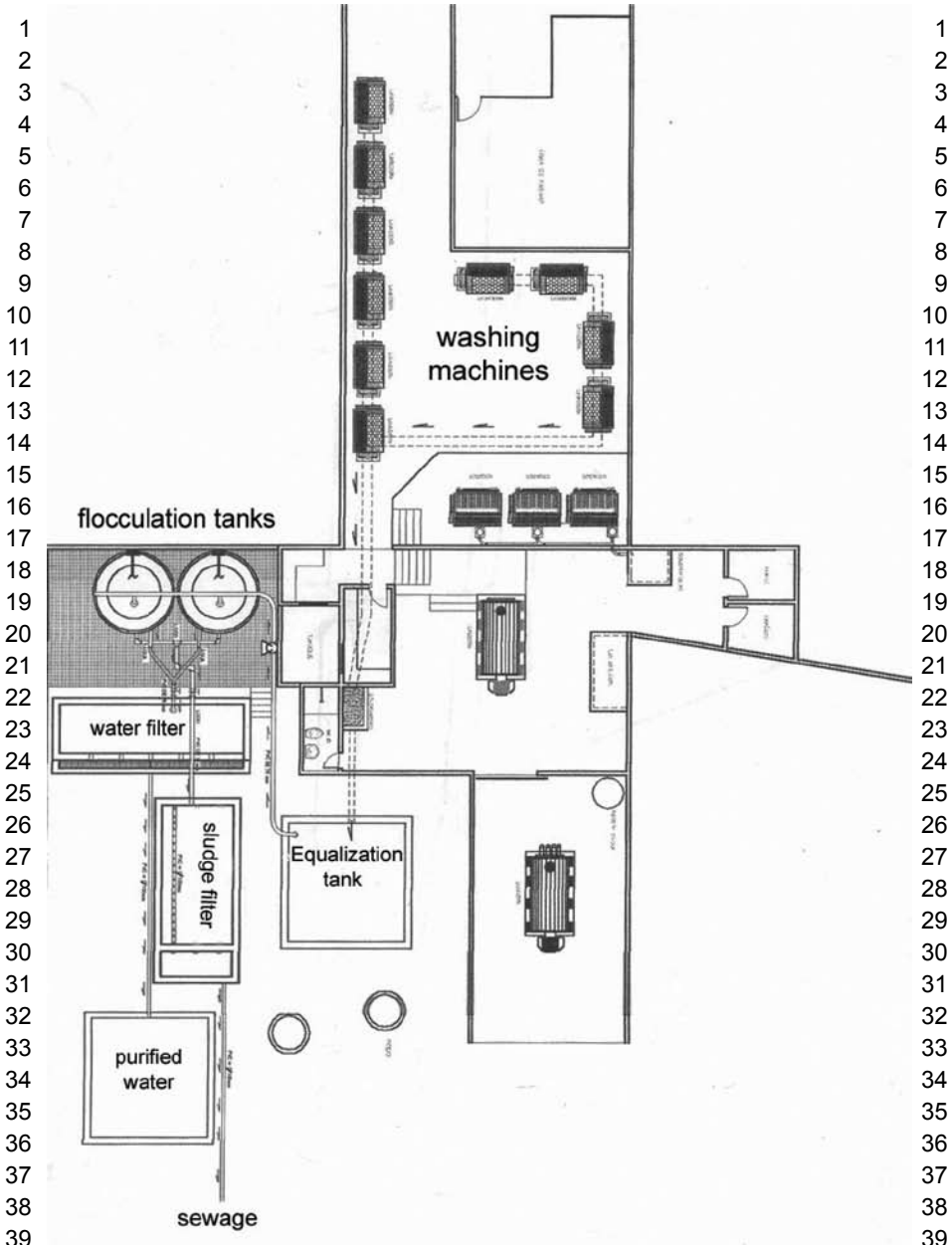
1 Therefore, the problem was not the absence of a technology to control the 1  
2 water pollution but the absence of a cost-effective technology to control the 2  
3 water pollution caused by small and medium laundries located next to residential 3  
4 houses. This was the challenge presented by the owner of the laundry Mamute to 4  
5 the German researchers financed by the German institution BFZ. 5

