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# Crossing the Great Divide: Coproductioin, Synergy, and Development

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**Summary** — Coproduction is a process through which inputs from individuals who are not “in” the same organization are transformed into goods and services. Two cases are presented – one from Brazil and one from Nigeria – where public officials play a major role. In Brazil, public officials actively encourage a high level of citizen input to the production of urban infrastructure. In Nigeria, public officials discourage citizen contributions to primary education. The third section of the paper provides a brief overview of the theory of coproduction and its relevance for understanding the two cases. The last section addresses the implications of coproduction in polycentric systems for synergy and development. Copyright © 1996 Elsevier Science Ltd

## 1. THE HYPOTHETICAL DIVIDE

In his introductory essay for this symposium, Peter Evans identifies a strong divide between “a market-based logic of development and traditional theories of public administration” (Evans, 1995b). He identifies Judith Tendler’s concept of blurred public-private boundaries and my work on coproduction as “radical” and potentially offending to “everyone’s sense of propriety.”

Public Administration purists see it as threatening the insulation necessary for clearheaded decisions that are in the public interest. Market advocates see it as hopelessly muddying the logic of individual incentives and rational resource allocation (Evans, 1995b).

Since I think the great divide between the Market and the State or between Government and Civil Society is a conceptual trap arising from overly rigid disciplinary walls surrounding the study of human institutions, I am delighted to be considered a radical. If trying to remove artificial walls surrounding disciplines is offensive, I regret assailing individual senses of propriety. I proceed on the assumption that contrived walls separating analysis of potentially synergetic phenomena into separate parts miss the potential for synergy (see V. Ostrom, 1995). By developing more fully the theory of coproduction and its relevance to the study of synergy and development, I hope to change the views of social scientists toward the hypothetical “Great Divide.”

My own approach to breaching the great divide utilizes the concept of “coproduction.” By coproduction,

I mean the process through which inputs used to produce a good or service are contributed by individuals who are not “in” the same organization. The “regular” producer of education, health, or infrastructure services is most frequently a government agency. Whether the regular producer is the only producer of these goods and services depends both on the nature of the good or service itself and on the incentives that encourage the active participation of others. All public goods and services are potentially produced by the regular producer and by those who are frequently referred to as the client. The term “client” is a passive term. Clients are acted upon. Coproduction implies that citizens can play an active role in producing public goods and services of consequence to them.

To provide grist for the discussion of coproduction

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in section 3, I discuss two experiences with coproduction in developing countries. One is based on excellent, detailed case materials by other scholars, and the second is based on my own and colleagues' fieldwork. In both cases, public officials play a major role: in the first case, public officials actively encourage an unusually high level of citizen input to the production of public goods. In the second case, the actions of public officials discourage citizen contributions. The first occurs in a somewhat unlikely sector: peri-urban water and sanitation. The second occurs in a sector where one would hope to find relatively high levels of coproduction: primary education.<sup>2</sup> In section 3 of this paper, I present a brief overview of the theory of coproduction and use it to explain some of the patterns of relationships discussed in section 2. In the last section of the paper, I address the implications of coproduction for the study of synergy and development.

## 2. EMPIRICAL CASES

### (a) *Activating coproduction of urban infrastructures in Brazil*

Constructing major infrastructures, especially water and sanitation works in urban and peri-urban areas, is not where one would first look to find important, replicable examples of effective coproduction in developing countries.<sup>3</sup> Because of the technical expertise needed to design effective public works, the considerable economies of scale present in large-scale construction projects, and the difficult legal problems of acquiring rights-of-way across private lands, most analyses of infrastructure have presumed that the provision of infrastructure was best performed in the public sector (but see World Bank, 1994, and E. Ostrom, Schroeder, and Wynne, 1993). The actual construction of infrastructure facilities has usually been undertaken by public agencies themselves or arranged for by these agencies through contracts with large-scale, private for-profit contractors. The opportunities for illegal side payments in this form of provision and production are substantial.

