

Opening a Policy Window: The Costa Rican Hospital Retrofit and Seismic Insurance Programs 1986-1992*

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In December 1986, the Costa Rican Social Security System formally initiated a seismic retrofit program for several of its principal hospitals as well as its administrative headquarters. Between 1983 and 1991 it also implemented a number of major changes in the seismic insurance coverage afforded its installations. Based on full access to internal documents and thirty-four in-depth interviews with key actors, the author examines the role of "focusing" disaster events and the financial, technical, professional, and ethical considerations behind these major innovations in earthquake protection policy.

Introduction

When, why, and how does a "window of opportunity" open for substantive public policy innovations? Or, as Kingdon (1984) asked in his general treatise, *Agendas, Alternatives, and Public Policies*, "How Does an Idea's Time Come?"

Despite the importance of these questions for disaster research, only a small number of scholars (Drabek et al. 1983, Lambright 1984, Olson 1985, Alesch and Petak 1986) have attempted to probe them in any depth. The unfortunate result is that the field possesses few detailed studies of hazard mitigation decisionmaking. Moreover, I can find none which deals with events and processes outside the United States. I offer this paper to partially rectify this gap.

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Although the story starts in 1983, the Costa Rican Social Security System (Caja Costarricense de Seguro Social, from here on the "Social Security System" or simply the "Caja") embarked on a structural retrofit program in 1986 to increase the earthquake resistance of four of its major hospitals: the Hospital Nacional de Niños (National Children's) and the Hospital México in the capital of San José; the Hospital Monseñor Sanabria in Puntarenas, the largest city outside the San José metropolitan area; and the Hospital Ciudad Neily near the southern border with Panama. The retrofit program also included the Social Security System central administrative headquarters in San José.

The importance of this retrofit program should not be underestimated. In contrast to the United States but as in much of Latin America and the rest of the world, the Costa Rican Social Security System constitutes the major national health provider, controlling 29 hospitals and nearly 150 clinics throughout the country. As such, the "Caja" is an extremely important and influential societal institution and touches the daily life of Costa Rica in many ways.

Also rooted in 1983 and taking several years, the Caja began a series of fundamental shifts in its approach to earthquake insurance, from a self-insurance philosophy to current-value coverage and finally to replacement-cost insurance. Especially when viewed in conjunction with the structural retrofit program, this complete change in earthquake insurance reflects a Caja committed to dramatic innovation.

For context, it should be noted that the Caja is a legally autonomous government entity. Through obligatory worker and employer contributions, the institution is essentially self-financing, enjoying a budget which, for purposes of comparison, is roughly equivalent to 70 percent of the total central ministerial budgets of Costa Rica. The Caja has a good deal of investment and decisionmaking leeway through its own Board of Directors, which is made up of representatives of employers, workers, and central government.

The purpose of this paper is to describe and analyze (1) the agenda-setting and decision processes behind the structural retrofit program, remarkable for any country but especially so for a "Third World" nation, and (2) the motivations for, and changes made in, Caja earthquake insurance policies.

This paper is based on unrestricted access to Caja documentation and correspondence and the results of thirty-four interviews with current and former Caja officials at the system headquarters in San José and at the regional offices and hospitals; with structural engineers and other involved technical experts; and with various political leaders and disaster mitigation

and preparedness specialists. The research was undertaken between June and September 1992.

The Retrofit Program

Pre-1983: Low Awareness

Prior to 1983, knowledge of and interest in the Costa Rican earthquake problem were quite low. The nation had suffered relatively few seismic events in the preceding decades. The major damaging earthquake of 1910, which destroyed the city of Cartago, 15 kilometers from the capital of San José, had faded from memory. Earthquake activity since 1910 had been concentrated in relatively isolated areas with minimal impacts on the population and economy.

Impacts on hospitals had been equally slight. No recorded structural damage had been suffered since the Cartago earthquake, which destroyed the existing (19th century) hospital in that city. In general, Costa Rica exhibited only a low level of earthquake awareness prior to the 1980s. Seismic safety activities remained limited.

A caveat is required, however. Spurred by the 1972 Managua, Nicaragua earthquake, which killed at least the officially recorded 6,000 people and devastated the capital of a neighboring country, leading structural engineers prepared Costa Rica's first seismic building code. Adopted in 1974 by the Federated College of Engineers and Architects, this code became obligatory for all practicing professionals.

Although still limited to specific groups, seismic awareness increased again as a result of the 1976 Guatemala earthquake. In 1977, the Costa Rican National Insurance Institute (NII) contracted with Stanford University to study Costa Rica's seismic risk in order to develop earthquake insurance policies. Franz Sauter, a distinguished Costa Rican structural engineer, and Professor Hareesh Shah of Stanford completed this study in September 1978.

