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Pollution in the Garden of the Argentine Republic: Building State Capacity to Escape from Chaotic Regulation

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Abstract:

Environmental regulation in middle-income and developing countries is often viewed with high degrees of pessimism. Although many countries have adopted protective laws, violations are widespread and institutions are weak. This paper analyzes the puzzle of shifting patterns of environmental regulation in Argentina, a country with widespread institutional weakness. Most regulators in Argentina take a firefighting approach, acting only when skirmishes emerge between communities and firms. Amidst regulatory chaos, improvements in the environmental performance of firms are few, and noncompliance remains the norm. However, in the province of Tucumán, the pattern of regulation shifted, and officials began to systematically enforce regulations. This paper traces shifts in patterns of enforcement back to broad pressures that provoked industry and environmentalists to support increases in the internal and external components of state regulatory capacity. The analysis uncovers political dynamics that can contribute to strengthening the institutions necessary for sustainable development.

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Introduction

Environmental regulation in middle-income and developing countries is often viewed with high degrees of pessimism. Although many countries have adopted protective laws on the books, their regulatory institutions do not effectively structure the actions of firms.¹ There is near consensus that such a broad institutional failure is problematic. For those concerned with environmental and social protection, the inability of policies to meet even remotely their stated ends exposes society and the environment to immediate and illegal harms.² For those focused on the detrimental developmental consequences of the weak rule of law, the resulting uncertainty is a potential drag on investment.³ A central task for many countries, therefore, is to escape chaotic regulation, wherein formal policies play a limited role and firms react directly to unmediated pressures from society. Despite this widespread challenge, research to date has given us few roadmaps towards more capable regulatory states that can render institutions strong enough to support sustainable development.

This paper analyzes the puzzle of shifting patterns of environmental regulation in Argentina, a country that shares many of the common pathologies of chaotic environmental regulation.⁴ The agencies charged with enforcement suffer from both political interference and extremely limited resources. This article demonstrates that despite the many constraints facing Argentine regulators, there are distinct patterns of enforcement and the state is not completely absent. Some regulators take a firefighting approach to enforcement, acting only when skirmishes emerge between communities and firms. In the province of Santa Fe, for instance, highly constrained regulators helped resolve a conflict surrounding pollution from an agro-industrial plant. Although such

actions reduce pollution and protest, regulation remains highly chaotic and such improvements are not broad or sustained.

By contrast, regulators in other parts of the country have overcome constraints and been able systematically to enable and incentivize entire industries to reduce pollution. As is described in detail below, such a shift took place in the province of Tucumán, where the state began to establish regulatory capacity and went beyond piecemeal action. Changes in Tucumán did not follow the traditional pathway of insulating the regulatory agency,⁵ but rather involved hiring technical staff and forming ties to society that allowed both business and environmental groups to exercise political influence and to provide regulators with resources. Notwithstanding these departures from standard reforms, regulators contributed to environmental improvements and helped key industries adjust when their social licenses to operate were threatened.⁶ In short, Tucumán began to move towards stronger institutions that could provide for structured pollution reduction and, ultimately, more sustainable development.

This paper makes two principal contributions. First, it shows that there are distinct patterns of enforcement even in places that lack the traditional features of state capacity. Second, it offers an explanation for shifts in patterns of enforcement. The analysis holds that firefighting enforcement is the result of regulators relying heavily on leveraging external resources (e.g. mobilized community groups) in order to supplement their own meager internal resources (e.g. staff and budget). To strengthen institutions through systematic enforcement, states must have both internal and external components of capacity that jointly allow regulators to undertake systematic enforcement. Conflict that threatens an industry's ability to operate can create a pathway toward increasing state

capacity by generating interest among a range of businesses for capable intermediaries (even if business continues to oppose stringent standards). When business support is combined with continued social conflict, regulators can gain the capacity to strengthen institutions and guide industry towards upgrading. This argument helps to advance studies of regulation in industrializing countries by moving the focus of inquiry beyond a narrow view of businesses and environmental groups fighting only over pollution reduction and short-term economic gain, and towards an analysis of the politics of institutional strengthening.⁷

The remainder of this paper is divided into four sections and a conclusion. The following section reviews debates on environmental regulation in industrializing countries, focusing on the important differences in patterns of enforcement apparent in the literature. Laying out the argument in more detail, this section also provides a framework for analyzing the politics of state capacity and institutional strengthening. The second section sets the stage in Argentina, describing the weak institutional landscape and the problems it generates from the perspective of firms, environmental groups, and regulators. The third and fourth sections examine enforcement in two provinces, showing how in Santa Fe firefighting was stable, in contrast to changes in the pattern of enforcement in Tucumán. These case studies are based on data gathered over sixteen months of field research in Argentina in 2008 and 2009, which includes over 110 semi-structured interviews⁸ (with regulators, environmental organizations, firms, and political leaders) and extensive documentary evidence (e.g. inspection reports, agreements between firms and regulators, NGO investigations, and a review of over 1,300 articles in provincial newspapers related to environmental regulation).

Patterns of Environmental Regulation

Studies of environmental regulation in industrializing countries often paint a bleak picture of unmitigated pollution.⁹ A number of factors are blamed for the lack of attention to environmental issues, including a political priority of economic growth over environmental protection, weak environmental movements, and competition created by international trade.¹⁰ One of the most immediate constraints is the lack of state capacity to implement policies. For many observers, the absence of functioning command and control systems is interpreted as a regulatory void. However, researchers have found that even weak states can undertake firefighting enforcement. For instance, O'Rourke identified "community-driven" regulation in Vietnam, by which citizen mobilization enables regulators who induce industry to mitigate pollution. O'Rourke argues that this model is the "best hope for advancing environmental protection" in places with weak states that are "conflicted" between economic growth and sustainable development.¹¹

There is broad agreement, however, that there are serious limitations to such chaotic regulation.¹² Community pressure is fickle, creating high levels of uncertainty and exacerbating inequalities. Moreover, firms cannot count on the support of the state to help manage unpredictable demands for pollution mitigation. And, when firms lose their social licenses to operate¹³ and cannot adapt, pushes for pollution reduction are detrimental to economic development.¹⁴ In short, the persistence of chaotic regulation and the dominant pattern of firefighting by states undermine environmental, economic, and social goals.

There are, however, alternative patterns of enforcement in industrializing countries with the potential to strengthen institutions.¹⁵ For instance, state regulators in Brazil played a key role in cleaning up the Cubatão through systematic enforcement.¹⁶ With help from their allies in society, they shifted industry away from a norm of noncompliance. Ultimately, they substantially reduced continuation on a regional scale. In this and other cases, researchers have found evidence that regulatory institutions can be strengthened. Behind these changes are state agencies that go beyond firefighting and that systematically enforce regulations, enabling and pressuring entire industries to upgrade towards compliance.

A key question, therefore, is what leads to shifts in patterns of regulation towards systematic enforcement that ultimately strengthen institution that support sustainable development? The dominant ways of examining environmental regulation that emphasize conflict between firms and environmental groups over pollution as the key mode of politics offer few answers to this question. Much of the literature locates environmental upgrading either as part of a strategy of “green firms,”¹⁷ or immediate community demands,¹⁸ or the sometimes positive effects of international trade.¹⁹ The state and institutional strength have been sidelined from dominant analyses.²⁰ Studies that have identified improvements in environmental policy implementation have sought to explain them through large structural changes, such as democratization.²¹ As a result, notwithstanding the literature’s advances, research has offered little in terms of unpacking the interest of key actors regarding institutional strength, and has not developed an account of the local politics that can make developmental regulation possible.

This paper proposes a framework for explaining changes in state capacity and in patterns of enforcement. First, as previewed in the introduction, this paper identifies the combinations of internal and external components of state capacity that are behind distinct patterns of enforcement.²² In the firefighting pattern, weak internal components of state capacity (e.g. staff, budgets, and expertise) limit state action, but enforcement is made possible when regulators are able to leverage external resources (e.g. mobilized community groups). In cases of systematic enforcement, external and internal components of state capacity are combined. Therefore, the central challenge is to discover processes through which both components increase simultaneously.

One pathway to investment in both components of state capacity is triggered by conflict at an industry scale that undermines the efficacy of firefighting. Whereas conflicts between communities and individual firms can be resolved by regulators with weak internal capacity, larger conflicts make it impossible for regulators to respond without substantial internal capacity. The immediate effect of such an industry-wide threat is a dramatic increase in uncertainty for all firms (including lead firms) that see their social license to operate threatened *en mass*. Under these conditions, industry's alternative to capable regulators is direct pressures from mobilized society or courts to reduce pollution, a situation that creates substantial risks. As a result, industry broadly favors the strengthening of state regulatory bodies that can broker the upgrading process, and firms seek to build linkages to potential allies in the state. In short, although the position of industry towards the strictness of regulations may remain unmoved (industry might continue to prefer deregulation above all other options), its position towards *regulators* who can help with adjustments to societal demands shifts from ambivalence to

support. Under these conditions, the risk that a regulator might take actions that are unfavorable to business becomes less daunting than a wave of unmediated social conflict and judicial action. This change lends crucial political backing for allocating scarce resources to the internal components of state capacity that can lead to orderly regulation.

Increased resources and ties to business alone are insufficient, especially in contexts with high levels of state politicization.²³ Regulators also need to build ties to environmental groups that can bring key political and operational resources. Ongoing small conflicts (in addition to the industry-wide threat) open political space for regulators to build linkages with environmental groups, primarily as a way of channeling demands out of the streets and into regulatory institutions. These ties help environmental groups act as countervailing powers to business, and to further augment the operational reach of the state. In sum, threats to entire industries can trigger processes that result in strengthening the two constituent parts of state capacity—1) internal capabilities within regulatory agencies, and 2) ties between regulators and environmental organizations—and thereby shifting patterns of enforcement.

This argument builds on research on upgrading and standards, which identifies external shocks—such as the imposition of global standards that break the “devil’s deals” underpinning chaotic regulation in many contexts—as key drivers of change.²⁴ It departs, however, from dominant approaches to studying environmental regulation in industrializing countries by providing an account of pathways out of the low compliance equilibrium. In doing so, it illuminates the differences between conflicts that are part of chaotic regulation and those that create the opportunities for changes in enforcement patterns. Moreover, it focuses on how actors strengthen (or weaken) institutions, instead

of solely analyzing fights over trade-offs between economic growth and environmental protection. In other words, the argument moves away from the view that firms universally resist regulatory capacity due to the costs associated with compliance, which has obscured the interest firms have in state assistance in the face of new social demands.²⁵ By contrast, it shows that conflicts over pollution abatement in the short-term can be qualitatively different from the politics of regulatory capacity, a key distinction that has been overlooked in the dominant debates. With a wider lens on the politics of regulation and a broader sense of what regulators do in practice, it becomes possible to identify conditions under which various actors support, rather than undermine, development of state regulatory capacity.

Chaotic Regulation in Argentina

Argentina's environmental regulatory institutions were born weak.²⁶ Juan Domingo Perón created the first environmental agency in 1973, but it was quickly dismantled by the military government in 1976. In the 1990s and early 2000s, there was an explosion of national initiatives to promote sustainable development; President Carlos Saúl Menem recreated the federal environmental agency, a major constitutional reform that included the right to a clean environment, and Congress passed laws that created minimum standards for pollution across provinces.²⁷ These policies, however, were largely unenforced, and the environmental agency charged with implementing them was plagued by corruption scandals.²⁸

Notwithstanding a proliferation of national policies, the federal nature of Argentine institutions left much of the power to regulate industrial pollution to the

provinces. Federalism added additional dysfunction to the institutions. A World Bank study, for example, found that “the most critical constraint for improving the management of pollution in Argentina is the absence of clear institutional responsibility . . . and the lack of effective enforcement.”²⁹ Another important impact of federalism was to create a wide range of variation in environmental policy implementation across provinces. Some provinces formed agencies and adopted regulations early on; for instance, in 1985, soon after the return to democracy, Córdoba created a Subsecretariat of Environmental Management and passed a General Environmental Law.³⁰ Most other provinces, however, lagged behind, leaving environmental functions spread out over a variety of government agencies, such as public health, water, and industry.