This system has not, however, been successful in providing safe water and adequate sanitation to citizens living in developing countries even after a decade (1981–90) devoted by the international donor community to enhancement of drinking water supply and sanitation. While the percentage of urban dwellers receiving water and sanitation increased during 1980–90, the absolute number of urban dwellers without adequate sanitation rose by about 70 million people (Briscoe and Garn, 1994, p. 3). In a few large cities in developing countries, such as Karachi and Christy Nagar in Pakistan, and in Brasilia, Recife, Natal, and several smaller urban areas in Brazil, the number of housing

units connected to a low-cost waterborne sanitation system has, however, been growing steadily throughout the 1980s (Watson, 1995, pp. 10–12). In Brazil alone, more than 75,000 connections serving 370,000 residents have been made to this type of “condominal system” – so called since it is like a system that might be designed for a co-owned apartment building. The living units exist on a horizontal plane, however, rather than in vertical relationships to one another.

The Recife-based Brazilian engineer, Jose Carlos de Melo, identified in the 1980s a number of institutional factors which, he argued, exacerbated the problems of developing countries already facing extreme financial constraints. First, centralizing infrastructure provision at the national level kept municipalities from access to decision-making responsibilities and resources in this area. Second, excessively high engineering standards set in a capital city were inappropriate, de Melo argued, for bringing better service to poorer regions and neighborhoods. Third, citizens were themselves helpless to do anything about squalid conditions even though they possessed skills and time that could be applied toward solving aspects of the problems they faced. While the proportion of Brazilian urban population receiving water had increased from 55% to 83% during the decade of the 1980s, the percentage connected to sewerage services rose from only 22% to 37% (Watson, 1995, p. 13). Moreover, most of those served were in the wealthier neighborhoods.

The reform plan initiated by de Melo combined an innovative approach to the design of engineering works combined with an active role for citizens.<sup>4</sup> Instead of designing all sanitation systems with large cast-iron pipes sunk deep under urban streets at high per household costs, de Melo proposed much smaller feeder lines that can run through urban blocks either in the back yards, front yards, or sidewalks of those being served. By placing these feeder lines away from heavy traffic, the costs of constructing the feeder section are about one-fourth that of conventional designs. Local residents have the skills needed to dig and maintain the feeder lines. The condominal feeder lines are then connected to larger trunk lines that are constructed to regular engineering standards, located under urban streets, and lead to treatment plants.

A key part of this program is the activation of local citizens to participate from the very start in the planning of their own condominal systems. To accomplish this goal, project teams first set up a series of neighborhood meetings where a general overview of the process, opportunities, and costs of a condominal system is presented. Then, meetings are held in *each* block where detailed discussions center on the choices that residents will have to make, their implications in regard to cost and in regard to the maintenance of the system. Block meetings are called off if half of the households on a block are not in attendance to ensure

that there is wide availability of relevant information and good discussion among those living on a block.

All of this effort to involve citizens is directed, however, toward facilitating their making real decisions in a process of negotiation among neighbors and with project personnel. Residents decide on the layout of the system they want, which affects the cost of the system and the charges that they will pay. Arriving at these decisions can take considerable time if some neighbors want the less expensive (but more intrusive) backyard layout while others want the more expensive (and less intrusive) front yard or sidewalk options. Much of the costs of determining and achieving rights-of-way agreements are borne by residents themselves. Residents also develop a plan for constructing the feeder lines, thus allowing for common agreement to be achieved about how diverse participants would contribute to maintenance. Before construction begins, residents sign a formal petition requesting a condominium system and committing themselves to the payment of the fee agreed upon during negotiations. The first blocks in an area may take from four to six months to gain the needed agreement, but these serve as demonstration projects for others to see and understand the process. The process speeds up once residents can see how alternative designs work and talk with others who have successfully obtained services. Condominium project planners have learned that they cannot restrict the planning process to only those issues that planners think should be on the agenda. Residents in each city have raised different issues that were crucial to them. As Watson concludes:

The evolution of what is negotiated and what is not reflects both project planners' refinements of the process of providing residents with choices, and the ability of residents and neighbourhood associations to push for their concerns with service providers. The lesson is that there is no "right" way to approach projects, but that each project's design, implementation strategy, and management arrangements evolve during the course of give-and-take negotiations between the project team and residents (1995, p. 23).

The overall performance of these systems has varied from project to project and depends both on the success of the negotiation process to achieve a plan that neighbors can really implement and on the construction of high quality trunk lines arranged for by public agencies. Watson (1995) reports that medium-sized local firms who contract with a municipal- or state-level water agency built better performing trunk systems. A reputation for high-quality work is important to a local contractor and may be of little concern to a large firm (with political connections to national leaders) who may never return to that locality.