Two 1983 Events: A Wake-Up Call

The relatively long period of seismic quiescence in Costa Rica ended in 1983 with two damaging earthquakes in a three-month period: the Osa-Golfito event (Richter M7.2) on April 2, and the San Isidro de El General event (Richter M6.2) on July 3, 1983.

The latter earthquake seriously damaged the Caja's "Hospital Escalante Pradilla" in the town of San Isidro and led to its evacuation. Structural damage to some 40 of the hospital's 250 ground floor columns, as well as

non-structural damage, caused economic losses of around 6 million colones (US\$142,000).¹ The Caja subsequently retrofitted this hospital at a cost of some 15 million colones (US\$355,000). Because of the ongoing economic crisis in Costa Rica and resulting financial restrictions on the Caja, these expenditures could only be described as painful. However, despite the fact that the San Isidro earthquake was the first to cause major damage to a hospital in Costa Rica in over 70 years, the event failed to stimulate action beyond this one hospital.

Nevertheless, awareness did increase. Starting in 1983, Caja headquarters officials and certain hospital directors and administrators began to express concern about the earthquake vulnerability of various of their structures. The Caja Engineering and Architecture Directorate staff started looking informally at their buildings around the country, including the Caja headquarters, focusing especially on the "imported" Mexican construction models, now recognized as possibly deficient. The Social Security System authorities took no specific action at this time, however.

The severe economic restrictions faced by the Caja at the time, a low level of consciousness about Costa Rica's real seismic vulnerability, and the tendency to consider the 1983 San Isidro event isolated and atypical all combined to defer the problem. Moreover, it was only later realized that the Osa-Golfito event signalled the beginning of a cycle of intense seismic activity, which recurs approximately every 40 years. Although it appears that latent consciousness of the structural vulnerability of the hospital system began to emerge at this time, the problem was effectively postponed within the Caja headquarters for future consideration, except in one area.

Combined with a large fire in the Caja warehouses in early 1984, the San Isidro earthquake stimulated the creation of a specialized Insurance Department at the Caja headquarters and a search for more comprehensive and updated insurance coverages. Despite pressures exerted since 1980 by the institution's Financial Director to improve insurance coverage, little progress had been made prior to the San Isidro event. Holding essentially to a philosophy of self-insurance, the Caja kept formal coverage of its installations to a minimum and grossly underestimated real property values. This discrepancy became distressingly clear following the San Isidro earthquake when the Caja recovered only some 900,000 colones (US\$21,000) from the state insurance company, as compared to the 6 million colones (US\$142,000) in damages suffered. This was due to that fact that the insured value of the Escalante Pradilla hospital was only 32 million colones (US\$762,000) compared to its real updated value of 140 million colones (US\$3.3 million).

Hospital damage from the 1983 San Isidro earthquake also had an effect quite outside the Caja. Partially as a result of the observed damage, two students from the University of Costa Rica (UCR) Engineering Faculty decided to focus their degree project on hospital vulnerability. Under the supervision of two young civil engineering faculty, one of the students completed her thesis on the seismic vulnerability of systems in the Hospital Calderón Guardia, located in the capital of San José.

This study (Hidalgo 1984) was the first of its kind in Costa Rica. Despite the fact that the second student dropped out of the project and a structural analysis of the hospital therefore not completed, the study motivated Hidalgo's faculty supervisors to promote further hospital vulnerability studies.

Toward the end of 1984, the two faculty approached the Caja seeking support for additional analyses of the hospital system. Although certain Caja authorities showed interest in the proposal, financial considerations and certain doubts as to the ability of the UCR engineers to undertake such specialized studies put a brake on the plan. They then sought support from the Costa Rican National Science and Technology Council. In late 1985, they were awarded a grant to study the seismic vulnerability of the country's largest and most important medical installation, the Hospital México.

What changed between late 1984 and late 1985? The twin earthquakes which struck Mexico City in September 1985.

Concern: Mexico 1985

On September 19 and 20, 1985, a great earthquake (Richter M8.1) and a major aftershock (Richter M7.5) occurred off the Pacific coast of Mexico in the Michoacán gap, 400 kilometers from Mexico City. The highly visible impacts of these events on Mexico City hospitals had a profound effect on Costa Rican doctors, many of whom had trained in the very hospitals which collapsed in the earthquakes. Institutionally, close links had always existed between the Costa Rican Social Security System and its Mexican counterpart. Indeed, the plans for the Hospital México in San José had been an early 1960s gift from the Mexican Social Security Institute, and Mexican experts had assisted in the construction of the hospital. Furthermore, many recent Costa Rican hospitals had followed Mexican architectural and engineering models.