6 The technology developed (adapted) at first by the German researchers and 6  
7 subsequently by ITEP is quite simple (see Figure 6.1). It consists of building three 7  
8 tanks to purify the water. The first tank, the *equalization tank*, receives all the 8  
9 water discharged from the laundering. The second tank, named *flocculation tank*, 9  
10 is made of either brick or fiberglass; this is the tank where the chemical process of 10  
11 water purification occurs. This tank is filled with aluminum sulfate and the water is 11  
12 agitated by a small motor to provoke the process of flocculation (the formation of 12  
13 large aggregated particles or flocs) and gravity sedimentation, in which flocs settle 13  
14 toward the bottom of the tank and the clean water stays in the upper portion of the 14  
15 tank. Once the wastewater is divided into clean water and sludge, the clean water 15  
16 pass through a filter made of brick, sand and stone, and it is ready to be discharged 16  
17 or recycled in the laundering process. The “dirty water” (the sludge) pass through 17  
18 a sludge filter and, then, it is discharged into the sewage system. 18

19 This simple technology developed by BFZ, ITEP and private firms to the 19  
20 laundries in Toritama was successful because it is cheap and can be completely 20  
21 customized to the size of each laundry. For instance, the number and the size of 21  
22 flocculation tanks to be built depend on the size of the laundry and the amount of 22  
23 water to be cleaned. If the laundry is too small, it needs to build only one small tank 23  
24 and install the filters. Second, if a laundry is medium and needs two flocculation 24  
25 tanks but lacks physical space, the tanks might be arranged either horizontally or 25  
26 vertically. Third, instead of buying pre-made fiberglass tanks, the tanks and filters 26  
27 can be made using cheap local materials (sand, bricks and stone) and the local 27  
28 labor force. In fact, the labor force is one of the most important inputs to install the 28  
29 process of water pollution control. However, since in Northeast Brazil the labor 29  
30 costs are the lowest in the country, the overall cost of the project turns out to be 30  
31 low. 31

32 The development of a new technology customized to small and medium 32  
33 firms in Toritama departs from the common sense of linking innovation with the 33  
34 development of a breakthrough technology. This is a case of developing a quite 34  
35 simple technology less advanced than the existing one, but a technology that fits 35  
36 the need of small and medium firms. In fact, the water cleaning process adopted 36  
37 by firms in Toritama is not as effective as the most advanced technology to clean 37  
38

39  
40 of hydrogen peroxide, and the production of ozone through an electrical discharge. The 39  
41 *activated sludge process* requires large tanks and a long time to clean the water (5 m<sup>3</sup> of 40  
41 water requires 12 hours). The *hydrogen peroxide* is also used in water purification, but the 41  
42 cost (US\$ 0.37 for m<sup>3</sup> of water cleaned) of this chemical substance is highly prohibitive for 42  
43 small and medium laundries. At last, the process of *cleaning water with ozone* requires a 43  
44 setup investment of US\$ 250,000 and a high consumption of energy in the process. 44  
45



41 **Figure 6.1** The plant of a laundry with the system to clean the water

42  
43  
44

41  
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43  
44



1 water used by the laundries in South Brazil (activated sludge process, hydrogen 1  
 2 peroxide, and producing ozone through electrical discharge). But this less advanced 2  
 3 technology at low cost proved more successful than the others to reach small, 3  
 4 medium and even large laundries in Toritama. In addition, the enforcement of the 4  
 5 law by the public sector opened the market for private and public firms (ITEP) to 5  
 6 step in and develop variant technologies similar to the one developed by BFZ to 6  
 7 be sold to laundries at Toritama<sup>22</sup>. 7

8 One might ask why local entrepreneurs have not searched for a low-cost 8  
 9 technology to recycle water before, since the lack of adequate supplying of water 9  
 10 is an old problem in Toritama. However, as I showed above, the shortage of water 10  
 11 was a problem that became acute at the end of the 1990s, when the production of 11  
 12 jeans increased at the same time that a long drought happened. The high prices 12  
 13 of water led the owner of the largest local laundry to seek for a technology to 13  
 14 recycle water, which had the positive side effect of controlling water pollution and 14  
 15 becoming the benchmark for other firms and also for the public sector. 15

16 In sum, the process of upgrading was triggered by the self-interest of a private 16  
 17 entrepreneur and the development of a low-cost technology. It is uncertain whether 17  
 18 the public sector would have succeeded to enforce the environmental law, had not 18  
 19 the private sector participated in this process of self-discovering to find a low-cost 19  
 20 technology to recycle water. In addition, despite the economic benefits of cleaning 20  
 21 the water to recycle, the role of public sector in enforcing the environmental law 21  
 22 was vital to diffuse the technology adopted by the pioneer firm. 22

23

24

#### 25 **6.4 Institutional Cooperation and Upgrading** 25

26

27 I have showed above that the state attorney's office together with the state 27  
 28 environmental agency (CPRH) succeeded in pushing small, medium and large 28  
 29 laundries in Toritama to make investments for pollution control. We identified 29  
 30 three key characteristics that explain the success of this program: a) a clear link 30  
 31 between upgrading and profits, once a private firm got involved in searching for 31  
 32 a technology to recycle water in laundering jeans; (b) the public sector role in 32  
 33 enforcing the law and helping firms to implement the changes (stick-and-carrot 33  
 34 policy); and (c) the development of a customized technology that fits the need and 34  
 35 constraints of the small, medium and large firms. 35