Studies of the performance of condominium systems point to difficulties in all stages of providing, producing, and maintaining these systems. Some systems

perform at low levels.<sup>5</sup> The extensive involvement of citizens requires time and effort on the part of public officials. Some neighborhood groups need more effort from facilitators than others to help them learn how to keep up their commitments. In addition, the problems of monitoring the performance of those who construct trunk lines do not disappear even though the length of the trunk lines is substantially reduced. On the other hand, many of these systems have been successful, and have dramatically increased the availability of lower cost, essential urban services to the poorest neighborhoods of Brazilian cities. Similar systems are now completed or under construction in Kenya, Paraguay, and Indonesia (Watson and Jagannathan, 1995).

While the results are impressive and similar efforts to encourage coproduction are being established in other parts of the world, the condominium system depends on three difficult challenges: (i) the organization of citizens and their fulfillment of promises to undertake collective action (what Judith Tendler, 1995, refers to as social capital *outside* the government), (ii) good teamwork within a public agency (what Tendler calls social capital *within* the government), and (iii) effective coordination between citizens and an agency. In many regards, the citizens in a condominium system face a similar set of problems to those of any group of potential beneficiaries facing the problem of producing a collective benefit. The rich literature on successful and unsuccessful efforts to organize to produce public goods or common-pool resources focuses on closely related problems.<sup>6</sup> Similarly, the literature on principal-agent relationships and on team production focuses on the second task.<sup>7</sup> Less attention has been paid, given the gulf perceived between public and private spheres, to the problem of relating citizen and official inputs.<sup>8</sup> Watson stresses the possibility that what citizens do improves the performance of what agencies can do.

Good agency performance results not from "strengthening" public sector agencies, but from increasing their responsiveness to customers. . . . The condominium system activates residents by engaging them during project implementation when service level, layout, maintenance arrangements, and cost recovery mechanisms are negotiated. This fosters an active, vocal constituency that puts in motion the accountability mechanisms needed for good agency performance (1995, p. 49).

Making these systems work effectively over the long run requires as much change in the attitude and operational routines of public agencies as it requires input from residents in all phases of the project.<sup>9</sup>

(b) *Thwarting coproduction of primary education in Nigeria*

A marked contrast exists between the condominium

systems in Brazil and what frequently happens in other developing countries. To provide a more typical example of how the actions of public officials at the heads of state agencies and national governments discourage effective participation of citizens, even in those sectors where such participation could be most efficacious, I draw on fieldwork conducted in 1991 in Nigeria.<sup>10</sup> We visited schools and health clinics in four Local Government Authorities (LGAs) in western, eastern, central, and northern Nigeria, talked with many school teachers and health workers, and dug into as many records as we could find about the provision and production of these services. Here I limit my focus to a review of our findings related to the coproduction of primary education.

Until the colonial period ended in Nigeria, primary schools were largely provided by missionary and philanthropic organizations. Schools were normally constructed by local villages and run by a religious organization. Local villagers frequently provided housing and food for the teachers at a local school and considered it to be "their" school. They usually had some voice in decisions about the retention of teachers based on their views of teacher effectiveness. During the 1970s, in an era of centralized military rule, all mission schools throughout the country became public schools even though they continued to carry their original name.

In 1976, in a dramatic move, the Federal Military Government launched an ambitious nationwide program of universal primary education. Formal enrollment in primary schools leapt from 6.2 million students in 1975 to 8.1 million students the next year and continued to grow rapidly until 14.7 million students were formally enrolled in 1983. Formal enrollment then fell for four years in a row until it reached 11.5 million in 1987 (estimated to be 77% of the school-age population). In 1990, enrollment was up to 13.6 million students, still not at the level it had been seven years previously (Ayo *et al.*, 1992, Table 5.1, pp. 30–31). The national government provided full grants to finance education during 1976–78.

The first oil shocks led the national government to demand that state governments begin to shoulder part of the cost of education. The national government stopped funding primary education in 1981. The World Bank estimated that per-pupil expenditures dropped from \$92 in 1970, to \$60 in 1974; \$48 in 1981; and \$55 in 1983 (World Bank, 1988, Table A-17, p. 141, in constant 1983 dollars). The first year that structural adjustment policies would have been felt was 1987, when expenditures on public education fell from \$848 million in 1986 to \$680 million. In 1988, the national government assumed responsibility for funding a portion of expenditures on primary education. In a sudden turnaround in 1991, it announced a decentralization program making local governments fully responsible for financing and managing local schools.