Argentine environmental institutions have never functioned in the way that any major group would support. For firms, the problem is uncertainty. An official in a large provincial firm association in Santa Fe remarked, “*What industry is looking for is legal certainty*” from environmental regulations.³¹ Similarly, a leader in a small metal manufacturing association in Buenos Aires lamented that the problem is “*judicial insecurity*” created by environmental regulations.³² Indeed, on multiple occasions, individual plants have been shut down after being singled out by mobilized community groups for violations that are likely pervasive.³³ In addition, the firefighting nature of enforcement exerts unequal pressure on firms. An official in the province of Córdoba’s major industry association noted that the principal problem with environmental laws is that regulators act like they are “*hunting in a zoo;*” they “*inspect the firms that are trying to do the right thing, but not those that are informal.*”³⁴ In Buenos Aires, a business

leader representing meat packing firms complained about “*illegal competition*” from completely informal firms that easily fly below the radar of regulators.³⁵ In sum, even firms that are at best ambivalent about investing in pollution reduction are clearly interested in reducing the uncertainty of chaotic regulation. One way of reducing uncertainty is through reducing standards, but, as I show below, this option is not always on the table when there is widespread conflict.

Unsurprisingly, for environmental groups, chaotic regulation is seen as a complete disaster.³⁶ A community group that mobilized against contamination in its working-class neighborhood in the city of Buenos Aires argued that in Argentina, “*development isn’t sustainable; firms don’t comply with regulations, the state doesn’t make them comply, and if there isn’t an enforcement authority, firms are just going to do what they can to save money.*”³⁷ A report by a leading environmental NGO found that “*the absolute absence of enforcement by the state, irresponsibility on the majority of the private sector, and general apathy contributed to...environmental crisis.*”³⁸ The running narrative throughout the discourse holds that extensive non-compliance, rather than environmental laws, remains the key bottleneck.

For those in charge of implementing policies, the tremendous gap between regulatory standards and practice is highly problematic. One head of a provincial regulatory agency complained, “*What has happened in Argentina...is that it is really easy to pass a law Today the Internet even gives us the ability to see and copy whatever are the best laws from the United States Environmental Protection Agency or the European Union This is a defect in our regulatory framework In some cases Argentina has stricter rules than the EU and USA.*”³⁹ In a similar statement, an official

in an environmental agency from another province stated that the law of environmental impact assessments “*was practically copied from what was one of the first environmental impact laws in Spain.*”⁴⁰ These environmental laws are seen as “impossible” for local firms to comply with because they are designed for advanced industrial countries. As a result, regulators are left to pick up the pieces of conflicts between industry and environmental groups. In short, notwithstanding the broad consensus in favor of reducing regulatory chaos, chaos still remains in most of Argentina.

There has been, however, substantial variation in the responses of provincial governments to the problems generated by regulatory chaos. The following sections analyze enforcement in the provinces of Santa Fe and Tucumán during the growth period following the financial crisis of 2001 to help bring into relief the processes that prevent, and produce, changes in patterns of environmental regulation. The pairing of Santa Fe and Tucumán is an unlikely one. Santa Fe has been the home of substantial economic dynamism in the past decade. The province does not depend on any one industry, but rather combines large agroindustry (soy, sunflower, dairy and the associated processing) with a number of other sectors, including a substantial manufacturing base (e.g. automobiles and metal) and the country’s second largest port. Additionally, political contestation in Santa Fe has increased in recent years and has triggered reforms of some regulatory agencies, including the Ministry of Labor.

In contrast to Santa Fe, Tucumán is a backwater. It is one of Argentina’s poorest provinces, and its economy is dominated by two polluting industries: sugar mills and citrus processing. Tucumán’s political system is controlled by a single party (a faction of Peronism that follows Governor Alperovich), and there have been no meaningful reforms

in its government administration in recent years. Given these structural conditions, it would appear that the deck is stacked against Tucumán, and for many years, provincial regulators in the province did, indeed, fail to implement environmental regulations. Yet, in 2003, Tucumán shifted paths and began to enforce regulations in key industries. The following two sections compare in detail stasis in Santa Fe with change in the less-likely case of Tucumán.

Firefighting in Santa Fe

With Santa Fe's substantial industrial sector, many firms in the province have high levels of potential pollution and non-compliance is the norm, creating formidable regulatory challenges in the province.⁴¹ Yet, there has been little in the way of systematic enforcement as a response to widespread noncompliance. In 2009, officials in the Santa Fe Environmental Secretariat (SFSMA) estimated that they were able to inspect less than 3% of facilities in the province each year, and they estimate that there were some 5,000 firms that “*are not totally identified*” and operate completely outside of the regulatory system.⁴² When they found violations, inspectors had difficulty taking steps that could alter firm behavior. For example, the process of using fines was often blocked. Out of the inspected firms in 2008, upwards of 50% were issued notices of non-compliance, but only 5% were issued penalties.⁴³ These enforcement outputs are not what regulators would prefer; an official explained:

“What we would like to do...is to plan inspections with the most frequency for the most risky firms, and with less frequency for the less risky firms in order to understand their main emissions...and to remediate or prevent any problems. [To be]...beyond the complaints that are always going to exist. But today we are still behind on this, and we are acting more as

firefighters...with complaints, and with judicial requests that have to be answered immediately.”⁴⁴

The SFSMA was not, however, a completely crippled agency. When there was social pressure over pollution in a specific community, regulators were able to take action. One inspector described the differences in the regulators’ capabilities when there is conflict, “*We can demand more because the firms feel very pressured because there can be a protest and blockade of the plant so that no one can go to work. Everything functions like that here.*”⁴⁵ In other words, regulators spent much of their time acting as “*firefighters,*” resolving piecemeal conflicts before they became destabilizing.

The case of the Santa Clara Plant, which processes soy and sunflower seeds to produce vegetable oil in the city of Rosario, illustrates how regulators resolve conflicts.⁴⁶ This plant’s processes result in a variety of pollutants that need to be mitigated to comply with regulations.⁴⁷ For years, inspectors from the SFSMA were well aware of the environmental problems caused by Santa Clara, which were common in the industry, but they were largely unable to take steps that would lead to compliance. According to inspectors, Santa Clara’s air “*emissions were very bad because they were burning sunflower seed shells to fire the boiler, which created high levels of particulates and noise. We confirmed all of this ourselves. As always, we required changes, but there were no sanctions. We required the changes again, and there were no sanctions again. It was a closed loop.*”⁴⁸ A former Secretary of Environment recounted, “*The state...was not complying with its own rules to apply sanctions and implement legislation.*”⁴⁹ In short, Santa Clara, like many of the cereal processing facilities in Santa Fe, was causing serious environmental damage and violating laws, and responses from regulators did little to mitigate the pollution or promote upgrading.⁵⁰

The trigger for change in this case was literally a series of fires and explosions that began in April 2004 in the Santa Clara plant.⁵¹ These incidents frightened nearby residents and spurred mobilization.⁵² Further stoking the conflict were health officials from a local clinic who revealed to the press that there had been disproportionately high rates of asthma in the neighborhood near the plant.⁵³ Local leaders protested and plant managers feared that the community would demand that the facility be closed down.⁵⁴ According to regulators, “*the pressure of the neighbors was so strong that the firm had to solve the problems, or the plant could not keep working.*”⁵⁵

Regulators in the SFSMA were able to leverage the resources generated by the conflict and to enforce regulations. Forming linkages with community organizations and municipal officials, the SFSMA conducted joint inspections that identified the violations in the plant.⁵⁶ According to neighbors, “*when environmental officials come to inspect the plant, we go to the plant as well.*”⁵⁷ Residents called this a system of “*neighborhood monitors.*”⁵⁸ The SFSMA became “*a mediator, demanding actions from the plant and...monitoring the plant to make sure the changes were adequate.*”⁵⁹ Santa Clara presented a plan of action to reduce pollution and come into compliance with regulations over a two-year period.⁶⁰ The process was anything but smooth, but this form of enforcing regulations with tight interactions between the SFSMA and the community pushed the firm to invest over two million dollars and complete the proposed projects.⁶¹

The results were surprisingly successful. From the point of view of the regulators, Santa Clara was a rare instance in which enforcement actually worked. “*After two long years, a lot of tolerance from the neighbors, an effort from the firm, and an effort from us acting in between those two groups, Santa Clara managed to fix the emissions and made*

many improvements.”⁶² Representatives from the community recognized both environmental and health improvements,⁶³ and leaders from a professional environmental organization saw the efforts as a “*positive case*” that resulted in “*many environmental improvements.*”⁶⁴ For managers at Santa Clara, the transformed relationship with the community had long-term benefits. Managers stopped worrying about the plant being shut down because of popular pressure and were actually able to get support from their neighbors on future modifications—the “*cherry on the cake*” of conflict mitigation according to plant managers.⁶⁵ Thus, regulation in this case was rewarding in a sense that a conflict over pollution that could have led to a firm closure instead resulted in continued operation of industry with fewer negative impacts on its community.

The conflict around Santa Clara was not unique; there were similar cases of mobilization triggering enforcement in other parts of the province.⁶⁶ However, regulators never were able to scale up their efforts and induce investments in pollution reduction at an industry level. There were many other similar plants with the same types of violations that regulators did not even inspect, let alone push to upgrade. And there were conflicts that led to shutting down firms instead of mitigating pollution and while generating economic activity.⁶⁷ As a result, immediate social pressure was more important than policy in driving firm behavior, and chaotic regulation remained stable.

Explaining Persistent Firefighting in Santa Fe

What accounts for this pattern of enforcement in Santa Fe? Among the immediate causes is a weakness in the internal components of state capacity. The SFSMA had an extremely small staff considering the sheer size of Santa Fe and the number of sites that needed to be controlled,⁶⁸ as officials noted, “*with so few people, we*

react according to necessity”⁶⁹ with “*little margin*” for proactive measures.⁷⁰ At a basic level, the inspectors lacked the materials they needed to organize and execute the tasks of enforcement; they had access only to one or two cars, and inspectors said they often “*had to pay for the gasoline [out of pocket] ...to be able to get to the inspection site.*”⁷¹ Moreover, there were limitations in information technology, and there was only one laboratory in the province.⁷² Although other regulatory agencies, such as the Ministry of Labor, expanded in the post-crisis period, the SFSMA remained underfunded.⁷³

Despite such limited internal resources, regulators could still respond to conflicts. In the Santa Clara case, as in others, regulators leveraged resources from mobilized civil society organizations. Mobilized community groups created skirmishes that demanded a reaction; a former agency head stated, “*When there was a high-conflict issue, it was necessary to give a response...to defend the government so it isn’t criticized [and] so they don’t fire me.*”⁷⁴ Even with few internal resources, regulators could attend to a handful of fires. Moreover, community groups and municipal governments assisted the SFSMA operationally by monitoring the behavior of firms, often through the creation of a local “*commission*” that formalized linkages between state and society.⁷⁵ In short, even with weak internal resources, the creation of linkages to mobilized groups made enforcement happen.