And yet, despite all these factors, the Mexico City disaster *per se* did not induce the Caja authorities to initiate widespread vulnerability analyses or retrofitting. One reason was the seemingly endless problem of a poor public sector financial situation in Costa Rica. Combined with the building

plans and programs already committed for 1986 (the Mexico disaster occurred near the end of the fiscal year when budgetary allocations for the following year were already finalized), Caja authorities could not see their way clear to reallocate funds. Also, the Mexico event could be rationalized as yet another "special" case because of the peculiar subsoil conditions of central Mexico City, as well as patterned corruption in building construction and inspection.

Actually, although the context was approaching what might be called a favorable state, the stimuli for hospital vulnerability studies in Costa Rica came from the authorities of a specific hospital, the National Children's, and from the UCR study of the Hospital México.

Emergence of a "Policy Entrepreneur"

The director of the National Children's Hospital had studied for many years in the hospitals which comprise the Mexican Social Security Institute. Following the 1985 Mexico City disaster, he and other authorities at Children's became increasingly worried about the structural condition of their hospital, based in part on their fears that the Osa-Golfito earthquake of 1983 had weakened a structural column and cross beam.

At any rate, after the 1985 Mexico earthquake, they asked the country's leading seismic design expert, Franz Sauter, to take a quick look at Children's and evaluate its structural security. After reviewing the installation and the original construction plans, he concluded, in a letter sent to the hospital director on December 16, 1985, that the hospital was indeed vulnerable to earthquakes.

With this letter in hand, hospital authorities requested that the Caja contract a thorough vulnerability study of the hospital. This study was contracted and completed by mid-June, concluding that the hospital needed a thorough retrofitting. Coincidentally but significantly, the hospital director had by this time left Children's for a new position—as Costa Rica's Minister of Health.

In retrospect, the discussions that took place among the Caja architectural and engineering staff in the first semester of 1986 centered on balancing two concerns: structural safety and financial feasibility. Caja staff recognized the need for an entire set of vulnerability studies, covering most of their installations, but they were concerned about the available financial resources to fund these studies and, more importantly, to undertake the necessary structural changes. Not unexpectedly, the financial concerns won out. In October 1986, the Children's Hospital study and the continuing UCR

study of the Hospital México were the only projects underway (only the former, however, was financed by the Caja). Then came the San Salvador event.

Trigger To Decision: San Salvador 1986

Given that the capital of El Salvador is much smaller than Mexico City, the earthquake which struck San Salvador on October 13, 1986 (Richter M6.2) was in many ways more destructive and disruptive than the Mexico earthquake of the previous year.

This major damaging Central American seismic event, together with (1) the consciousness raising efforts of certain Costa Rican structural engineers, (2) the definitive conclusions of the Children's Hospital study and the preliminary conclusions of the Hospital México analysis, (3) memories of the 1985 Mexico and 1983 San Isidro earthquakes, and (4) an improving financial situation at the Caja all moved Social Security System authorities from concern to action.

That is, the San Salvador disaster triggered a definitive institutional change, and the Caja began considering a true hospital retrofit *program*. From this point forward, Caja authorities and staff "internalized" the need for systematic vulnerability analyses and retrofiting.

The "Insider Alliance"

In his new capacity as Minister of Health, the ex-director of Children's remained a kind of godfather for the hospital retrofit program. At the same time, various structural engineers provided a scientific pin pricking impetus for policy innovations. Pushing a program through the Social Security System, however, required an "insider alliance" without which it is doubtful that the retrofit program would have been placed on the policy agenda. This alliance constituted the Caja's Director of Engineering and Architecture, the head of the Architecture Department, and the institution Executive Officer.

The head of the institution's Architecture Department was the principal technical protagonist of the program from conception to implementation. The zealotry with which he pushed the program between 1986 and 1991 was notorious. The enthusiasm and commitment to the retrofit process undoubtedly related to various facets of his professional makeup.

Graduated in Architecture in Mexico, he had been commissioned by the Mexican Social Security System to help supervise the construction of the Hospital México in San José during the early 1960s. Following its

completion, he decided to stay on in Costa Rica and became a leading career architect at the Social Security System headquarters. During the 1980s, he served as head of the Caja's Architecture Department. As such, he played a prominent role in the design specifications of many of the new Caja hospitals and clinics. The México, Monseñor Sanabria, Ciudad Neily, and San Isidro hospitals, amongst others, showed his particular design blueprint.

The suddenly suspect Mexican architectural and construction models, plus his emotional attachment to Mexico and the impact of the Mexico City earthquakes, undoubtedly spurred his own particular professional, personal, and ethical commitment to the retrofit program. At times, it was called his "obsession."