36

37

38 <sup>22</sup> This case of developing a customized technology at low cost is similar to many 38  
 39 cases of innovation reported by Prahalad (2005). In one of these cases, Prahalad describes 39  
 40 the development of a prosthetic foot and lower limb prosthetics in India, the Jaipur Foot, 40  
 41 using only local resources at low cost. The emphasis to innovate was placed on the cost of 41  
 42 the materials used to build a low cost prosthetic that would fit the need of rural workers in 42  
 43 India. Similar to the case of developing a low-cost process to control for water pollution 43  
 44 in Toritama, in both cases, the development of this customized innovation at low cost was 44  
 45 crucial to its success and diffusion. 45

1 In this section, I will develop further how the cooperation between public and 1  
 2 nonpublic institutions evolved and the key role this institutional cooperation had 2  
 3 in implementing the program of pollution control in Toritama. One reason behind 3  
 4 the success of this public policy is linked to the fact that the institutions involved 4  
 5 in this program went well beyond their formal duties to help local entrepreneurs to 5  
 6 comply with the law. Instead of relying only on enforcing the law, the institutions 6  
 7 in Toritama intensively helped local firms to implement the technology to control 7  
 8 for effluent pollution, negotiated directly with chemical firms to collect back the 8  
 9 empty chemical packages from the laundries, and actively supported firms' owners 9  
 10 to organize and also to negotiate with high rank officials in the government<sup>23</sup>. 10

11 In 2000, CPRH received a complaint about the pollution problem caused by the 11  
 12 laundries in Toritama. The CPRH's staff decided to visit Toritama and check the 12  
 13 extent of the problem. Before 2000, CPRH had never monitored the pollution in 13  
 14 Toritama because they did not know about the existence of the laundries there and 14  
 15 the huge volume of jeans produced in that city by small and medium firms. The 15  
 16 CPRH's staff got shocked when they arrived in Toritama and saw the extent of the 16  
 17 pollution, especially, the contaminated water the laundries were discharging direct 17  
 18 at the Capibaribe River. The workers of this environmental agency never thought 18  
 19 that a cluster of small and medium garment firms could cause an environmental 19  
 20 problem that they expected to find only in the metropolitan region of Recife, where 20  
 21 large firms from different industrial sectors are located. 21

22 The director of CPRH, Geraldo Miranda, then decided to meet different actors 22  
 23 to try to elaborate a plan to push the laundries to control the pollution. At first, he 23  
 24 met with the mayor in Toritama and some local politicians. Both were reluctant 24  
 25 to take any action since they believed that laundries' owners could not comply 25  
 26 with the law. Then Mr. Miranda met with the representatives of SINDIVEST, 26  
 27 who were aware of the problem but felt powerless to take any direct action since 27  
 28 SINDIVEST was just beginning a slow process of inviting garment producers in 28  
 29 Toritama to join the association in the capital, Recife. At last, Mr. Miranda decided 29  
 30 to meet with the state attorney in Recife and see whether the state attorney's office 30  
 31 could help CPRH in designing a plan of pollution control in Toritama. As I have 31  
 32 showed, the state attorney started a close cooperation with CPRH that resulted in 32  
 33 the program explained in this chapter. 33

34  
 35  
 36 <sup>23</sup> The proactive role of civil servants from the state agency responsible for pollution 36  
 37 control was also essential to implement a successful program to control for industrial 37  
 38 pollution in Cubatão, a city in São Paulo known in the 1980s as the "valley of death" 38  
 39 because of the high levels of air, water and soil pollution. Lemos (1998) shows that the 39  
 40 alliance between progressive technocrats from the state environmental protection agency 40  
 41 (Cetesb) and popular movements in Cubatão was key to building a coalition to support 41  
 42 the program to control the pollution in that city. See Lemos, M. C. M. (1998).. Tandler 42  
 43 and Freedheim (1994) also identifies the direct involvement of public healthy agents in 43  
 44 performing tasks well beyond their formal duties as being a key factor behind the success of 43  
 44 a preventive healthy program implemented in the Brazilian Northeastern state Ceará. 44