Why did the internal components of state capacity remain underdeveloped? A full account will only be possible in comparison to Tucumán, but it is helpful to consider some hypotheses. One might be that environmental organizations were exceedingly weak. However, in comparison with other provinces, including Tucumán, Santa Fe had a relatively well-developed environmental movement. There were a large number of

professionalized environmental organizations in the province.⁷⁶ Moreover, these environmental groups were organized into a coalition (the Socio-Environmental Agenda) that combined forces of the movement to advocate for stronger environmental protection, including moving towards a strategic approach to enforcement.⁷⁷ On some fronts the environmental groups were successful. For instance, they effectively removed a secretary of environment whom they accused of being too close to polluting industry.⁷⁸ Still, these organizations clearly were unable to persuade politicians to follow their interests and invest resources in the SFSMA.

Firms, for their part, did not advocate for or against the SFSMA. A senior official in the federation of industry associations explained that in the 1990s, the federation “*made a proposal, which we presented in the legislature, for the creation of an Environmental Secretariat*” that eventually passed.⁷⁹ Industry wanted an “*agency that was serious,*” one that could handle conflicts and offer “*judicial security.*” But when the economy suffered after the 2001 crisis, industry could no longer “*prioritize*” investment in environmental institutions. In contrast to accounts of environmental politics that pit firms against regulators, the main industrial association in Santa Fe held a largely neutral position towards the SFSMA, which is not surprising given its role in mediating conflicts.

The example of Santa Clara helps clarify why industry was ambivalent about providing more resources in the SFSMA. Industry wanted legal certainty from regulators. The SFSMA was able to provide some margin of certainty by putting out fires like the one around Santa Clara, even with extremely limited staff. This suggests that successful firefighting can actually undermine industry support for institutional strengthening.

Without a conflict that requires a systematic response from the state, industry will not prioritize investment in the regulatory agency.

Shifting Patterns in Tucumán, the Garden of the Republic

Located in the northwest of Argentina, the province of Tucumán, known as the “garden of the republic,” faces a series of environmental challenges from agroindustry. The dominant sectors in the province are citrus (processing lemons for export) and sugar mills (producing sugar and ethanol), both of which are highly polluting.⁸⁰ From the 1990s until the early 2000s, environmental laws existed on the books, but violations were widespread and the state did little to guide firm behavior. The government agency responsible for controlling pollution from industry was the Ministry of Health (*Sistema Provincial de Salud*, SIPROSA). Although the exact number fluctuated over time, SIPROSA had approximately thirteen inspectors tasked with enforcement. These inspectors regularly took samples from the pollution emitted by the largest firms and identified levels of contaminants.

The regulatory system, however, was completely ineffective. Invariably, inspectors found pollutants in excess of legal limits, but they were unable to penalize those responsible or to enable firms to comply through instruction. An official explained the difficulties, “*What happens is that the system of fines hasn’t been applied as it should...there would be a delay of at least five years before the fine was completely [processed].*”⁸¹ The regulatory system was full of weak points that could be exploited by firms with capable lawyers and political connections.⁸² For example, an official explains how it was politically impossible to close down polluting firms in the sugar industry:

“Once the mill is going, it is very hard to close it because it is the economic base of Tucumán. Therefore, you have to be very careful because if you aren’t, the society is going to come on top of you. For environmental issues, it isn’t just complying with laws. It is achieving an equilibrium between the laws and what firms are able to do.”⁸³

That “*equilibrium*” meant, for many years, allowing sugar mills to violate laws with impunity. The citrus industry largely followed the same pattern. The firms would be inspected, SIPROSA would find violations, and then nothing would happen.⁸⁴ Apart from sanctions, inspectors did little to take pedagogical actions that could help firms upgrade. In fact, regulators had few direct interactions with firms. Instead, they mostly took samples and issued violations without engaging in discussions of the underlying causes of pollution.

Even after over ten years of regulation and the passage of various national and provincial laws, violations continued and there were very low levels of enforcement. Overall, pollution increased dramatically in the province at the end of the 1990s and beginning of the 2000s. The citrus industry grew nearly fourfold; sugar mills responded to increases in natural gas prices by switching to polluting biofuels without installing air filters; and incentives for ethanol production pushed more sugar mills to add large distilleries that increased water pollution. It was clear from scores of interviews with business leaders, regulators, and environmental groups that not a single firm complied with regulations during this period. Some firms took steps to reduce contamination, but these changes were driven largely by external market demands, not by regulatory policy.⁸⁵

Mobilization Against Pollution

In the early 2000's, political pressure to reduce pollution began to increase. In comparison with Santa Fe, there were fewer professional organizations advocating for environmental protection broadly.⁸⁶ However, in a form similar to Santa Fe, there was a series of mobilized community groups that fought against contamination from sugar mills and citrus plants in their towns.⁸⁷ One group, formed in the beginning of 2003, was UniVec (*Union de Vecinos del Sur*), located in the town of La Trinidad, where pollution levels from a nearby sugar mill increased substantially, blanketing the town with soot. Two neighbors, both school teachers, started lodging complaints about the increase in pollution with a wide range of government agencies and politicians.⁸⁸ Eventually, they took their complaints to the street:

“We gathered all of the ash from the house of my neighbor...We put it all in a container, put it in a wheelbarrow, and made a poster that said ‘There Is No Right To Pollute.’ We went—my neighbor and our wives and kids...this wasn’t a big mobilization—through the central streets of the town, calling to everyone that we were taking the ash and returning it to the mill. From that moment, it was public, and that allowed neighbors in other places where mills are located to connect with us.”⁸⁹

The incident generated news stories in the local press and made the two neighbors focal points in the conflict against the pollution from the local mill.⁹⁰ These types of mobilizations were very similar to those that engendered a firefighting response from regulators in Santa Fe and in other provinces.

Pressure to clean up Tucumán's environmental act, however, did not end with small community mobilizations and demands from professional environmental groups. Towards the end of the 1990s, there was an external shock, the first in a series, that came from a neighboring province, Santiago del Estero, which was receiving pollution in the

Rio Salí from Tucumán's industry. Officials in Santiago del Estero took the province of Tucumán to Federal court hoping to compel it enforce its own environmental laws.⁹¹

And the national government became somewhat involved, especially after President Néstor Kirchner appointed a lawyer with a record of arguing for environmental groups to lead the federal environmental agency.⁹² These actions threatened industry even if the federal government could not directly regulate firms in Tucumán (the province retained jurisdiction, and in other similar cases in Argentina, such as the Riachuelo Watershed in Buenos Aires, federal court orders proved to have limited immediate effect).

Conflict that could not be resolved in institutions spilled out onto the streets when fish kills in a lake at the border between the provinces made the consequences of water contamination highly visible.⁹³ Large protests broke out in the town in Santiago del Estero on the border with Tucumán, including blockades of the roads that link Tucumán to the markets and ports in Buenos Aires and Rosario.⁹⁴ These actions reinforced the external pressure on the entire industries.⁹⁵ Unrest and road blocks were seen by industry leaders in Tucumán as a serious threat that could disrupt exports of citrus goods and shipments of sugar—not for just one firm, but for all.⁹⁶

An additional major force from outside the provincial regulatory institutions came through the judiciary.⁹⁷ A new federal district attorney, Antonio Gustavo Gómez, began a campaign against violations of environmental law, taking over sixty cases to court, including the citrus and sugar industries.⁹⁸ A senior official in the Environment Department described the change. *“For many years, the environmental problems, the fines and the rest, they were managed politically. There would not be effective fines, or the fines would be suspended, or they would only collect minimum fines, these kinds of*

things. Then the Federal prosecutor came into the picture, and... things began to get complicated because they left the borders of Tucumán."⁹⁹ Whereas SIPROSA lacked teeth, Gómez was all bite; he charged the directors of firms personally with environmental crimes, scaring and embarrassing people of power. Unlike the equilibrium sought by SIPROSA, Gómez had no problem with shutting down entire industries if they could not comply. As a federal prosecutor, locally powerful political actors, such as firms owners, were limited in their ability to fight back against Gómez.

Furthering the role of the courts, the Federation of Environmental Non-Governmental Organizations (FA) in Tucumán filed a lawsuit against all of the sugar mills for non-compliance with air pollution regulations. The FA effectively bypassed the regulators, who they believed would protect firms, and took on the firms directly through a civil action.¹⁰⁰ Three of the mills settled with the FA and agreed to install filters. For the rest of the mills, there was an extended legal battle that the FA eventually won in 2008. This was a serious victory for the FA against the powerful industry.¹⁰¹ In combination with the lawsuits of Gómez, the FA's civil action circumvented regulatory institutions and directly threatened the firms.

In sum, mobilization against pollution in Tucumán took a qualitatively different shape from the one in Santa Fe. There were flare-ups of unrest around specific communities and firms, but there was also a series of pressures that threatened all firms in the citrus and sugar industries. This combination of flare-ups and pressures put these industries into a crisis in which their licenses to operate were threatened.

Shifting Regulatory Patterns and Investment in State Capacity

The provincial government of Tucumán could have taken a number of courses of action in light of the conflict around pollution. Regulators could have put out as many fires as possible, mediating conflicts between individual firms and communities where there were disruptive mobilizations without taking further steps (as in Santa Fe).

Alternatively, regulators could have stepped back while the courts slowly worked through their process since court orders could be met with a pro forma response that would simply defend the politically powerful industries (such as claiming that firms were complying with regulations even if they were not).¹⁰² Any of these reactions would have been possible without any real investment in state capacity, and scarce resources would not have to be allocated to environmental regulators.

The consequences of either of these paths would have been further increases in pollution levels. In addition, firms would have been left on their own to defend their social licenses to operate without state support, a highly risky situation. Blocked from changing the laws,¹⁰³ industry saw that its back was against the wall. Although firms had been successful in the past in resisting pressures, there was a perception (whether or not it was warranted) among leading industrialists that the questions were *when* and *how*, not *whether*, they would have to change. A leader in the industry summed up the challenge this way. “*The idea was that we would have sugar as cheap as in a village in Africa and production methods as clean as the highest level of the first world...which generated a very difficult situation. Eventually “[we] have to comply or we will be shut down.”*¹⁰⁴

Compared with facing the onslaught of social mobilization and prosecution on their own, the prospect of more capable state regulators presented substantial advantages

to industry (given the constraint that they could not diffuse mobilization or rewrite the laws). On the one hand, the firms needed help figuring out how to deal with the new demands. For some issues, such as air pollution from boilers in the sugar mills, the technical solution was fairly clear, only requiring investment in technologies and operating costs. For other issues, such as treatment of water pollutants, even leaders in the industry did not know what solution might work in a cost effective way. At the beginning of the 2000s, most firms did not have environmental managers or engineers with training in pollution mitigation. On the other hand, firms also wanted regulators to provide them with protection from the coming social pressure (exercised through the courts and in the street) while they looked for a solution. All the firms in the citrus and sugar industries (not just those located next to mobilized communities) were threatened. Anything that could buy the firms time to upgrade progressively instead of forcing changes all at once would help them survive.