His zealousness was balanced by the cooler, more calculating and systematic approach offered by the institution's Director of Engineering and Architecture. A highly respected career engineer, he had worked at the Caja for three decades and was also closely identified with the construction and expansion of Social Security System installations. As such, his own professional and ethical commitment to the retrofit program (and to improved insurance coverage) was also spurred by his personal identification with the Caja hospitals and clinics. Following the San Isidro earthquake and resultant damage to the Escalante Pradilla hospital and, later, with the National Children's vulnerability study, he had been the first person to point out the potential vulnerability of many Caja installations and the need for financially onerous outlays to remedy the problems.

The technical impetus given to the program was taken up unreservedly, at a decisionmaking level, by the Executive Officer at the Caja. He had been a principal political and philosophical architect of the Social Security System and the move towards the universalization of health coverage in Costa Rica. In 1970, he had moved from his medical position at the Hospital México to the Caja headquarters where he became responsible, during the following years, for the establishment of the State National Hospital System. This involved both the purchase and incorporation of existing "independent" hospitals and the promotion of new construction. When he was named Executive Officer at the Caja in 1982, in the midst of the most serious financial crisis faced by the country (and the Caja) in many decades, he was intimately familiar with all of the Social Security System installations and highly conscious of the financial outlays and burdens involved in providing the infrastructure for universalization of health coverage in Costa Rica. He proved a ready colleague and completed this three-person insider alliance.

Following the 1986 San Salvador earthquake, the Caja's Board of Directors expressed its first officially recorded concern for the structural safety of Social Security System installations. On October 23, 1986, Board members requested a status report on the various studies completed or in progress. As a result, Caja staff circulated internal reports, developed planning and policy guidelines, and began openly discussing anticipated implementation problems—including budget and human resource allocations.

On December 4, 1986, the country's leading structural engineer delivered a lucid and powerful presentation on hospital vulnerability to the Caja Board of Directors. Further discussion ensued. On December 11, 1986, the Board of Directors finally authorized the contracting of vulnerability studies and the planning required to retrofit structurally insecure buildings. This Board of Directors action constituted formal acceptance of the retrofit program, which thus became official Caja policy.

Setting Priorities for the Program

Selecting the installations for the first phase of the retrofit program was essentially *ad hoc*. No one made a systematic, in-depth evaluation of hospital and clinic vulnerability. In effect, Directorate of Engineering and Architecture staff established the priorities unilaterally.

It was inevitable that the Children's and México hospitals would be incorporated into the program from the very beginning. In November 1986, the Hospital Monseñor Sanabria in Puntarenas (on the Pacific coast) and the Central Office building of the Social Security System in San José were added to the retrofit plan. The implicit criteria appeared to be that they were large, multistory buildings and constituted major economic investments with large staff and user concentrations. To be fair, the Monseñor Sanabria hospital is also the largest provincial hospital in the country and serves a population of some 350,000. Finally, the Hospital Ciudad Neily appeared on the formula in 1987. The criteria used to select this relatively modern installation are unclear, although its location in Costa Rica's projected highest risk zone seems to have been one of the factors.

The exclusion of the remaining 25 Social Security System hospitals from the first stage program appears to have been based on four criteria (none of which was ever clearly spelled out in documentary terms, however): (1) hospitals in projected low seismic risk zones; (2) hospitals where plans already existed for their replacement or substantial remodelling; (3) single story or lowrise hospitals; and (4) recently constructed buildings certified sound by their designers.

The Contracting of Retrofit Plans and the Construction Process

Tables 1 and 2 summarize the hospital retrofit contracting and construction processes. A detailed analysis of these processes is beyond the scope of the present article and constitutes a separate story in itself. I would like to point out, however, that the contracting and construction phases were plagued with numerous administrative, legal, budgetary, coordination, and planning problems. The result was severe delays and increased costs in the retrofit process and the complete postponement (to date, March 1993) of work on the Neilly hospital and the Caja administrative headquarters. Despite the problems, the Children's, Mexico, and Monseñor Sanabria retrofits all had been completed by mid-1992.

The design specifications for the retrofit conformed to the norms established in the country's new (mid-1986) seismic code. Moreover, the construction program was given an added impetus by the publication of a Presidential Decree in September 1987 which ordered all public sector agencies and ministries to undertake vulnerability studies of their installations and to remedy any identified problems.