Thus, throughout the 1970s and 1980s, turbulent change characterized national, state, and LGA policies related to the organization of primary education. Early claims were made that neither local nor state governments were capable of providing and producing adequate levels of education, and that a massive infusion of funds from the national level was essential. As the costs of carrying out such policies became apparent, however, diverse strategies were adopted to shift the costs through changes in funding formulae. Changes in financial responsibility carried with them dramatic changes in who hired teachers; what standards were to be used in retaining, transferring, or promoting teachers; and exactly how teachers were to be paid. At several junctures, teachers waited for long periods of time to receive their paychecks. Parents were told at one point that they should not have to pay for education only to have school fees reestablished a short time thereafter. Free books were provided in one period but not in the next. Teachers had very little input to such decisions and local villagers even less. All policy switches appeared in a top-down proclamation by the national government, acting alone, or after some consultation with State governments.

In all of the villages we visited, informal associations of villagers were actively engaged in community projects such as the maintenance of a road, the repair of a school building, and/or the construction of a community center. In many cases, the successful "sons and daughters" of the village returned each year to participate in general planning of improvements that could be made and they sent funds to purchase supplies that were needed to undertake the project. Some projects would take many years to complete because of limited resources, but all of the villagers were proud to tell us of the projects they had undertaken. In all of the villages, therefore, it was possible to mobilize citizen effort for community affairs and the coproduction of goods and services.

In each of the villages we found teachers wanting to increase the skills and knowledge of their students but facing immense problems in trying to create an effective learning environment. All of the schools suffered from a paucity of books and teaching materials. Most of the teachers had the minimal certification necessary for teaching at a primary school, but many of them hoped they could find ways of obtaining further training or higher educational degrees themselves. Most of them, however, did not feel that they had any voice in making decisions either about how they could improve education in the school to which they were assigned, or about their own career development. They all faced immensely difficult financial constraints exacerbated by the recent and major devaluation of their currency on top of their need to pay for their own housing and to try to find land where they could grow some of their own food.

While differences always exist among administra-

tive structures, all four of the LGAs we visited were relatively similar in regard to the type of top-down decision making that characterized them. Officials in the LGA headquarters worked in isolation from what was going on in the villages. While vehicles were parked in the LGA lot, funds were not available for gas and maintenance. Travelling to the villages was a rare adventure for LGA officials. Since decisions from the State and National government came arbitrarily, issuing the same kind of top-down orders to local schools was the accepted way of handling key decisions. Village administration is not considered part of the formal structure of governance even though substantial activities are organized within each village and carried out by the villagers themselves. The four villages included in our study varied substantially in the support they provided to primary education even though we could find no evidence of major difference at the LGA level.

Let us first discuss two villages located in the western and eastern parts of Nigeria where villagers provided a higher level of support to their primary schools than the two villages located in the central and northern regions. The two schools in Itangunmodi village located in the Atakunmosa LGA in Oyo State<sup>11</sup> were in the best condition of all of the schools we visited during our study. The teachers also had the highest morale. Itangunmodi, a village of about 200 households, is located on a barely motorable road about 40 minutes from Osu, which was the headquarters of the LGA. Parents-Teachers Associations had remained active at each school since 1970 when the formerly missionary schools became public schools. The buildings themselves were in good repair. While in the lower grades, two or three students shared a desk, there were desks in all classrooms, and upper-grade students each had their own desk to use. Teachers at both schools indicated that all eligible students attended primary school and that parents did not try to keep children at home. School records were available showing the number of students completing sixth grade and the rate of success in passing the state-administered Primary School Leaving Certificate. Since 1979, 85% of the students at the Methodist School and 82% of those at the Nawarudine School had obtained their Certificates.

This excellent record was achieved in a setting where few parents were able to purchase books for their children. Most classrooms had no more than three or four books per classroom for classes that averaged 17 pupils in Nawarundine and 28 pupils in the Methodist School. The problem of unavailable textbooks was greatly exacerbated by the fact that the list of textbooks authorized by the Ministry of Education changed every year. Students from one class could not, therefore, pass books onto the next class to allow for a slow accumulation of books for each class. Further, teachers were confronted with new books to master every year. Given the limited teaching materials,

teachers found that they had to dig into their own diminishing salaries to provide essential charts and other teaching supplies.