When the support from firms for increased regulatory capacity was combined with demands from environmental groups (which had always wanted the state to take its enforcement role more seriously), the provincial government began to invest in internal components of state capacity. The first program was the Provincial Plan for Clean Production (*Plan Provincial de Producción Limpia*, or PPL), by which the province signed agreements with firms to implement pollution prevention technologies and management systems.¹⁰⁵ Though the program was created at the end of 2001, it did not really begin until the economy reactivated in 2003. The PPL created a new specialized group of technical staff called the Center of PPL, which was jointly run through a collaboration between the Federal government, provincial government, and the National

University of Tucumán. The Center of PPL hired a team of twelve young engineers to oversee implementation of the program (on top of the existing staff at SIPROSA, which remained), thereby dramatically expanding internal component of state capacity for regulation.¹⁰⁶

With the PPL, regulators responded to both of the immediate needs of industry. First, the PPL staff audited environmental management in the firms in order to identify changes that would reduce waste generation, water consumption, and energy use. They gave free consulting advice to the firms (many of which did not have in-house expertise in environmental management), looking for “win-wins” that immediately made pollution prevention pay. Through the process of the PPL some firms saw benefits, as a manager explained “*We started with the problems of order and housekeeping. From there, we started to find lots of things, such as the waste of oils, products, and paper.*”¹⁰⁷ The accumulation of these efforts led to real benefit for some firms. For example, the sugar mill, Marapa, increased energy efficiency with a savings of over \$100,000 and invested in better filtration systems that reduced pollution, as well as waste, with a three-year payback. The citrus firm Citrusvil reported improving efficiencies in their operations to reduce the use of sodium hydroxide saving thousands of dollars in the process. And the citrus firm Citromax improved water efficiency to reduce usage, and costs, by 5%.¹⁰⁸ Regulators also encouraged firms to collaborate with one another, and with the state, in search of better technical solutions to the root causes of pollution. In addition, the PPL brought in experts outside of the province to talk about environmental management with industry. The result of these actions was the formation of thick ties between regulators

and firms that enabled the state to extend its ability to assist firms in finding solutions to pollution challenges.

Second, the PPL offered firms a degree of legal certainty by shielding them from prosecution while they tried to improve their performance. A senior official who was involved in the PPL described the informal exchange. *“There was a verbal commitment that while a firm is in the PPL, it would not be penalized. This was a commitment absolutely outside of the law because the agreements could not modify the law.”*¹⁰⁹ A manager at a citrus firm described the importance of the plan:

*“[The regulators] knew no one could comply with the legislation. It was for that reason that they established the PPL, and that is why we were part of the project... We could say [to the courts and environmental groups] ‘well, we are working, we are in the PPL, we are doing things, but we still haven’t gotten to the pollution levels, but we are looking for a better technology.’ With this, the PPL helped us, it was a commitment to really find a solution.”*¹¹⁰

In sum, the PPL mitigated the costs of regulated firms through customized technical assistance from regulators that helped firms figure out how to reduce pollution, as well as through the creation of the program that gave firms a workable schedule to install upgrades and change processes. Thus, the enforcement process was categorically different than the image of regulatory unreasonableness or rigidity that is often blamed for perverse economic outcomes.¹¹¹

Although the PPL took a step forward by investing in state capacity and by shifting the pattern of interaction between regulators and firms, the reform was incomplete in many ways—without penalties, many firms failed to live up to their agreements, and environmental groups saw the program primarily as a tool to protect the industry instead of as a real driver of change. Notwithstanding these deficits, the PPL

was an important development because regulators were, for the first time, systematically monitoring the activities of the majority of sugar and citrus firms (in addition to other major polluters, such as a paper mill) and taking actions to help them come into compliance.

The PPL was originally created as a temporary program, and as it was winding down in 2006 the pressure on firms to address pollution in the courts and through protests intensified. In addition to direct challenges to industry, an unrelated environmental conflict outside of Tucumán over a paper mill in Uruguay near the Argentine city of Gualeguaychú signaled to many that there just might be political will to combat pollution. This conflict resulted in marches of over 40,000 people, a blockade of a key international bridge, and President Néstor Kirchner's holding a rally attended by nineteen governors and the entire presidential cabinet in support of the environmentalists.¹¹² Despite no direct connection with the problems in Tucumán, the unprecedented scale of the conflict and the supportive political response furthered concern among industry in Tucumán that real threats loomed for firms that did not get pollution under control.

When the PPL formally ended in Tucumán, industry recognized the benefits from the program and reaffirmed its interest in improved regulatory capacity. In the words of a senior official, "*Firms were desperate to continue to have a refuge,*" and they recognized that the regulators "*gave them the ability to introduce environmental issues in their factories.*"¹¹³ With industry support and help from the Federal government, Tucumán created the Plan of Industrial Reconversion (PRI) that included a new round of voluntary agreements with firms, and which brought with it another shift in the composition of the state bureaucracy.¹¹⁴ The change to the organization of the executive branch involved the

initiation of a process to create an Environment Department by consolidating various agencies involved in environmental management into one single agency. In addition, replacing the staff from the Center for PPL, a new group of sixteen professionals were hired to implement the PRI.¹¹⁵ All were highly skilled (engineers and a lawyer); additionally, they were supported by interns who were engineering students, thereby making the overall level of expertise much higher than in most Argentine bureaucracies.

In order to jointly engage in problem-solving with industry, the PRI staff needed access to firms in order to have open conversations about the problems facing the firms in reducing pollution. This was made possible, in part, by the composition of the new staff, which came into the state with thick ties to the industries they had to regulate. For example, the coordinator of the program had been a plant manager at some of the largest mills before becoming an environmental specialist. Others had a few years of experience working in industry and then left to work for the state. One senior official described his previous experience with the firms:

“With the people who manage the firms, there is a relationship of trust, and with some of friendship. Everyone knows me because I was classmates of a number of them at the university....This relationship that I have with the people who manage the firms has been very valuable because it has opened doors for me.”¹¹⁶

These relationships were key for building on the existing collaboration between the state and the private sector that had begun in the PPL. Of course, open relationships would not form with every firm, but there was a clear shift away from the previous approach to regulation under SIPROSA. Without reforms to augment autonomy, these changes opened up the regulators for even more political interference.¹¹⁷ In sum, the enforcement bureaucracy expanded its internal capacity and developed strong ties with the industry.

With the creation of the PRI, conflict and demands by environmental groups for pollution reduction did not cease. The actions of environmental groups provided additional support for investment in state capacity. A senior official said, “*All of the actions of the NGOs I see as opportunities to grow institutionally...to gain more resources.*”¹¹⁸ In addition, as did their counterparts in Santa Fe, regulators in Tucumán attempted to channel demands for pollution reduction out of the streets and into the regulatory system. No formal advisory committees were set up, but there were informal channels that allowed groups, especially neighborhood groups that could mobilize protests and disrupt firms, direct access to the Secretary of Environment.

From the perspective of regulators involved in the PRI, societal groups made valuable contributions to the process of implementing the agreements.¹¹⁹ For example, environmental organizations helped regulators gather information about firms. As one official stated, “*We are in constant contact with the people from the NGOs. [They say] ‘this firm is better, this one is worse,’ or ‘look, this firm is dumping this filth into the river, go [inspect them].*”¹²⁰ For instance, through his linkages to leaders in UniVec, the Secretary of Environment Alfredo Montalván met with neighbors of a mill who lived near a polluted stream.¹²¹ The information and support Montalván gained from his linkages with UniVec enhanced his ability to monitor pollution. Community organizations confirmed the statements of regulators; for example, one community leader said that he “*sits down with regulators to discuss problems, and they have never denied [us] access to information.*”¹²² Another commented that when there were conflicts, the Secretary of Environment “*personally came*” to meet with them and they had “*fluid*” contacts with regulators.¹²³

There was, not surprisingly, continued strain between regulators and environmental groups. On the one hand, many groups were wary about legitimizing programs that could give firms protection from judicial claims and did not support the PRI.¹²⁴ On the other hand, the regulators wanted to maintain control over enforcement while bringing environmental groups into the process:

“The majority of NGOs have received, from us, all of the information about the commitments of the firms. Many times, the NGOs...have been able to, in some way, follow them from close by...The problem is that, because of their lack of trust, many of the NGOs want to transform themselves into the authority, and this is not possible.”¹²⁵

This tension allowed environmental NGOs to augment the operational capacity of the state while remaining a countervailing force against industry.

In sum, there were major shifts in the internal and external components of state regulatory capacity in Tucumán. First, the regulatory bureaucracy added staff and consolidated functions of different branches of government, augmenting the operational capacity of the state. Second, through the agreements in PPL and PRI, and by virtue of the career backgrounds of many of the regulators, state officials formed strong ties with business that fostered cooperation for finding solutions to compliance challenges. Third, officials worked to channel the continued actions of environmental groups into regulatory institutions, and thereby developed linkages with community organizations; these ties expanded regulators’ ability to monitor firms and created an accountability mechanism.

Enforcement changed substantially with the shifts in state capacity. In addition to gaining information from mobilized community groups, the regulators conducted a baseline analysis of all firms in the citrus and sugar industries, noting their effluent levels and technology for pollution control. Every two months, firms sent progress reports on

investments they made as outlined in the agreements, and regulators conducted “patrol” inspections. Constant monitoring was important because even when firms invested in technological fixes to contamination problems, it was necessary for firms to adapt these changes to their operations and maintain them over time. In other words, enforcement was a key element that complemented the actions of courts and protests, which alone were incomplete. For example, some of the contamination problems, such as managing semi-solid waste from the sugar mills (*cachaza*), involved putting into place systems to ensure that wastes were carried into the fields by trucks and not dumped in rivers and canals. Such a process needed constant monitoring, as it was not accepted practice in the industry. Furthermore, large capital investments had to be maintained and used, as one regulator explained. *“This mill has a beautiful boiler, new, the latest generation technology, and managers don’t open the water circuit [that enables the air filter] ...because it costs money to run the water. Thus, the mill emitted black smoke even though they have everything [technologically].”*¹²⁶ With their patrol inspections and ties to the community, regulators were able to stay on top of all firms in the industry and identify those that were backsliding.

Not only had regulation in the sector progressed to the point where regulators were periodically visiting firms and using a variety of tools to induce compliance, but by using their linkages, regulators and the firms were building their capacity together. One mechanism the inspectors used was information diffusion. The director of environmental health and safety in a large sugar mill described the benefits of the regulators: *“They have more information from a variety of industries and are able to solve punctual problems when I don’t have access to the information myself. There is a technology transfer.”*¹²⁷

This view of the enforcement process was widely shared. The environmental specialist for a citrus plant recounted “*the regulators see what is happening in different industries and have more of a global view of the situation. At the end of each year they present to the firms...showing us cutting edge advances of how firms are working on environmental issues.*”¹²⁸ For some challenges, such as processing the huge volumes of wastewater, the technology was not locally understood. Some firms experimented with new forms of treatment, such as incinerating the pollutant vinasse and using it as a fuel, using processes with largely unknown results.¹²⁹ An environmental manager from another citrus firm described her relationship with the regulators:

*“They come and do their audits, but more than anything, the regulators visit us to find out what is going on, to soak it in, because our processes are applicable to other citrus plants. Our relationship with the people from the PRI is pretty open. The inspectors don’t have the knowledge and neither do we. We are buying technology from abroad, and we are learning, and the regulators come to learn as well.”*¹³⁰

In meetings between the state and the firms, each firm explained what it was doing to solve specific pollution problems, thereby mitigating adjustment costs by diffusing practices across the industry in a way the industry associations largely had not.¹³¹ Joint efforts were made in identifying new technologies to reduce pollution through the provincial government’s agricultural research agency, the Agro-Industrial Research Station Obispo Colombres, which is funded and overseen by the private sector.

Representatives from the industry along with regulators took a joint trip to the University of Valparaiso in Chile to examine new technologies for treatment of water effluents.¹³²

All of these actions reduced adjustment costs. They contrast strongly both with firefighting (that was dominant in Santa Fe), and with ridged implementation that relies entirely on creating incentives.