**Table 1. Dates of Retrofitting Plans,
Contracted Companies and Costs**

	Date of Contract	Date of Completion	Company	Cost (thousands of dollars)	Sq. Meters of Construction (in thousands)
National Children's	23-12-86	23-04-87	Sauter and Company	31.5	22.5
Monseñor Sanabria	20-02-87	October 87	Bel Engineering	20.2	21.4
México	29-10-87	July 88	HERIEL S.A.	34.7	98.4
Ciudad Neily	04-12-87	02-11-88	INGES S.A.	23.6	11.0
Central Offices (1st Phase)	20-02-87	not completed	Bel Engineering	24.5	14.1
Central Offices (2nd Phase)	11-12-87	late 1988	Bel Engineering	83.5	14.1

**Table 2. Contracting and Construction:
Dates, Companies and Costs**

	Date of Public Bidding	Date of Contract Award by Board of Directors	Date of Commencement Retrofitting	Date of Completion Retrofitting
National Children's Hospital	01-02-88	07-04-88	26-06-88	Feb. 1990
Monseñor Sanabria	12-01-88	07-04-88	01-08-88	July 1991
México	29-09-88	02-03-89	15-05-89	July 1992
Central Offices	19-04-90	not awarded		
	Original Contract Period	Company	Original Contract Cost (millions of dollars)	
National Children's Hospital	15 months	COCOSI S.A.	0.830	
Monseñor Sanabria	12 months	SAMYP	1.041	
México	18 months	WEISLEDER AND COCOSI S.A.	2.205	

Rethinking Institutional Insurance

From the late 1970s to the mid 1980s, the Caja held to a philosophy of "self-insurance." Subsequently, the Costa Rican Social Security System made important changes in the insurance coverage afforded its installations: Coverage has increased considerably.

As late as 1985, the Caja only insured 82 of its 150 buildings for a total value of 722 million colones (US\$13.5 million). The Caja took original construction costs as the basis for insurance coverage as opposed to the real value of the installations or their replacement cost. The real 1985 value of Caja installations was estimated at approximately 4.8 billion colones (US\$90 million), and the replacement value certainly approached or exceeded the 12 billions mark (US\$224 million).

The inconsistency of the policy can also be seen in the insured values of different buildings. Thus, the large, provincial Monseñor Sanabria hospital was insured for 32.6 million colones, whereas the much smaller but

more recently constructed Ciudad Neily hospital was insured for 33.5 million colones.

As I noted above, the 1983 San Isidro earthquake revealed the flaw in this "self-insurance" approach. In the case of the Hospital Escalante Pradilla in the town of San Isidro, the Caja recovered only *one-sixth* of the total cost of damages, because the installation was valued at that time at only 31.9 million colones. Its real value was approximately 140 million colones. The San Isidro event prompted the Caja to continue and complete a thorough review of its insurance coverage.

During 1984 and the first semester of 1985, the new Insurance Department and the director of Engineering and Architecture at the Caja put together an insurance plan taking into account the real, updated value of buildings. In early September 1985, the Board of Directors reviewed the plan and its various options. On September 26, 1985, the Board approved the subscribing of a new policy based on real values with the National Insurance Institute to cover all buildings worth 200,000 colones or more. The yearly premium for this coverage would be 15.6 million colones (US\$292,000).

It took over a year to achieve final agreement with the NII, however, primarily because of problems and delays in the calculation of the real value of various installations. The policy was finally issued on October 1, 1986 and covered 150 buildings. The insured value (80 percent coinsurance) summed to 3.9 billion colones (US\$67 million) at a premium cost of 13 million colones per year (US\$222,000).

Between 1986 and early 1989, the Caja maintained the policy, with inflation increases applied to the insured colón value. Thus, in 1988, the Caja had an 80 percent coverage for its buildings, for a total insured value of 5.3 billion colones (US\$67 million). The annual premium was 15 million colones (US\$190,000).

On January 26, 1989, the Caja Board of Directors approved a new contract with updated real property values to substitute the 1988 coverage. Under this policy, an 80 percent coverage was taken for a total insured value of 8.2 billion colones (US\$98 million). The annual premium came to 23 million colones (US\$274,000).

At this time, the NII was offering a new type of insurance policy allowing coverage for "replacement value" as opposed to real value. This policy alternative was presented to a number of Caja executives in early 1989. However, it was not until the latter part of 1990, eight months after a March earthquake near Cóbano (Richter M6.8), that the idea of an insurance cover for replacement value started to take hold in the institution. The

Cócano event, with its epicentre only 40 km from the Monseñor Sanabria hospital, caused serious nonstructural damage to the installation. At the time, the hospital was being retrofitted.

In November 1990, the Caja Insurance Department made its first request for calculations of the replacement value of Caja buildings. This process would take nearly five months to be satisfactorily completed and approved. Methodological problems, lack of adequate systematized and updated information, and certain indefinities on the inclusion of furniture, machinery, equipment, etc. in the calculated values explain this prolonged process. A further five months were consumed in negotiations on a premium and in completing the information required by the NII for a new contract.

Finally, after a whole year of calculations, negotiations, resolving discrepancies, and other delays, the new insurance policy was issued—on December 1, 1991.

The current policy covers 183 buildings (including, for the first time, buildings under construction) for an insured value of 21.6 billion colones (US\$172 million). The tariff rate was finally fixed at 0.30 percent, as opposed to the previous 0.35 percent, so the annual premium came out at 64.6 million colones (US\$517,000).