1 The director of CPRH decided to meet with the state attorney's office to begin 1  
2 a cooperation to solve the problem in Toritama because these institutions had 2  
3 already a history of working together that had started at the beginning of the 2000s 3  
4 when one of the directors of CPRH, Geraldo Miranda, was working in the city 4  
5 council in Recife and got involved in a program to control the pollution in garbage 5  
6 dumps. The pollution of garbage dumps in Recife is a well known environmental 6  
7 problem and also a social one since many poor families and children used to work 7  
8 collecting objects in these dumps. During the implementation of the program to 8  
9 set treatment plants in garbage dumps, Mr. Miranda came to know the branch of 9  
10 the state attorney's office responsible for enforcing the environmental law. Once 10  
11 Mr. Miranda moved from the city to the state government as a director at CPRH, 11  
12 he continued the program to control the pollution in the garbage dumps at the state 12  
13 level. In expanding this program, CPRH worked together with the state attorney's 13  
14 office to control the impetus of young state attorneys who were overreacting to 14  
15 the environmental problem in small counties, adopting a command-and-control 15  
16 approach and jeopardizing the program adopted by CPRH, which was more 16  
17 tutorial and based on incentives rather than on sanction and coercion. 17

18 Therefore, the cooperation between CPRH and the state attorney's office had 18  
19 started at the beginning of the 2000s and it was based on an effort to coordinate 19  
20 action to control the pollution in the garbage dumps. This early cooperation 20  
21 between these institutions opened a lasting communication channel between them 21  
22 that, eventually, evolved into the more recent cooperation to solve the pollution 22  
23 problem in Toritama. 23

24 The deep cooperation between CPRH and the state attorney's office is an 24  
25 important factor to explain the pollution control in Toritama. On the one hand, 25  
26 CPRH has the power to monitor a firm's compliance with environmental law, but 26  
27 lacks the power to order the closure of firms. On the other hand, the state attorney 27  
28 has the power to order the closure of firms, but he does not have resources to 28  
29 monitor firms' compliance with the law. When these two institutions work together, 29  
30 they can use a stick-and-carrot approach, helping firms to meet the environmental 30  
31 standards and use the threat of closure to trigger investments to control the 31  
32 pollution. But this partnership only worked because each agency truly helped each 32  
33 other and both went well beyond their formal duties. I turn next to this point. 33  
34 34

#### 35 *6.4.1 Public Servant's Role: Going Beyond the Formal Duties* 35

36 36  
37 In the case of the pollution control explained in this chapter, the process to clean 37  
38 the water adopted by the laundries in Toritama is still insufficient to make the firms 38  
39 to comply with the Brazilian environmental law. The effluent pollution caused by 39  
40 laundries in Toritama amounted to a biochemical oxygen demand (BOD) of 600 40  
41 milligrams per liter of water and this number is reduced by half once the process of 41  
42 cleaning the water is installed. However, the Brazilian environmental legislation 42  
43 requires a BOD of only 50 milligrams per liter. For the laundries to reach this 43  
44 required level of BOD, they will have to install an additional underground filter 44  
45 45

1 that requires a significant physical space not available to many small laundries. 1  
2 CPRH and the state attorney decide to accept the lower level of pollution instead 2  
3 of enforcing completely the law, fearing that a wide program that required the 3  
4 full installation of the system would fail<sup>24</sup>. In doing that, these two agencies had 4  
5 to reach a compromise; the state attorney had to accept that a pollution drop of 5  
6 50% was the most that could be achieved in the short-run and CPRH had to agree 6  
7 to issuing a temporary environmental license to the laundries. Had either agency 7  
8 been inflexible in its duties, it is likely that the program would have failed at the 8  
9 beginning. 9

10 *Second*, CPRH not only cooperated with the state attorney's office but also 10  
11 persuaded the state attorney to pressure the state and city government to build a 11  
12 sewage system in Toritama. Once the meetings between CPRH, the state attorney 12  
13 and laundries' owners started in Toritama, the entrepreneurs complained about the 13  
14 requirement to install individual septic tanks in each laundry. Entrepreneurs claimed 14  
15 that the lack of a sewage system in Toritama was the fault of the government and, 15  
16 therefore, the state could not impose on them the burden of doing something that 16  
17 the government is supposed to do. CPRH officials agreed with the entrepreneur's 17  
18 view, but they felt powerless to pressure directly the high-level officials in the 18  
19 government. However, CPRH officials requested that the state attorney, who is in 19  
20 independent from the state government, do that. The state attorney monitored by 20  
21 CPRH had a meeting with the mayor and state's secretaries pushing them to build 21  
22 a sewage system in Toritama. 22