Joint-learning between regulators and the industry was supported by actual penalties for firms that failed to comply. While the core of the PRI was collaborative, it was supported by regulatory elements that more resembled command and control than resembled cooperation. In May 2007, the San Juan sugar mill had its operations suspended for not meeting its commitments.¹³³ This was the first time ever that a mill was closed down for a period of time due to pollution. In January 2008, the Environment Department closed another sugar mill, La Corona, for failure to install air filters in its smokestacks.¹³⁴ The latter closure was supported by protests from UniVec that mobilized against the mill and supported the Environment Department's action, but the former closure occurred even without an immediate mobilization. A senior official in the Environment Department described the intent of these closures as a signal that the state is serious. "*The state will close you...It was a clear message to the businessmen. 'Don't fuck with me.'*"¹³⁵ Another official described the move as a way of inducing cooperation.¹³⁶ The closures, although temporary, were a significant change in environmental regulation in Tucumán. Regulators were able to take these actions by using their internal capabilities to actually gather information about compliance, and by leveraging political backing from the environmental groups and the courts. Firm owners now saw evidence that there was a real possibility they would be shut down for not complying, thus creating the conditions for productive regulator-firm collaboration. This enforcement process is consistent with rewarding regulation--while it is important for regulators to enable firms to comply by educating them about how to change their processes and technologies, such collaborative actions alone can be insufficient. A background threat of penalties can be used to get firms to the table to start the

conversation about how to solve problems, as well as to motivate firms that do not respond to assistance without strong incentives.¹³⁷

Enforcement did more than put out a few fires; it helped tilt the balance of complete non-compliance in the sugar and citrus industries towards steady investment in pollution reduction. By 2009, tensions reduced substantially; although the head of the Federation of Environmental Non-Governmental Organizations remained critical of the Secretary of Environment, he noted that there were fewer problems, complaints, and conflicts than there had been in the earlier period.¹³⁸ This outcome suggests that regulators were able to create some order in a chaotic regulatory environment. Although continued pressure from regulators and communities will likely be necessary to sustain these changes, firms did develop capabilities to manage pollution for the first time. One sugar mill hired one of the staff from PRI to open up an environmental department in the firm. It was hardly unique. A citrus firm that had been operating since the 1970s without any environmental specialists created a department to manage environmental issues in 2004.¹³⁹ Creating specialized offices to address environmental concerns could also very well be a key step in firms justifying environmental management in terms of efficiency and competitiveness, a process that has amplified the effect of state regulation in other contexts.¹⁴⁰

There were also concrete changes in pollution mitigation that coincided with the regulators' efforts. Before 2006, only a third of the sugar mills had a system for managing the pollutant *cachaza*, and by 2008 nearly all mills had developed *cachaza* management systems.¹⁴¹ Similarly, in 2005 very few mills had installed filters to reduce air pollution from burning bagasse. The percentage of air emissions that were filtered

increased from 19% in 2006 to 62% in 2007. By August 2009, 96% of emissions were filtered. Firms also invested in experimenting with solutions, and some used short-term methods to reduce water pollution (vinasse) in rivers. Overall, sugar mills reported that they invested nearly 50 million dollars in decreasing pollution in 2008 and 2009.

Improvements in enforcement also coincided with concrete results in the citrus firms, which invested over ten million dollars in environmental management. A number of firms had installed more advanced pollution treatment systems, and at least two firms gained ISO 14,000 certifications. One firm successfully installed a biogas system to power the plant, reducing greenhouse gas emissions and earning carbon offset credits to gain revenues from treating wastewater.¹⁴² Although the actions of regulators were one of many factors (such as the courts) pushing firms to comply, in this case, environmental regulation was clearly successful in helping induce pollution reduction and bringing firms closer to compliance with the laws.

In sum, there was a dramatic shift in Tucumán, which contrasts strongly with stasis in Santa Fe. Whereas in Santa Fe regulators put out fires and made chaotic regulation bearable for industry, in Tucumán regulators systematically took steps to enable entire industries to move towards compliance. Regulators in Tucumán not only penalized firms that were not complying, but they also helped identify and diffuse technologies and management practices that could help firms improve their environmental performance. By doing so, regulators help avoid two possibilities that, in this case, would have been detrimental to development. On the one hand, regulators could have done nothing and firms could have been powerful enough to fend off societal demands without reducing pollution. If this had been the case, industry might have been

spared investments in pollution reduction, but with the negative effects on the community (as well other parts of the economy, such as the tourism industry that depends on clean air and water). On the other hand, societal and court demands could have disrupted the entire sugar and citrus industries with road blockades (as in Gualaguaychú) or judicial demands that industry lacked the capability to meet (such as reducing vinasse effluent). In this case, pollution would have been reduced at the expense of the survival of industry. The leaders of major firms believed that the latter, not the former, scenario was more probable.¹⁴³ But neither of these scenarios came to pass. Instead, the state in Tucumán became a mediator of environmental conflict by taking a situation in which there were real threats of economic damage from widespread conflict, and translating them to progressive upgrading and continuous improvement.

The gains in Tucumán are still not cause for a final celebration. The province has a ways to go before it gets pollution completely under control. Moreover, the reforms to the bureaucracy have not moved it further towards an autonomous regulatory agency that is insulated from powerful groups.¹⁴⁴ Therefore, sustained enforcement is contingent on continued threats to business from mobilized groups in society and from activists pockets of the judiciary. Nevertheless, there have been real changes in Tucumán and substantial departures from the firefighting model. Given the weakness of environmental regulation in much of the world, the mechanisms that led to the marginal improvements are worthy of close analysis.

Explaining the Shift in Tucumán

Why were regulators in Tucumán able systematically to take steps to promote compliance? The most immediate answer is that Tucumán increased both the internal

and external components of state capacity, thereby enabling regulators to take a broad range of action at an industry level. In contrast to Santa Fe, there was a larger regulatory staff with more expertise and greater material resources. These changes were crucial to the constant monitoring. Moreover, the strong ties regulators had to industry and environmental groups allowed regulators to extend their capacity; they were able to assist firms in upgrading their pollution control systems and to penalize laggards. Again, this shift contrasted with stasis in Santa Fe, where regulators were relatively isolated from societal groups unless there was an immediate conflict.

Why was there investment in the two components of state capacity in Tucumán? The answer lies in part in the shocks created by a combination of social mobilization and the action of the prosecutor. These pressures are not, however, sufficient to account for the changes in Tucumán for two reasons. First, the state could have taken any number of actions in response to social demands, including pure window dressing. While the prosecutor and community groups could have put pressure on the firms, there was no real political opposition to threaten the governor (who won elections by 19 points in 2003 and 73 points in 2007). The economic threat of these pressures does not directly translate to a political threat in a political context without robust competition. Second, and related, the types of investments made in state capacity did not follow from the demands of those mobilized most strongly against pollution—many of these groups, including the prosecutor, were against progressive plans that helped industry and prevented immediate closures of firms.

Instead, the coalition behind the PPL and PRI was a combination of industry and several of the environmental groups. This combination was enough to generate political

support for the PPL, PRI, and eventually the reorganization of the regulatory agency. The counterintuitive interest that industry had for capable regulators derived from industry's need for regulators who could respond to the full-scale crisis that was not contained in any one community (as in Santa Fe). Ultimately, a key part of the explanation lies in the fact that, although firms wanted to avoid costly investments in environmental protection where possible, this position was separate from their interest in regulatory institutions that could structure conflict. It is not that business preferred systematic enforcement to complete deregulation, but given the prevailing conditions of social conflict and that some environmental standards were set at the national level, the latter was off the table. The choice, instead, was between a small regulatory agency that could only put out fires and a more substantial one that could help with adjustments and quell social unrest. Overall, the industry begrudgingly chose the latter—the refuge from the chaos was sufficiently helpful to counter the possibility that regulators would push them on investments for pollution prevention.

Conclusion

Sustainable development requires institutions that can give firms the incentives and ability to upgrade. Yet, there is ample evidence that in many industrializing countries regulatory institutions are weak, and as a result, firms respond directly to unfiltered social demands. With chaotic regulation, there are high levels of uncertainty for firms, low levels of pollution abatement, and few structures to help progressive upgrading. As a result, trade-offs of environmental protection versus economic development take center stage, with environmental groups and firms locked in seemingly

zero-sum conflicts. This outcome, however, is not inevitable. Researchers working in a variety of countries have identified instances in which regulatory institutions have been able to induce upgrading that supports environmental protection and economic prosperity.¹⁴⁵

This paper explored the conditions under which there are shifts in the ability of the state to promote institutional strength by enforcing rules already on the books. First, the argument located the first-order underpinnings of firefighting and systematic enforcement in combinations of internal and external components of state capacity. This conceptualization helped focus attention on how politics relates to changes in both administrative resources and in state-society ties. Second, the paper examined changes in patterns of enforcement over time in Tucumán in contrast with stasis in Santa Fe. The Tucumán case was particularly puzzling because improvements to the regulatory agency occurred despite low levels of economic development, uncompetitive local politics, and economic dependence on commodity-producing (and polluting) industries. Using the common frame of environmental groups and industry battling over pollution, changes in Tucumán seem highly unlikely—industry was politically well-positioned, environmental groups were marginal players, and the rule of law was highly questionable.

In contrast, analysis of the case identified an unexpected relationship between conflict over pollution and the politics of strengthening institutions. In the face of an industry-wide conflict, even firms that would have rather avoided investment in pollution abatement had an interest in stronger internal components of state regulatory capacity. Even if firms continue to prefer weaker regulatory laws, they can still (under some conditions) prefer stronger intermediaries. The apparent contradiction in an anti-

compliance but pro-regulator position becomes clear once we take into account the ways by which regulators help industry adjust to demands from society.¹⁴⁶ Industry support in the case of Tucumán was critical to the development of improved state regulatory capacity and, ultimately, to shifting patterns of enforcement. In addition to close ties with firms, continued community-level conflicts allowed regulators to build relationships with environmental groups, which supplemented regulators' internal resources and ties to industry. This result contrasted with the case of Santa Fe, where isolated conflicts, which could be addressed through firefighting, never triggered industry support for a stronger regulatory state. As a result, the state remained weak and firefighting was stable.

Strengthening regulatory institutions is by no means simple. Analysis of the Argentine cases suggests that some conflicts are pathways out of chaotic regulation, while others are not. Tucumán's regulators and environmental groups benefited from the particular nature of pollution (which crossed provincial borders) and the role taken by the courts in promoting an industry-wide threat. There are, however, examples beyond Argentina of industry-wide threats leading to increased state action to promote environmental upgrading. For instance, in response to demands by a German ban on chemicals used in leather tanning, the Indian state helped "institutionalize compliance" with the benefit of support from industry.¹⁴⁷ The dynamics of this and other cases suggest that research on regulation needs to be attentive to two related, but distinct, spheres of politics—the immediate conflicts between firms and communities, and the politics of state capacity and institutional strength. Greater understanding of the pathways out of regulatory chaos can help identify new opportunities to promote developmental regulation in the context of weak states.

NOTES

¹ Hemamala Hettige, Mainul Huq, Sheoli Pargal and David Wheeler, "Determinants of Pollution Abatement in Developing Countries: Evidence From South and Southeast Asia," *World Development* 24, no. 12 (1996), 1891-1904. World Bank, *Greening Industry : New Roles for Communities, Markets, and Governments*, (New York: Oxford University Press, 1999).

² Benjamin Van Rooij, "Greening Industry Without Enforcement? An Assessment of the World Bank's Pollution Regulation Model for Developing Countries," *Law & Policy* 32, no. 1 (2010), 127-152. Allen Blackman, "Alternative Pollution Control Policies in Developing Countries," *Review of Environmental Economics and Policy* 4, no. 2 (2010), 234-253.

³ For a review, see: S Haggard, A MacIntyre and L Tiede, "The Rule of Law and Economic Development," *Annual Review of Political Science* 11, (2008): 205-34.