During the long year of calculations and negotiations, Costa Rica was seriously affected by the December 1990 Alajuela (Richter M6.4) and the April 1991 Limón (Richter M7.4) earthquakes. Serious structural and nonstructural damage to hospital infrastructure was sustained in the cities of Alajuela and Heredia by the former event and in different parts of the Atlantic coast region by the latter.

Insurance claims for these damages, however, were based on the 1990 policy, giving the Caja one more painful lesson on the virtues of updated and comprehensive insurance policies and rapid calculation and negotiation procedures.

For example, when the La Fortuna Clinic in the Atlantic region's Rio Estrella valley was totally destroyed during the Limón earthquake, the insurance cover for the building (updated real value) totalled only 9.4 million colones. The Caja received 7.2 million colones indemnization, but the estimated construction costs for the new clinic (replacement) were 60 million colones! A *conservative* overall calculation shows that the Caja received over 300 million colones less in indemnization following the Alajuela and Limón earthquakes than would have been the case if the new policy had been in effect. This loss is equivalent to (1) five years payment of the new annual premium, (2) twenty-four years of the amount saved by

the drawn out negotiations on the new premium rate, or (3) the cost of retrofitting three or more medium size hospitals!

The good news is that by 1992, the Caja had a fully comprehensive risk insurance coverage (fire, volcanic effects, flooding, earthquake, etc.) and a reasonably high level of financial protection.

A number of interesting questions arise from an analysis of the National Insurance Institute's seismic protection coverage and tariff structures. NII does not discriminate between the cost and coverage of insurance for seismically sound versus unsound buildings. Neither does it take into account their location in high or low seismic risk zones. The tariff structure is exactly the same—obviously a disincentive to retrofit weak structures or pay attention to differences between seismic risk zones.

NII also follows a curiously differential policy on premium rates for public institutions. The 0.30 percent rate finally conceded the Caja is, for example, discriminatory as compared to the 0.14 percent rate offered the Costa Rican Institute of Electricity (ICE), another governmental autonomous agency. As the NII has a monopoly control over public sector insurance, questions arise about guidelines for fixing premiums, so that socially sensitive institutions like the Caja receive more preferential rates. Finally, thought should be given to national insurance companies and international reinsurers designing low interest loan schemes for public building retrofits in developing countries. As we have seen repeatedly, financial limitations were a major stumbling block to structural retrofit.

Conclusion

Staying as close to the case material as possible but still offering some overall points, I would like to conclude with a short observation on the apparent lack of relationship between basic science knowledge and decisionmaking in this case and then more extended observations about (1) the temporal sequencing of "focusing events" and their impact on problem definition and agenda-setting; (2) the financial, normative, professional, and ethical factors influencing innovative decisionmaking; and (3) structural versus insurance protection against earthquakes. I will finish with another short observation about the value of this type of research, especially in the developing countries.

Scientific Knowledge and Mitigation Decisions

It remains remarkable the degree to which Caja decisionmakers divorced scientific knowledge from their actions on the retrofit program and

insurance coverage and tariff structures. At best, Caja decisions reflected an imperfect and only sporadic relationship between scientific knowledge of specific seismic risks in Costa Rica and the relative structural vulnerability of their installations. Existing seismic risk zoning and knowledge of active fault systems and plate tectonics were given relatively little account in allocating scarce monetary resources.

In the light of this experience, I would like to suggest the relevance of further research which attempts to examine the conditions and factors which promote an integration of basic and natural science "evidence" into decisionmaking on mitigation processes. In the Costa Rican case, partial social, economic, and personal criteria were used to select installations for the retrofit program. Deemed levels of seismic risk and relative structural vulnerability were given little weight. In the insurance area, the Caja opted for homogeneous coverage, irrespective of different levels of risk and vulnerability. In addition, the NII itself offered equal levels of coverage and tariffs for all installations — despite the existence of its own 1978 study indicating differential areas of risk! These and other puzzles deserve further examination, especially comparatively.

Focusing Events and "Disaster Learning"

Several major domestic (Osa-Golfito and San Isidro, 1983; Cóbano and Alajuela, 1990) and foreign seismic events (Mexico City, 1985, San Salvador 1986) moved Caja authorities from latent to active awareness of the structural and financial vulnerability of their installations and then to problem definition. Kingdon (1984) argues that focusing events often serve to coalesce the streams of "problems, policies, and politics" to bring about innovation. From the Costa Rican case, it would seem that focusing events were important within all three streams as well. Initially, one or more helped stimulate problem definition. After that, event lessons framed alternatives and facilitated "entrepreneurs" pushing solutions to and then through implementation.