23 At the same time, CPRH officials informally fed the local press with news about 23  
24 the potential harm the pollution of the Capibaribe river could have on "Jucazinhos", 24  
25 the water reservoir that supply many cities in the region, including Caruaru, the 25  
26 most populated city in the region. CPRH officials also elaborated an internal report 26  
27 to the top rank officials in the government claiming that the risk of contamination 27  
28 of the most important water reservoir in Sulanca region (Jucazinhos) could have 28  
29 a negative impact on the political support of the governor's party in the region, 29  
30 since this reservoir supplies water to 83 cities in the region. Once this diagnosis 30  
31 was presented to the governor, he did not think twice and ordered that CPRH and 31  
32 state's secretaries get involved to solve the problem of pollution in Toritama. 32

33 The way CPRH officials framed the pollution problem in Toritama as being a 33  
34 potential political problem instead of relying solely on technical arguments was 34  
35 fundamental to push high-rank officials and the governor himself to support a 35  
36 solution to build a sewage and water system in Toritama. This kind of involvement 36  
37 of both CPRH officials, the head of the state secretary of technology and 37  
38 environment, and the local state attorney in taking sides with entrepreneurs in 38  
39 Toritama to push the state and the local government to build a sanitary sewage and 39  
40 a water system is far beyond the formal duties of these state workers. In fact, this 40

41 \_\_\_\_\_ 41  
42 24 The requirement for the laundries to install this extra underground filter was 42  
43 postponed for a second phase, once each has completed installed the process to reduce 43  
44 water pollution. 44

1 broad involvement of public servants with their clients helped to build a sense of 1  
2 trust between CPRH, the local state attorney and laundries' owners that helped the 2  
3 implementation of the program of pollution control. 3

4 In December 2004, the state attorney, the mayor and the state government signed 4  
5 a plan —“Termo de Ajuste de Conduta” (TAC)—in which the mayor promised to 5  
6 build a sewage system in one year and the state government promised to help 6  
7 the city's mayor to raise funds to finance the construction of the sewage system. 7  
8 In this same plan, it was established that the mayor will have to pay a fine if the 8  
9 sewage system is not built and CPRH will not renew the temporary permission 9  
10 for the laundries to run. In doing that, CPRH and the state attorney in Toritama 10  
11 pushed the entrepreneurs to pressure the mayor to build the sewage system, since 11  
12 the permission for them to stay on business will depend on the construction of this 12  
13 public infrastructure. 13

14 Lastly, the state attorney and CPRH officials together with other institutions 14  
15 (SEBRAE and SINDIVEST) strongly helped laundries' owners to build an 15  
16 association. Since the beginning of the public sector action in Toritama, state 16  
17 officials developed a strong partnership with the owner of the laundry Mamute, 17  
18 who helped the public and nonpublic institutions alike to schedule the meetings 18  
19 with the laundries' owners to convince them of the economic benefits of recycling 19  
20 water. The testimony of a local entrepreneur who enjoyed strong ties with 20  
21 laundries' owners and garment producers helped CPRH and the local state attorney 21  
22 to increase the dialogue and to earn the trust of local entrepreneurs to pursue the 22  
23 plan of pollution control. The increasing number of meetings to debate the plan 23  
24 to control the pollution also acted as a vigorous stimulus for entrepreneurs to start 24  
25 an association. 25

26 In the second semester of 2004, the entrepreneurs founded the Associação 26  
27 Comercial e Industrial de Toritama (ASCIT). Once the public sector step in 27  
28 Toritama and entrepreneurs had to bargain with public officials, they had for the 28  
29 first time a clear incentive to mobilize and they actually received the incentive to 29  
30 do that directly from public servants. This is the kind of positive dynamic going 30  
31 from the public sector to the civil society, when civil society activism is in large 31  
32 a product of the initiative of the government or political parties<sup>25</sup>. In this case, 32  
33 public officials acted as “agents of change”, working hard to foster participation 33  
34 and helping firms' owners to organize. 34

35 Although I am stressing in this section the cooperation between CPRH and 35  
36 the state attorney's office, it is important to point out that many other institutions 36  
37 were also important to trigger the process of institutional cooperation explained 37  
38 here. The Training and Development Centers of the Bavarian Employers' 38  
39 Associations (BFZ), for instance, had a key role in developing the technology 39  
40 used by Mamute and also in providing a course together with the Bavarian Ministry 40  
41 of Environment to entrepreneurs and state officials from Pernambuco in Bavaria. 41  
42 According to the director of BFZ, Martin Wahl, this course triggered a process of 42

43 \_\_\_\_\_ 43

44 25 See Abers, R. (1998) and Houtzager, P. P. (2003: 304). 44

45

1 institutional exchange among public and nonpublic institutions from Pernambuco 1  
2 that helped to increase the communication channels between them. 2