⁴ On environment in Argentina, see: Kathryn Hochstetler, "After the Boomerang: Environmental Movements and Politics in the la Plata River Basin," *Global Environmental Politics*, no. 4 (2002): 35-57. Javier Auyero and Débora Alejandra Swistun, *Flammable: Environmental Suffering in an Argentine Shantytown* (New York, Oxford: Oxford University Press, 2009). Ralph Espach, *Private Environmental Regimes in Developing Countries: Globally Sown, Locally Grown* (New York: Palgrave Macmillan, 2009). On the general pathologies, see: Dara O'Rourke, *Community-driven Regulation: Balancing Development and the Environment in Vietnam* (Cambridge: MIT Press, 2004). Lesley McAllister, *Making Law Matter: Environmental Protection and Legal Institutions in Brazil* (Stanford: Stanford Law Books, 2008).

⁵ See, for example: *Ibid.*

⁶ Neil Gunningham, Robert A Kagan and Dorothy Thornton, "Social License and Environmental Protection: Why Businesses Go Beyond Compliance," *Law & Social Inquiry* 29, no. 2 (2004): 307-341.

⁷ I define institutional weakness as a failure of institutions to structure behavior, not as a set of regulations that (if followed) would offer little protection to the environment. On institutional weakness as a concept, see: Guillermo O'Donnell, "On the State, Democratization and Some Conceptual Problems - A Latin American View with Glances at Some Postcommunist Countries," *World Development*, no. 8 (1993): 1355-1369. Steven Levitsky and María Victoria Murillo, "Introduction," in *Argentine Democracy: The Politics of Institutional Weakness*, (University Park, PA: The Pennsylvania State University Press, 2005).

⁸ Interviews are noted by a code, not by the name of the interviewee, to maintain confidentiality.

⁹ See for example: Jorge Nef, "Environmental Policy and Politics in Chile," in *Environmental Policies in the Third World* (Westport, CT: Greenwood Press, 1995). Peter Utting, *The Greening of Business in Developing Countries: Rhetoric, Reality and Prospects* (London: Zed, 2002). Carlos Reboratti, "Environmental Conflicts and Environmental Justice in Argentina," in *Environmental Justice in Latin America: Problems, Promise, and Practice*, (Cambridge: MIT Press, 2008). Anthony Bebbington, "Contesting Environmental Transformation: Political Ecologies and Environmentalisms in Latin America and the Caribbean," *Latin American Research Review* 44, no. 3 (2009):

177-186. O P Dwivedi and Dharendra K Vajpeyi, *Environmental Policies in the Third World: A Comparative Analysis* (Westport, CT: Greenwood Press, 1995). S Y Tang, V Prakash and C Tang, "Local Enforcement of Pollution Control in Developing Countries: A Comparison of Guangzhou, Delhi, and Taipei," *Journal of Public Policy* 18, no. 03 (1998): 265-282. L A Henry and V Douhovnikoff, "Environmental Issues in Russia," *Annual Review of Environment and Resources* 33 (2008): 437-460. D V Carruthers, *Environmental Justice in Latin America: Problems, Promise, and Practice* (Cambridge: MIT Press, 2008). Rachel E Stern, *Environmental Litigation in China: A Study in Political Ambivalence* (Cambridge, UK, New York: Cambridge University Press, 2013).

¹⁰ For example, see the citations within: B R Copeland and M S Taylor, "Trade, Growth, and the Environment," *Journal of Economic Literature* 42 (2004): 7-71. O'Rourke, 2004. McAllister, 2008.

¹¹ Dara O'Rourke, "Motivating a Conflicted Environmental State: Community-Driven Regulation in Vietnam," *The Environmental State Under Pressure* 10 (2002): 242. O'Rourke, 2004.

¹² For two recent studies, see: E Lee, "Information Disclosure and Environmental Regulation: Green Lights and Gray Areas," *Regulation & Governance* 4, no. 3 (2010): 303-328. Blackman, 2010. These studies echo arguments of earlier work by Susan Silbey. See: Susan Silbey, "The Consequences of Responsive Regulation," in *Enforcing Regulation Law in Social Context Series* (Boston: Kluwer-Nijhoff, 1984).

¹³ The concept of social license was developed for application in advanced industrial countries, specifically to explain firm behavior that went "beyond compliance." Gunningham, Kagan and Thornton, 2004. On environmental regulatory dynamics in the absence of effective states, see: Hettige and others, 1996. World Bank, 1999.

¹⁴ Nandini Dasgupta, "Environmental Enforcement and Small Industries in India: Reworking the Problem in the Poverty Context," *World Development* 28, no. 5 (2000): 945-967

¹⁵ For example: Meenu Tewari and Poonam Pillai, "Global Standards and the Dynamics of Environmental Compliance in India's Leather Industry," *Oxford Development Studies* 33, no. 2 (2005): 245-267. Salo V Coslovsky, "Relational Regulation in the Brazilian Ministério Público: The Organizational Basis of Regulatory Responsiveness," *Regulation & Governance* 5, no. 1 (2011): 70-89. Kathryn Hochstetler and Margaret E Keck, *Greening Brazil: Environmental Activism in State and Society* (Durham: Duke University Press, 2007). Allen Blackman and Geoffrey Bannister, "Community Pressure and Clean Technology in the Informal Sector: An Econometric Analysis of the Adoption of Propane by Traditional Mexican Brickmakers," *Journal of Environmental Economics and Management* 35, no. 1 (1998).

¹⁶ Maria Carmen De Mello Lemos, "The Politics of Pollution Control in Brazil: State Actors and Social Movements Cleaning Up Cubatão," *World Development* 26, no. 1 (1998): 75-87. Maria Carmen Lemos and Johanna W Looye, "Looking for Sustainability: Environmental Coalitions Across the State-Society Divide," *Bulletin of Latin American Research* 22, no. 3 (2003): 350-370.

¹⁷ Simone Pulver, "Introduction: Developing-Country Firms As Agents of Environmental Sustainability," *Studies in Comparative International Development* 42 (2007): 191-207.

¹⁸ O'Rourke, 2004.

¹⁹ Daniel Chudnovsky, Andrés López and Valeria Freylejer, "The Diffusion of Pollution Prevention Measures in LDCs: Environmental Management in Argentine Industry," in *Industry and Environment in Latin America* (London, New York: Routledge, 2000).

²⁰ Notable exceptions include: Hochstetler and Keck, 2007. McAllister, 2008.

²¹ See: Paul Steinberg, "Welcome to the Jungle: Political Theory and Political Instability," in *Comparative Environmental Politics* (Cambridge, MIT Press, 2012). Ibid.

²² The approach to state capacity builds on: Michael Mann, *The Sources of Social Power: Volume 2* (New York: Cambridge University Press, 1993). Peter Evans, "Introduction: Development Strategies Across the Public-private Divide," *World Development* 24, no. 6 (1996).

²³ Douglas Chalmers, "The Politicized State in Latin America," in *Authoritarianism and Corporatism in Latin America* (Pittsburgh: University of Pittsburgh Press, 1977).

²⁴ Judith Tandler, "Small Firms, the Informal Sector, and the Devil's Deal," *IDS Bulletin* 33, no. 3 (2002).

²⁵ This argument has been developed in relation to trade Copeland and Taylor, 2004. and the "race to the bottom" A B Jaffe, S R Peterson, P R Portney and R N Stavins, "Environmental Regulation and the Competitiveness of US Manufacturing: What Does the Evidence Tell Us?," *Journal of Economic literature* 33, no. 1 (1995): 132-163. Note that this process is fundamentally different than regulatory capture, as presented by Stigler. Firms are not looking to block market access, but instead to rationalize the process of upgrading.

²⁶ Antonio Elio Brailovsky and Dina Foguelman, *Memoria Verde: Historia Ecológica de la Argentina* (Buenos Aires: Sudamerica, 1991).

²⁷ Silvia Coria, Leila Devia, Ana Lamas, Silvia Nonna and Claudia Villanueva, *El Rumbo Ambiental en la Argentina* (Buenos Aires: Ediciones Ciudad Argentina, 1998).

²⁸ The Secretary of Environment under Menem, María Julia Alsogaray, used much of her time in government to enrich herself. She was convicted for corruption involving privatization of the telephone company Entel and for various actions as Secretary of the Environment. On her arrest and conviction: *Página/12* "Coleccionista de juicios" 08/08/03; "María Julia está a punto de mudarse" 08/08/03 "Una prueba de que el dinero no hace la felicidad" 05/22/04

²⁹ Andres Liebenhal, "Argentina Managing Environmental Pollution: Issues and Options," *World Bank* (1995): 5

³⁰ C23 (former official, Córdoba Environmental Protection Agency, Córdoba), interview by author, June 3, 2009.

³¹ S24 (Industrial Federation of Santa Fe, Rosario), interview by author, May 13, 2009.

³² B38 (Metal Plating Association of Argentina (ASADAM), Buenos Aires), interview by author, October 8, 2008.

³³ For example, in the province of Córdoba, a tannery was shut down and relocated after mobilization by community groups. There is little to indicate that this tannery was worse than others, but once it became a target it was closed. C29 (Enforcement Department, Córdoba Environmental Secretariat, Córdoba), interview by author, March 19, 2009. "Freyre: vecinos de una curtiembre muestran análisis de tóxicos en sangre," *La*

Voz del Interior (18 May 2005); “Muestran análisis de tóxicos en sangre” (18 May 2005); “Curtiembre cuestionada por vecinos estudia trasladarse a San Francisco” (20 May 2005).

³⁴ C02 (Industrial Union of Córdoba, Córdoba), interview by author, March 17, 2009.

³⁵ B14 (Argentine Sausage Industry Association, Buenos Aires), interview by author, September 30, 2008.

³⁶ See for example: “Informe Ambiental Anual 2011”, Fundación Ambiente y Recursos Naturales, Buenos Aires.

³⁷ B24 (“La Boca” Neighborhood Association, Buenos Aires), interview by author, October 4, 2008.

³⁸ Napoli, Andres. “Una Política de Estado Para el Riachuelo.” Fundación Ambiente and Recursos Naturales 2009

³⁹ B12 (senior official, Santa Fe Environmental Secretariat, Buenos Aires), interview by author, May 26 2009.

⁴⁰ CR8 (Corrientes Water and Environmental Agency, Corrientes), interview by author, September 12, 2008. These laws were adopted as “window dressing” to comply with the requirements of international finance organizations Steven Levitsky and Maria Victoria Murillo, “Variation in Institutional Strength,” *Annual Review of Political Science* 12 (2009): 115-133.

⁴¹ A study released by researchers in the National University of Rosario’s medical school in 2011, in collaboration with the United Nations, found that the province’s industry posed the highest risk of contamination in the country. *La Capital* “Rosario es una de las zonas con mayor contaminación del país” 05/08/11

⁴² S49 (inspector, Santa Fe Environmental Secretariat, Santa Fe), interview by author, December 10, 2008; S50 (inspector, Santa Fe Environmental Secretariat, Santa Fe), interview by author, December 10, 2008; S01 (senior official, Santa Fe Environmental Secretariat, Rosario), interview by author, April 30, 2009. Total number of facilities estimated from the Economic Census of 2004, INDEC.

⁴³ This practice was not due to a strategic use of flexibility. Instead, penalties were easily evaded by firms either by exploiting organizational failings in the SFSMA or by taking advantage of the limited appetite for punitive measures among senior officials. S01, (senior official, Santa Fe Environmental Secretariat, Rosario), interview by author, April 30, 2009; S13 (inspector, Santa Fe Environmental Secretariat, Rosario), interview by author, April 30, 2009.

⁴⁴ S13 (inspector, Santa Fe Environmental Secretariat, Rosario), interview by author, April 30, 2009.