Consciousness accumulated on structural vulnerability from San Isidro (1983) to Alajuela (1990), but the clincher was the urban hospital disaster of San Salvador (1986). Consciousness of the financial/insurance problem accumulated similarly but had a two-step clincher. San Isidro (1983) pushed the Caja to change from original cost-based insurance to current value-based. Then, Cóbano and Alajuela (1990) pushed them to replacement-value insurance, the wisdom of which the Limón (1991) earthquake confirmed.

This issue of combination learning from domestic and foreign disasters is intriguing. It is often assumed that "local" events are more likely to be important in problem identification than "foreign" ones. It seems clear, however, that Mexico City (1985) and San Salvador (1986) had at least as great an impact on problem definition as did the local events. Of course, one must ask, would Mexico and San Salvador have had a definitive impact without the sensitizing (and local) San Isidro experience?

What makes "foreign" events relevant? It appears that the closer the technical and professional relationship and spatial proximity between two countries, the more likely it is that "disaster learning" will occur. Because of the longstanding relationships between Mexico and Costa Rica in medical education, training, and hospital construction, the 1985 Mexico City disaster and its impacts on the hospital system grabbed the attention of the Costa Rican medical community — as did the San Salvador earthquake the next year. In addition, considering earlier Central American events (Nicaragua, 1972 and Guatemala, 1976, especially), one could not escape the question, when would it be Costa Rica's turn?

This disaster learning argument leads me to a specific point about Costa Rica. Franz Sauter (1992), the nation's most well known structural engineer and a prolific consciousness raiser himself, insists that major seismic safety innovations have been made in general prior to any major damaging earthquake in Costa Rica.

Perhaps luck should receive some credit here as well, however. Costa Rica has been especially fortunate to see "teaching disasters" occur in neighboring countries. For example, prior to San Salvador (1986), the 1974 and 1986 seismic codes were stimulated in a number of ways by the Managua (1972) and Mexico City (1985) earthquakes respectively. Moreover, as I noted above, the 1976 Guatemala earthquake pushed the National Insurance Institute to undertake its seismic study. The principle question to be resolved here relates to the particular characteristics of the Costa Rican professional and political milieu (educational levels, opportunism, financial availability, etc.) which stimulate the learning and activity curve in ways not seen in many other Latin American countries. That is, what accounts for a Costa Rican ability to learn and thereby "make its own luck?" This requires further research.

Decisionmaking

The transformation in this case of a diagnosed context (Caja installation structural vulnerabilities) into a policy and then program agenda exhibited the coalescence of three interrelated but differentially weighted factors:

financial, normative-technical, and professional-ethical. The Mexico City and San Salvador focusing events opened the window for the process to take place. The arguments and analyses of a select group of structural engineers had helped frame policy alternatives.

Undoubtedly, the marked improvement in Caja finances starting in 1986 was a necessary, but not determining, factor in promoting the structural retrofit program and changes in insurance philosophy and coverage. However, financial availability is invariably relative (money is fungible), and other competing demands always exist. In the case of the Caja, following five years (1980-1985) of very severe restrictions on modernizing infrastructure and constructing new installations (hospitals, clinics, etc.), all available financial resources could very easily have been directed towards widening service provisions via new construction and equipment purchases. Such activities would have brought concrete short-term political benefits to Caja authorities and the government. The fact that significant resources were in fact directed to the retrofit program between 1987 and 1991, with virtually no clear cut short-term political benefits of any kind, requires additional explanation.

The existence of the updated 1986 seismic code and the promulgation of the 1987 Presidential Decree ordering structural revision of all public buildings provided supporting conditions, but they were neither necessary nor determining in the final decision. The 1986 Seismic Code carried no retroactive obligations. It simply offered a point of departure for analyzing the structural security of buildings. For its part, the Presidential Decree came nearly a year *after* the retrofit program commenced and really only strengthened Caja resolve to proceed with the program.

I would argue that the technical, and professional-ethical alliance established among leading Caja authorities was critical in achieving agenda status for the retrofit program. It cannot be emphasized strongly enough that the commitment and activity of these persons and their tenure and identification with the hospital system transcended mere political considerations.

It is important to note here, that apart from the insistence by the National Children's Hospital authorities for a retrofit of their installations, neither Caja hospital staff nor the general public pressed for a general retrofit program. To the contrary, "diverting" financial resources to the retrofit program elicited negative reactions from certain sectors, principally hospital directors and administrators who saw their own expansion and modernization plans postponed as a result. That is, the Caja decision to invest in retrofit activities and in expanded insurance coverage was an internal, *institutional* decision. Persuasive external lobbying was basically absent.

The mechanism which led Caja authorities to promote the retrofit program most closely approximates what Cobb, Ross, and Ross (1976) term the "inside initiative" model. However, an interesting difference exists as compared to the characteristics of their model: The retrofit idea was *not* put on the public agenda (nor was it the product of "public" lobbying) not out of fear that it would prove to be unpopular, but rather because it might have proved *too* popular.