3 SEBRAE also had an important role in the process of educating entrepreneurs 3  
4 about the benefits and importance of controlling the pollution in Toritama. In 4  
5 addition, SEBRAE and ITEP implemented together the program to subsidize the 5  
6 design of the water treatment for small laundries. At last, but not least, SINDIVEST 6  
7 also had an important role in bringing BFZ and ITEP to Toritama and also in 7  
8 helping local entrepreneurs to associate. It is important to remember that the action 8  
9 of SINDIVEST to recruit new associates in Sulanca was what made it possible, at 9  
10 first, for BFZ in contact with Mamute, the laundry that was the first to install the 10  
11 equipments to clean and recycle water in Toritama. 11

12 In sum, the points raised above show that the institutional cooperation was 12  
13 key to help laundries in Toritama to invest on pollution control. In addition, the 13  
14 CPRH and state attorney's office went well beyond their formal duties to convince 14  
15 the government to improve the local infrastructure in Toritama and to help firms' 15  
16 owners to control the pollution and to build an association. This deep involvement 16  
17 of public servants with their clients is something that has been identified as a 17  
18 positive factor to explain the success of industrial policies (see Evans, 1995). 18  
19 However, this kind of embedding is usually absent in the modern literature of 19  
20 public administration<sup>26</sup>, which suggests exactly the opposite; i.e., a clear definition 20  
21 of the tasks carried out by front-line workers to avoid these workers deviating 21  
22 from their core activities to do nonessential things. I will show next that the deep 22  
23 involvement of civil servants with laundries' owners in Toritama did not evolve 23  
24 to rent-seek activities because this close cooperation between private and public 24  
25 actors did not decrease civil servants' accountability. 25

26 26  
27 *6.4.2 Outcomes vs Control: Public Sector Intervention and Accountability* 27

28 28  
29 The modern literature of public administration assumes that once public servants 29  
30 have clear and limited tasks to pursue, it would be easier for high-rank officials to 30  
31 supervise "street level" workers. In addition, according to this view, the control over 31  
32 public servants to concentrate on their core tasks would decrease the opportunities 32  
33 for these workers to pursue self-interest. Based on this view, the efficiency of the 33  
34 public sector might increase when administrative reforms decrease public servants' 34  
35 discretion over their tasks and increase the control supervisors have over them. 35  
36 But many cases of successful developmental policies<sup>27</sup> happen when public and 36  
37 private actors are strongly linked to each other and public servants act in a very 37  
38 broad way. In fact, public servants' high discretion in South Korea, for instance, 38  
39 was important to support the industrial development despite historical cases of 39  
40 corruption of East Asian states before the 1960s. 40

41 41

42 42

43 26 See Tendler, J. and S. Freedhlein (1994).. and the literature cited therein. 43

44 27 See Evans, P. (1995) and Amsden, A. H. (1989). 44

1 How can someone explain that the greater public sector involvement to 1  
2 promote the industrial development in East Asian countries did not ended up 2  
3 in rent-seeking activities? In other words, how did the state succeed in having 3  
4 a more active role to promote industrialization and, simultaneously, discipline 4  
5 business in East Asian? Amsden (1989) shows that the public sector succeeded in 5  
6 promoting and disciplining business in South Korea because subsidies allocation 6  
7 was tied to performance standards, where exports seemed to be the most efficient 7  
8 monitoring device. These kinds of policy, where incentives goes hand in hand with 8  
9 performance requirements, are stick-and-carrot policies. In the case reported in 9  
10 this chapter, the involvement of state officials with the private sector to enforce the 10  
11 environmental law help firms to upgrade and control the pollution worked because 11  
12 the higher discretion of public officials in pursuing their tasks did not decrease 12  
13 their accountability. 13

14 Northeast Brazil is a region where states have traditionally embarked in a fiscal 14  
15 war to attract industrial firms from South and Southeast Brazil (Tendler, 2000). 15  
16 The states give these incoming industrial firms fiscal and financial incentives, and 16  
17 usually finance labor force training. The problem with this policy lies in the fact 17  
18 that incentives are usually not linked to performance, and there is no evaluation 18  
19 of the net benefits these industrial firms bring to the local economy. In addition, 19  
20 the states usually do not make public the terms of agreement between the state 20  
21 government and private firms. Therefore, it is impossible for someone out of the 21  
22 government to check whether or not firms are complying with the targets they had 22  
23 set when they bargained with the public sector for fiscal and financial incentives. 23  
24 Neither is it possible to understand why some firms can renew incentives when 24  
25 they expire while others cannot. 25