⁴⁵ S13 (inspector, Santa Fe Environmental Secretariat, Rosario), interview by author, April 30, 2009.

⁴⁶ The Santa Clara plant is owned by Molinos Río de la Plata, an Argentine agro-industrial firm that produces primary products (soy beans, sunflower, rice), vegetable oils, biodiesel, and a variety of processed food products. Molinos Río de la Plata is a large firm that grew extremely rapidly during the commodity boom to reach 1.7 billion dollars in sales, 1.3 billion dollars in exports, and 5,000 employees in 2007. Santa Clara, one of five plants owned by Molinos, had the capacity to process a massive amount of soy and sunflower seeds (4,500 tons per day). Source: Annual Report, Molinos Río de la Plata, 2007.

⁴⁷ In the air: particulates, hexane, nitrogen oxides, ammonium, residual pesticides; in the water: oils, fats, and sulfates. Source: Torres de Quinteros, Zulema et. al.

“Condiciones ambientales y salud en el área influencia de la Aceitera Santa Clara (Distrito Sudoeste de Rosario-Argentina)” *Investigación en Salud*, no. 8, número especial (2007).

⁴⁸ S13 (inspector, Santa Fe Environmental Secretariat, Rosario), interview by author, April 30, 2009.

⁴⁹ B12 (senior official, Santa Fe Environmental Secretariat, Buenos Aires), interview by author, May 26, 2009.

⁵⁰ For example, see an editorial from the environmental group *Taller Ecologista*: “Más cerealeras, más deuda ecológica,” *La Capital* (20 February 2004).

⁵¹ “Explotó un silo y provocó gran incendio en una aceitera,” *La Capital* (6 April 2004); “Un incendio destruyó un silo en una aceitera,” (7 April 2004); “Un incendio en la aceitera Santa Clara arrasó un silo,” (9 May 2004); “Otro incendio en un silo de la aceitera Santa Clara,” (11 May 2004). The fires were caused by problems in silos that held sunflower seeds, which were not properly ventilated, leading to gas build-ups that eventually ignited. S36 (manager, Cereal Industry Firm, Rosario), interview by author, May 13, 2009.

⁵² S25 (Vecinal Santa Teresita, Rosario), interview by author, May 8 2009. “Piden controlar los silos de la planta aceitera Santa Clara,” *La Capital* (11 May 2004).

⁵³ “Advierten que aumentaron los casos de asma cerca de una planta aceitera,” *La Capital* (25 May 2004). Torres de Quinteros, Zulema et. al. “Condiciones ambientales y salud en el área influencia de la Aceitera Santa Clara (Distrito Sudoeste de Rosario-Argentina)” *Investigación en Salud* no. 8, número especial (2007).

⁵⁴ S25 (Vecinal Santa Teresita, Rosario), interview by author, May 8 2009; S36 (manager, Cereal Industry Firm, Rosario), interview by author, May 13 2009.

⁵⁵ S13 (inspector, Santa Fe Environmental Secretariat, Rosario), interview by author, April 30 2009.

⁵⁶ “Por la aceitera Santa Clara se reúnen provincia y municipio” *La Capital* (27 May 2004); “Controlarán las emanaciones que produce la aceitera Santa Clara,” (1 June 2004).

⁵⁷ S47 (Vecinal Santa Teresita, Rosario), interview by author, May 8, 2009.

⁵⁸ In Spanish: “*vecinos controladores*,” S25 (Vecinal Santa Teresita, Rosario), interview by author, May 8, 2009.

⁵⁹ S13 (inspector, Santa Fe Environmental Secretariat, Rosario), interview by author, April 30, 2009.

⁶⁰ The plan included the installation of electrostatic filters in their chimneys to reduce air pollution and a change in grain handling practices to further reduce air pollution. The plant management also promised to install a series of controls in the silos to reduce the risk of additional fires and an alarm system that could notify neighbors of any accidents. Finally, Santa Clara committed to undertaking a number of projects in the community, including planting a barrier of trees between the neighbors and the plant. “Santa Clara busca bajar la polución ambiental con un plan forestal,” *La Capital* (23 August 2004).

⁶¹ “Avanzan las mejoras ambientales en la zona de la aceitera Molinos Río de la Plata,” *La Capital* (9 August 2006). S36 (manager, Cereal Industry Firm, Rosario), interview by author, May 13, 2009.

⁶² S13 (inspector, Santa Fe Environmental Secretariat, Rosario), interview by author, April 30, 2009.

⁶³ S25 (Vecinal Santa Teresita, Rosario), interview by author, May 8, 2009.

⁶⁴ S04 and S18 (Taller Ecologista, Rosario), interviews by author, May 14, 2009 and June 3, 2009.

⁶⁵ S36 (manager, cereal industry firm, Rosario), interview by author, May 13, 2009.

⁶⁶ There was a similar case in the northern city of Rafaela, which also involved a commission of municipal government officials and neighborhood groups that monitored firms. Also, there were at least two other similar cases involving industry in the greater Rosario area. On Rafaela: S28 (inspector, Santa Fe Environmental Secretariat, Santa Fe), interview by author, December 10, 2008. On Capitan Bermudez: S04 (Taller Ecologista, Rosario), interview by author, June 3, 2009 and “La Justicia ordenó la clausura de Petroquímica Bermúdez,” *La Capital* (11 November 2006); “Celulosa y una medida a favor de los vecinos,” (13 March 2008); “Hallan cianuro en lo que fue una laguna estabilizadora de Bermúdez,” (5 June 2008). On Laser House: S13 (inspector, Santa Fe Environmental Secretariat, Rosario), interview by author, April 30, 2009 and “Clausuran una fábrica que emanaba olores en zona norte,” *La Capital* (22 March 2007); “Nueva denuncia contra una empresa por peligrosas emanaciones,” (12 June 2007).

⁶⁷ “Pavón y Fighiera cortaron la ruta en rechazo a fábrica contaminante,” *La Capital* (6 May 2007); “Marcha en Pavón contra un proyecto industrial,” (5 August 2007); “Desautorizan la instalación de una fábrica en Fighiera,” (22 August 2007). S01 (senior official Santa Fe Environmental Secretariat, Rosario), interview by author, April 30, 2009.

⁶⁸ In the south of the province, the SFSMA had only one environmental inspector responsible for literally thousands of industrial facilities, large and small, in the industrial corridor that surrounds Rosario. In the north, which has fewer polluting industrial sites, there were five inspectors, bringing the total to between six and ten inspectors in the entire province (depending on how they are counted).

⁶⁹ S01 (senior official Santa Fe Environmental Secretariat, Rosario), interview by author, April 30, 2009.

⁷⁰ B12 (senior official, Santa Fe Environmental Secretariat, Buenos Aires), interview by author, May 26, 2009.

⁷¹ S29 (inspector, Santa Fe Environmental Secretariat, Santa Fe), interview by author, December 10, 2008.

⁷² S01 (senior official, Santa Fe Environmental Secretariat, Rosario), interview by author, April 30, 2009.

⁷³ For example, the Santa Fe Labor Secretariat was given money to purchase over one hundred computers under governor Obeid and was upgraded to a full Ministry under governor Binner with funds to hire new inspectors. There was no such investment in the SFSMA, and Binner actually lowered the rank of the agency. Environment was reduced from a *secretaría del estado* to normal secretariat within a larger ministry.

⁷⁴ B12 (senior official, Santa Fe Environmental Secretariat, Buenos Aires), interview by author, May 26, 2009.

⁷⁵ S28 (inspector, Fe Environmental Secretariat, Santa Fe), interview by author, December 10, 2008.

⁷⁶ These include Foundation Protect (*Fundación Proteger*, founded in 1991), which is run by a local professor and focuses on water and fish conservation in the Paraná river basin. Another is the Santa Fe Center for the Protection of Nature (*Centro Santafesino de Protección a la Naturaleza*, CEPRONAT founded 1977), which has a campaign against pesticides and publishes a monthly journal “The Environmentalist” (*El Ambientalista*) covering local and global environmental issues. In Rosario, the Ecological Workshop (*Taller Ecologista*, founded in 1984) and Center for Biodiversity and Environmental Research (*Centro de Investigaciones en Biodiversidad y Ambiente ECOSur* founded in 1993), are professional organizations with members who include journalists, university professors, and lawyers. These organizations regularly conduct studies about environmental issues and are referents for the press in environmental matters. By most measures, they are comparatively well developed—they boast expertise, funding, and some even have international connections.

⁷⁷ These groups have exercised some political muscle. In 2003, they essentially vetoed the appointed secretary of environment, forcing the governor to select another candidate.

⁷⁷ “Rechazó el cargo el secretario de Medio Ambiente designado por Obeid,” *La Capital* (20 December 2003).

⁷⁸ “Confirmado,” *La Capital* (19 December 2003); “La Secretaría de Medio Ambiente se usa para pagar favores políticos,” (19 December 2003); “Rechazó el cargo el secretario de Medio Ambiente designado por Obeid,” (20 December 2003).

⁷⁹ S24 (Industrial Federation of Santa Fe, Rosario), interview by author, May 13, 2009.

⁸⁰ Processing lemons creates large amounts of organic wastes, which overload the river systems, literally making them run yellow. Sugar mills release a viscous substance called vinasse into the rivers, which is a byproduct of the process of making ethanol that contains extremely high quantities of organic pollutants. In addition, mills often dump wet organic solids called *cachaza* (a byproduct of cleaning and processing of the raw cane) into canals and rivers, which adds more organic pollutants to the watershed. Finally, during sugar processing and ethanol distilling, mills burn dried excess cane, called bagasse, for energy. This process releases particulate matter (soot) and a variety of other chemicals, which blankets residential areas (it is literally called “*black rain*” by residents). The combination of pollutants resulted serious environmental problems—extremely poor air quality and eutrophication.

⁸¹ T18 (environmental inspector, Tucumán Ministry of Health (SIPROSA), Tucumán), interview by author, November 4, 2008.

⁸² Officials openly stated in 2003 to the press that the regulatory institutions were full of weaknesses: “El PE reconoce que no cuida el medio ambiente,” *La Gaceta de Tucumán (LGT)* (2 August 2003).

⁸³ T18 (environmental inspector, Tucumán Ministry of Health (SIPROSA), Tucumán), interview by author, November 4, 2008.

⁸⁴ T02 (environmental specialist, citrus firm, Tucumán), interview by author, April 17, 2009.

⁸⁵ “Inspección ambiental a la citrícola Citrusvil,” *LGT* (30 April 2002); “Citrusvil no detiene su avance hacia la calidad total,” (23 August 2002).

⁸⁶ The only real professional environmental organizations is the Federation of Environmental Non-governmental Organizations (FA, *Federación de Organizaciones Ambientales No Gubernamentales de Tucumán*). The FA formed in 1987 as a confederation of various environmental organizations and professional societies. It only had one staff member but could draw on the resources of the professional societies. Two medium size groups were Pro-Eco and Pacto Verde, which included some individuals with professional backgrounds, but otherwise were local community organizations with few members. None of these groups had the staff, international connections, or presence of groups like Taller Ecologista and ECOSur in Santa Fe.

⁸⁷ In fact, Tucumán did not have a particularly strong endowment of environmental groups. A survey of NGOs found that there were approximately 190 in Santa Fe that included environmental issues in their actions (a very weak test), whereas there were 107 in Tucumán Elba Luna and Elida Ceconi, " Published by: United National Development Program, Inter-American Development Bank, and the Grupo de Análisis y Desarrollo Institucional y Social , Argentina, 2004. There were four major professionalized environmental organizations in Santa Fe; in contrast there was only one in Tucumán (which had fewer resources than the stronger groups in Santa Fe in terms of budget and expertise). In both provinces there were federations of environmental organizations. On citrus, see: T29 (Pro Eco, Tafi Viejo, Tucumán), interview by author, November 1, 2008; "Protesta vecinal contra una citrícola en Tafi Viejo," *LGT* (27 July 2006).