Caja authorities were clearly convinced of the urgency of undertaking the retrofit program. The problem was that numerous hospitals, clinics, and training centers were potential candidates for the first stage program. To have opened up the policy decision for wideranging "public" debate or approval may well have stimulated numerous demands for retrofit activities by hospital and clinic directors, Caja employees, the general public, or the press. It was much safer to follow an "elitist" and relatively hermetic policy process. Such a selection process was probably the only way to guarantee rapid implementation of the retrofit program given conditions of scarce economic resources—insufficient, in the short-term, to cover all latent or real demands for retrofit and new construction activities.

Finally, it is important to point out that the autonomous character of the Caja within the government system clearly facilitated decisionmaking. The fact that the use of available finances did not have to be debated or lobbied within the overall government system (ministries and autonomous agencies) clearly eased the process and made an internal, "elitist" decision possible. The only real debate revolved around using resources for retrofit activities versus covering other Caja priorities (e.g., new construction, remodelling, equipment purchases).

The lessons here are clear. The study of public decisionmaking processes and agenda definition must necessarily consider differing *types* of government organizations. It is perhaps not surprising that public sector retrofit activities in Costa Rica have been more easily promoted within autonomous agencies (e.g., the Costa Rican Electricity Institute (ICE), the Petroleum Refining Company (RECOPE), and the Central Bank) than within the ministerial system (e.g., Health, Education, Agriculture) where budgetary allocations enter into the political free-for-all battle over public funds.

Structural versus Financial Security

Caja seismic protection policy coalesced two different (but related) agenda schemes: structural and insurance-financial. Various questions can be posed about the relationships and temporal sequences between the two

forms of protection and how these forms were rationalized by decisionmakers. Clearly, insurance protection is no substitute for the service and human life protection offered by structural solutions, but the underlying question remains: Are there certain conditions which promote the use of one or the other, or both, in determined moments? Do the particular impacts of "focusing events" play a part in decisions to implement insurance and/or structural protection?

In the Costa Rican case, for example, can the promotion of new insurance coverage immediately after San Isidro (1983), as opposed to a retrofit program, be explained by the lack of severe structural damage (and loss of human life) but onerous economic losses caused by this event? Does a similar logic hold for the replacement-value policy following the largely nonstructural and low human losses caused by Cóbano, Alajuela, and later, Limón events? Had the Hospital Escalante Pradilla been destroyed in 1982, with substantial human losses, would the retrofit program have been advanced, substituting or complementing new insurance coverage? Or, would ongoing economic restrictions have postponed such a decision, no matter what?

These, and many other questions need to be resolved in the study of seismic protection decisionmaking. All relate to the economic and political "cost-benefit" equation of differing types of earthquake safety options.

A Final Word

Few opportunities exist for undertaking such a detailed analysis as that provided in the present case study. Rarely is it possible to gain virtually unrestricted access to the necessary documentation and be allowed to probe the minds and memories of such a range of decisionmaking actors. This research is a tribute to the openmindedness and critical attitude of those actors and may help to dispel the image (in Latin America and elsewhere) that public sector officials are uniformly hermetic and unresponsive to requests for what could be seen as confidential and, at times, uncomfortable information.

Clearly, additional studies are required of prevention and mitigation decisionmaking processes, particularly in the largely unexplored domain of the developing countries. Such knowledge is important not only in order to allow us to more fully understand how problems and issues move from problem definition to the decision agenda and then to implementation, but also in order to understand how advocates should proceed and what doors must be opened to provide an impetus for innovation.

The currently dominant perspective on how to "persuade" decision-makers to implement mitigation activities seems to involve some sort of cost-benefit argument whereby if it can be shown that more is gained economically by doing something today than paying the price of recovery tomorrow, the "right" decision will be made. This hospital study shows that no such calculation was made, although there can be no doubt that the financial costs incurred should destruction occur had some weight in the decisionmaking process, but it was more relevant to the insurance coverage decisions than to the structural retrofit program. It appears that the key factors explaining the Costa Rica hospital retrofit program related more to professional-ethical and conjunctural contexts than to simple questions of financial or political gain.

The point remains, however, that we as yet know very little in Latin America (or other regions) about how decisions are *really* taken, as opposed to the theoretical or technical arguments which would substantiate making the "right" decision. Wideranging studies across the Third World would clearly be of great use and might even undercut the notion that experiences can be generalized. We may have to be satisfied with an end result which shows that each case is unique and special in itself and that each context for promoting mitigation schemes requires different approaches, adjusted to the particular societal circumstances existing at a determined time in history.

Notes

1. Throughout the text conversions into U. S. dollars have been made at the average exchange rate for the year, or for the period under consideration.

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