26 The case of state intervention in Toritama to control the pollution is different 26  
27 from these traditional policies to attract industrial firms in Northeast Brazil 27  
28 because all incentives and requirements for each firm is clearly established in a 28  
29 legal instrument named "Termo de Ajuste de Conduta" (TAC). This instrument 29  
30 works in the following way: once the state attorney's office finds out that a firm is 30  
31 not complying with the environmental law, the state attorney has two options. One 31  
32 is to firmly apply the law, ordering the closure of the firm and starting a lengthy 32  
33 and slow process in court that might take years to reach its final resolution<sup>28</sup>. 33  
34 A second option is to bargain with the firm's owner to sign a TAC, which is a 34  
35 document where the firm's owner recognizes that he is not complying with the law 35  
36 and agrees to follow a schedule to meet law standards. In this document, the state 36  
37 37

38 38  
39 39  
40 28 This is exactly what happened in another cluster of jeans producer in Brazil Center- 40  
41 Western region. In the city of Jaraguá located in the state of Goiás, the public attorney tried 41  
42 to push laundries to comply with the environmental legislation based only on sanction and 42  
43 coercion. The laundries did not take any action to control the pollution, and the state and 43  
44 the laundries have engaged in a slow and lengthy battle in courts that might take years to 44  
45 reach a final solution. 45

1 attorney's office gives the firm's owners a grace period to comply with the law, and 1  
2 establish fines in case of no compliance. 2

3 The TAC is a highly discretionary device, since the state attorney has freedom 3  
4 to decide over the penalties and the extension of the grace period for each firm 4  
5 or group of firms. But despite being a discretionary device, each TAC is a public 5  
6 document published by the state official press. Therefore, any citizen can have 6  
7 access to these documents and check which incentives and penalties the state 7  
8 attorney's office and the state government established to make firm's owners to 8  
9 comply with the environmental legislation. 9

10 In addition, if any firm's owner fail to meet the targets established in the TAC, 10  
11 this document works as a personal statement of guilt, in which the entrepreneur 11  
12 assumes that he was violating the law. This confession speeds up the court process, 12  
13 making it easier to close noncompliance firms. In sum, the greater involvement of 13  
14 the public sector in enforcing the law and helping laundries' owners to upgrade to 14  
15 comply with the environmental law worked in a way similar to the stick-and-carrot 15  
16 policies adopted by East Asian countries. In the case reported here, the "Termo de 16  
17 Ajuste de Conduta" (TAC) was essential to disclosure information over what the 17  
18 public sector had negotiated individually with each firm, the incentives (carrot) for 18  
19 complying with the law and the penalties (stick) in cases of noncompliance. 19

20 The use of the TACs in this program of pollution control was important to make 20  
21 the public officials accountable despite the high involvement public officials had 21  
22 with the firms they are supposed to inspect. Differently from the modern public 22  
23 administration literature, which overstates the control on public servants' tasks, 23  
24 the control in question was made on outcomes. In this case, higher discretion of 24  
25 public servants over their tasks did not decrease their accountability, and the use 25  
26 of the TACs increased the ability of the state to circumvent the historical delay 26  
27 of the court system in Brazil in case of prosecution. As the local state attorney in 27  
28 Toritama stated: 28

29 29  
30 we have tried to do this process in a very open and institutionalized way to make it 30  
31 independent from any individual. It does not matter with whom private entrepreneurs 31  
32 will be talking to one year from now, since everything that was negotiated with 32  
33 individual firms are set in each firm's TAC—a public document anyone can access 33  
34 to check whether firms' owners are meeting the conditions they had negotiated with 34  
35 the public sector. 35

36 36  
37 37

### 38 **6.5 Conclusions** 38 39 39

40 This chapter analyzed a program still in progress to control for water pollution 40  
41 in a city in Northeast Brazil countryside (Toritama), where both the state and the 41  
42 local government used to be strongly absent. We have showed that the economic 42  
43 progress of this city comes from a cluster of jeans producers responsible for 15% 43  
44 of the jeans produced in Brazil. Despite the high informality rate, this city is also 44



1 among the most dynamic ones in Northeast Brazil based on different economic 1  
2 indicators (high per capita income, low economic poverty rate, low dependence of 2  
3 governmental transfers, etc.). 3

4 The existence of a cluster of jeans in a region far away from the coastal 4  
5 area where the industry in Northeast Brazil still concentrates today is per se an 5  
6 interesting fact. The location of garment producers in Pernambuco's countryside 6  
7 and the resilience they have showed to compete with low-priced Chinese products 7  
8 is quite impressive. In addition, the location of jeans producers in a region famous 8  
9 for lacking an adequate water supply is something that challenges the comparative 9  
10 advantage theory and geographical barriers to development. Neither is this kind 10  
11 of economic growth explained by the new growth theories and its focus on 11  
12 innovation and education, which are usually characterized as being prerequisites 12  
13 for economic growth<sup>29</sup>. 13