⁸⁸ "La Trinidad padece por la contaminación," *LGT* (2 August 2004). T21 (environmental activist, Tucumán), interview by author, November 15, 2008 and April 16, 2009.

⁸⁹ T21 (environmental activist, Tucumán), interview by author, November 15, 2008 and April 16, 2009.

⁹⁰ "La Trinidad padece por la contaminación," *LGT* (2 August 2004); "Piden que se ponga en vigencia una ley contra la polución," (21 July 2005).

⁹¹ "Grave demanda contra Tucumán," *LGT* (28 September 2002).

⁹² "Evidentemente, el Plan de Producción Limpia no es suficiente", opinó Picolotti," *LGT* (28 October 2006), "La contaminación del Salí inquieta al Gobierno nacional," (28 October 2006).

⁹³ "Hallan una mancha de aceite y peces muertos en El Frontal," *LGT* (10 August 2005); "El embalse de Río Hondo se llenó de algas y peces muertos," (17 August 2006).

⁹⁴ "Pobladores de Las Termas protestaron cortando la ruta 9," *LGT* (10 October 2006). "Caos en la ruta 9 por un reclamo en Las Termas," (4 November 2006); "Termenses afianzan su plan de lucha," (4 November 2006). The protests also made it to Tucumán, "Tres mil cartas le enviaron los santiagueños a Alperovich," (2 December 2006).

⁹⁵ "Anuncian cortes de ruta en Las Termas," *LGT* (20 February 2007), "Ambientalistas cortan la ruta 9 durante 24 horas," (15 February 2007).

⁹⁶ Business leaders were especially concerned because of the blockades of the bridge in Entre Rios over the Botnia paper mill, which was condoned by President Kirchner.

⁹⁷ "La Justicia mejoró sus puntos de vista con respecto a los temas ambientales," *LGT* (25 May 2003).

⁹⁸ "Investigan 60 causas por daño ambiental," *LGT* (23 October 2006). T08 (Federal Court of Tucumán, Tucumán), interview by author, April 14, 2009.

⁹⁹ T17 (senior official, Tucumán Environmental Secretariat, Tucumán), interview by author, November 3, 2008.

¹⁰⁰ T20 (Federation of Environmental Non-governmental Organizations, Tucumán), interview by author, November 3, 2008.

¹⁰¹ “El fallo en contra de los ingenios: “fue una lucha entre David y Goliath,” *LGT* (15 September 2008).

¹⁰² A common response by Argentine regulators is to “*generar numeros*”, meaning to undertake actions that look good in quantitative evaluations but have no real substance.

¹⁰³ When all of the legal battles began heating up in 2006, the main business association, the Economic Federation of Tucumán (FET), met with politicians looking for help. They enlisted the national Deputy Beatriz Rojkés de Alperovich (who is also the governor’s wife) to declare an “environmental emergency” in Tucumán and suspend the court cases against the firms. This attempt was unsuccessful and the court cases went forward. “Proponen que se declare en emergencia la cuenca del río Salí,” *LGT* (24 October 2006). “Hay voluntad política para sanear la Cuenca,” (19 December 2006).

¹⁰⁴ T49 (Tucumán Regional Sugar Industry Association (CART), Tucumán), interview by author, November 14, 2008.

¹⁰⁵ “Tratarán en un foro la contaminación del Salí,” *LGT* (6 October, 2012). B28 (Federal Secretariat of Environment and Sustainable Development, Buenos Aires), interview by author, September 22, 2008.

¹⁰⁶ There was not a textbook reform—all the staff had temporary contracts without civil service protection and they were not integrated into the career structure of the state apparatus—but it was a clear departure from Santa Fe (and many other provinces in Argentina) in that it was investment in the internal components of state capacity.

¹⁰⁷ T23 (environmental specialist, sugar mill, Tucumán), interview by author, November 12, 2008.

¹⁰⁸ González, J. (2003). *Producción limpia en Tucumán: Primera experiencia demostrativa en Argentina*. Tucumán: Ministerio de la Economía, Gobierno de la Provincia de Tucumán. See also: “La Producción Limpia aumenta las ganancias,” *LGT* (17 July 2012).

¹⁰⁹ T10 (cleaner production center, Tucumán), interview by author, November 11, 2008.

¹¹⁰ T02 (environmental specialist, citrus firm, Tucumán), interview by author, April 17, 2009.

¹¹¹ Eugene Bardach and Robert A Kagan, *Going by the Book: The Problem of Regulatory Unreasonableness* (Philadelphia: Temple University Press, 1982).

¹¹² “Es una cuestión ambiental que atañe a todo el país,” *Página/12* (6 May 2006). Days later, during a photo session of heads of state attending the European Union-Latin American summit in Vienna, the queen of the carnival in Gualaguaychú surprised the delegation in her carnival costume with a sign protesting Botnia. Author, “Mueva, mueva, mueva, no a las papeleras,” *Página/12* (12 May 2006). For a journalistic account, see: Verónica Toller, *Daños Colaterales: Papeleras, Contaminación y Resistencia en el Río Uruguay* (Buenos Aires: Editorial Marea, 2009).

¹¹³ T07 (senior official, Tucumán Environmental Secretariat, Tucumán), interview by author, November 4, 2008; November 14, 2008; and April 20, 2009.

¹¹⁴ “La tensión no frenaría la firma del acuerdo” and “Tucumán acordó con la Nación sanear la cuenca Salí-Dulce,” *LGT* (27 October 2006).

¹¹⁵ Again, this change was not a move towards a more Weberian bureaucracy. The PRI team had short-term contracts, no clear career path within public administration, and there was no exam to ensure that the hiring was meritocratic.

¹¹⁶ T17 (senior official, Tucumán Environmental Secretariat, Tucumán), interview by author, November 3, 2008. This is similar to Evans’ concept of embeddedness: Peter Evans, *Embedded Autonomy: States and Industrial Transformation* (Princeton, NJ: Princeton University Press, 1995).

¹¹⁷ The lack of any development of bureaucratic coherence that could lead to autonomy separates this case from the “embedded autonomy” model that has largely been the focus on analysis of the influence of state-society relations. See: *Ibid.*

¹¹⁸ T07 (senior official, Tucumán Environmental Secretariat, Tucumán), interview by author, November 4, 2008; November 14, 2008; and April 20, 2009.

¹¹⁹ T43 (engineer, Tucumán Environmental Secretariat, Tucumán), interview by author, October 28, 2008 and April 20, 2008.

¹²⁰ T13 (lawyer, Tucumán Environmental Secretariat, Tucumán), interview by author, October 28, 2008.

¹²¹ The author was copied on emails after interviewing one of the representatives of a neighborhood association.

¹²² T21 (environmental activist, Tucumán), interview by author, November 15, 2008 and April 16, 2009.

¹²³ T29 (Pro Eco, Tucumán), interview by author, November 1, 2008.

¹²⁴ T21 (environmental activist, Tucumán), November 15, 2008 and April 16, 2009. “Ambientalistas aprueban lo realizado, pero piden que les den participación,” *LGT* (15 October 2009).

¹²⁵ T07 (senior official, Tucumán Environmental Secretariat, Tucumán), interview by author, November 4, 2008; November 14, 2008; and April 20, 2009.

¹²⁶ T15 (industrial engineer, Tucumán Environmental Secretariat, Tucumán), interview by author, October 28, 2008 and November 10, 2008.

¹²⁷ T03 (environmental specialist, Sugar Mill, Tucumán), interview by author, April 21, 2009.

¹²⁸ T05 (environmental specialist, Citrus Firm, Tucumán), interview by author, April 17, 2009.

¹²⁹ T24 (environmental specialist, Sugar Mill, Tucumán), interview by author, November 12, 2008.

¹³⁰ T02 (environmental specialist, Citrus Firm, Tucumán), interview by author, April 17, 2009.

¹³¹ I directly observed two of these meetings in which firms discussed problems and talked about ways of diffusing practices.

¹³² T04 (Agro-Industrial Research Station Obispo Colombres, Tucumán), interview by author, April 20, 2009.

¹³³ “Por tercera vez en menos de ocho meses clausuran el ingenio San Juan,” *LGT* (9 January 2008). “La clausura del San Juan podría levantarse el lunes,” (19 May 2007); “El capítulo local del “affaire Picolotti”” (14 July 2007).

¹³⁴ “Clausuran el ingenio La Corona por contaminación,” *LGT* (6 January 2008).

¹³⁵ Anonymous official (Tucumán), interview by author, April 2009.

¹³⁶ T17 (senior official, Tucumán Environmental Secretariat, Tucumán), interview by author, November 3, 2008.

¹³⁷ On the relationship between penalties and problem-solving, see: Robert Kagan and John Scholz, "The "Criminology of the Corporation" and Regulatory Enforcement Strategies," in *Enforcing Regulation* (Boston: Kluwer-Nijhoff, 1984). Ian Ayers and John Braithwaite, "Responsive Regulation: Transcending the Deregulation Debate," in *Responsive Regulation: Transcending the Deregulation Debate* (Oxford: Oxford University Press, 1992). Keith Hawkins, *Law As Last Resort: Prosecution Decision-making in a Regulatory Agency* Oxford Socio-legal Studies (Oxford, New York: Oxford University Press, 2002). Richard Locke, Matthew Amengual and Akshay Mangla, "Virtue Out of Necessity? Compliance, Commitment, and the Improvement of Labor Conditions in Global Supply Chains," *Politics & Society* 37, no. 2 (2009): 319-351.

¹³⁸ “Ambientalistas aprueban lo realizado, pero piden que les den participación,” *LGT* (15 October 2009).

¹³⁹ T02 (environmental specialist, Citrus Firm, Tucumán), interview by author, April 17, 2009.

¹⁴⁰ Frank Dobbin and John Sutton, "The Strength of a Weak State: The Rights Revolution and the Rise of Human Resource Management Divisions," *American Journal of Sociology* 104, no. 2 (1998): 441-476.

¹⁴¹ Data provided by the Environment Secretariat. These figures are largely supported by interviews with the government critics.

¹⁴² “Una industria citrícola tucumana es pionera en el proyecto de convertir efluentes en biogas,” *LGT* (5 January 2008).

¹⁴³ T49 (Tucumán Regional Sugar Industry Association (CART), Tucumán), interview by author, November 14, 2008.

¹⁴⁴ Evans, 1995.

¹⁴⁵ For example: Tewari and Pillai, 2005. Coslovsky, 2011. Hochstetler and Keck, 2007. Blackman and Bannister, 1998.

¹⁴⁶ The pedagogical role of regulators is not limited to environmental programs for cleaner production, but has also been identified as a key logic of action in labor inspectorates in the region. See: Michael Piore and Andrew Schrank, "Toward Managed Flexibility: The Revival of Labour Inspection in the Latin World," *International Labour Review* 147, no. 1 (2008). Roberto Rocha Coelho Pires, "Promoting Sustainable Compliance: Styles of Labour Inspection and Compliance Outcomes in Brazil," *International Labour Review* 147, no. 2-3 (2008): 199-229.

¹⁴⁷ Tewari and Pillai, 2005. See also Rebecca Neaera Abers and Margaret E Keck, "Mobilizing the State: The Erratic Partner in Brazil's Participatory Water Policy," *Politics & Society* 37, no. 2 (2009): 245-267. on civil society helping with the “throughput” of policy implementation.