14 Despite the economic growth of the garment sector in Pernambuco countryside, 14  
15 I have showed in this chapter that this growth created an acute problem of 15  
16 pollution caused by the laundries in the jeans cluster in Toritama, a place where 16  
17 the government had been absent in enforcing the labor, tax and environmental 17  
18 legislation and also in providing public goods. The challenge of this chapter was 18  
19 to explain how laundries located in a place where informal firms flourish, local 19  
20 entrepreneurs hardly cooperate and pollution has been common, decided to invest 20  
21 in a new technology of pollution control. 21

22 I claim that the program to control pollution in Toritama is succeeding because 22  
23 of a process that blends together three elements: (a) a clear link between upgrading 23  
24 and profits, once a private firm got involved in searching for a technology to 24  
25 recycle water in laundering jeans; (b) the public sector role in enforcing the law 25  
26 and helping firms to implement the changes (stick-and-carrot policy); and (c) the 26  
27 development of a customized technology that fits the need and constraints of the 27  
28 local firms, especially, small and medium ones. Lastly, the role of the public sector 28  
29 in the case analyzed here involved three key elements: a strong cooperation within 29  
30 the public sector, a high dedication of public officials who self-enlarged their 30  
31 formal duties to help entrepreneurs to implement the program, and public-private 31  
32 cooperation to diffuse innovation developed within the private sector. 32

33 I also showed the double role the state had in Toritama—enforcing the 33  
34 environmental law and helping firms to upgrade—did not decrease the 34  
35 accountability of public officials. This happened because the private firms' 35  
36 deal with the public sector was made public through a document named "Termo de 36  
37 Ajustamento de Conduta" (TAC), in which anyone can check the incentives and 37

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29 I do not, however, dispute the view that education and innovation are important  
for development. What I am claiming here is that the focus solely on these factors as being  
the most important ones to foster development is misleading and might divert the public  
sector of adopting simple but effective growth enhance policies in poor regions. See the  
chapter 4 of Easterly, W. (2001). for a critique about the focus only on education to explain  
economic growth.

1 penalties established by the public sector to allow firms to upgrade and comply 1  
2 with the law. 2

3 One point we must have in mind is that the case developed in this chapter 3  
4 happened in a place where the state had been absent for decades and local 4  
5 entrepreneurs did not cooperate. Therefore, the city of Toritama in Pernambuco's 5  
6 countryside is a place where we would not expect to find an example of a successful 6  
7 public policy, especially one that has to do with controlling pollution. The case 7  
8 reported here casts some doubt on the traditional way scholars have applied the 8  
9 well-known work of Putnam (1993). In Toritama, the lack of social capital was not 9  
10 a deterministic factor to deter the success of a program of pollution control. 10

11 The point developed in this chapter is closer to the idea developed by Locke 11  
12 (2001), who stresses that the government can be an important actor to help firms' 12  
13 owners to cooperate even under adverse circumstances (lack of social capital and 13  
14 lack of trust). According to Locke, cooperation within the private sector might 14  
15 arise when the public sector voluntarily push for cooperation in exchange for 15  
16 public support, there is self-interest of private actors to cooperate to get state's 16  
17 support, and there is the development of some mechanisms for self-governance 17  
18 and monitoring. 18

19 In the case explained here, however, the cooperation happened within the 19  
20 public sector and this institutional cooperation was a key factor behind the success 20  
21 of the public policy of pollution control. Self-interest of private actors in the case 21  
22 analyzed here also played a key role, but in a slight different way from that one 22  
23 explained by Locke. Here, self-interest is more linked to the private sector search 23  
24 for a low-cost technology to recycle water rather than on entrepreneur's incentives 24  
25 to start cooperating in exchange for public support. Eventually, entrepreneurs in 25  
26 Toritama built an association, but this happened later in the process. 26

27 At last, the jeans cluster in Toritama, a place where the public sector had been 27  
28 absent for years and a cluster where the state used to be ashamed, now turned 28  
29 into a successful case highly praised and publicized by state officials. Nowadays, 29  
30 instead of being a place the public sector tries to hide and exclude from state's 30  
31 developmental programs, Toritama is a place used by Pernambuco's policymakers 31  
32 as a showcase of their policy to support the development of clusters in the state 32  
33 countryside. In addition, as the secretary of science, technology and environment 33  
34 of Pernambuco, Claudio Marinho, stated: 34

35 35  
36 once the public sector stepped in Toritama to solve the problem of the pollution; 36  
37 it is just a question of time for the state government to start supplying health, 37  
38 educational services, and to have a more active role in supporting the development 38  
39 of the region. 39

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