Illustrative of the formal administrative structure that teachers faced is their lack of control over where they would be assigned to teach. The Headmaster of the Nawarudine School traced his career path for us since he graduated from Teachers College in 1979. During these 11 years he had taught at seven different schools, never staying at one school more than two years at a time. With one exception, the transfers were all initiated by his superiors. He had most recently been shifted from being a teacher at the Methodist School to become Headmaster at Nawarudine, where he had never taught previously.

The second village included in our study where we found higher levels of coproduction was Ofemilli, located in the Oji River LGA in Anambra State about 32 kilometers from Enugu, the state capital. The school in Ofemilli village had been built by the community in 1945 and staffed by the Roman Catholic Church until it became a public school after the civil war. The building, while small, was in reasonable physical condition. All four classes were conducted in the same large, rectangular classroom. As many as 120 children and their teachers used the same room simultaneously. Only a few benches were available at each of the major blackboards. Again, only a few children in each class had textbooks.

Parents in this village were highly supportive of primary education and the local school. They had decided upon several projects that would improve the physical structure and sanitary conditions of the school. One project was building a new pit latrine for the school. All work on this project was on hold, however, waiting for permission from the state government authorities. Attendance rates were high. The headmaster proudly told us that 32 out of 34 students passed the school-leaving examination in the prior year (94%) and one with distinction. A local progressive union awards scholarships to at least three students from the village to attend secondary school.

The LGA Educational Authority was in a similar situation to the LGA authorities visited elsewhere. During 1983–88, teacher paychecks had been issued irregularly as various changes had occurred in the financial responsibility for the payment of teachers. Some years, books arrived from the State government late in the year and sometimes never arrived. Getting the books out to the schools was not, however, a high priority for LGA officials as we stumbled over crates of books in the office of the Director of the LGA Education Authority.

The two villages that members of our team visited in Plateau and Sokoto States were a distinct contrast. Plateau State is located roughly in the center of Nigeria. We focused on Wereng Village in the Barakin Ladi LGA located about 50 kilometers south-east of Jos,

the state capital. This area had been a tin mining area, but the larger commercial firms had all left the region during the mid-1960s when the tin mines no longer produced sufficiently for commercial mining. During the tin mining era, considerable investment had been made in the construction of all-season roads and other public facilities including schools and health clinics.

The maintenance of school buildings in the area was generally deficient. In a relatively rich village that we visited, Foron, the primary school was in a deplorable state of repair and had virtually no classroom furniture. In Wereng, the roof blew off one section of the primary school in 1988 and a second section in 1989. Members of the community replaced one section of roofing not long before we arrived after giving up hope of getting the LGA to do the repair.<sup>12</sup> This classroom, however, had not yet been returned to use for classes as the community had also hired a carpenter to repair broken furniture and he was using this classroom for that purpose. Thus, only about half of the students attended school at one time and classes were divided between a morning and afternoon session. The number of books available in any one classroom varied from a low of zero books (in one of the Grade 5 classrooms) to a high of 21 books (for the 32 students in the second Grade 5 classroom). Overall, an average of just under one-third of the students had the textbooks assigned for their class.

The proportion of students in Wereng who received a full six years of education is lower than the average for Barakin Ladi. Further, many children enter school after the first grade for a year or so before dropping out. For example, 53 boys and 66 girls started first grade in 1986 and 84 boys and 88 girls showed up for second grade. The problem was even greater in 1987 when more than half of the students in the second grade had not attended first grade. Tracing students through five years revealed that only about one-fourth of the girls and boys in the first or second grade in 1985 or 1986 were in fifth or sixth grade in 1990. Many erratic changes had occurred in class size during the interim period, and very few students attended classes during the rainy season where their labor was needed by their families. Few students continue education after the sixth grade. No data were available regarding the proportion of students obtaining a school-leaving certificate.

Teacher morale was obviously low in this setting. Besides the problems of overcrowded and short sessions, they all mentioned the lack of teaching materials in the classroom. In the words of the teachers themselves:

- I don't like to teach in a school where the students don't attend.
- I would like to go somewhere where parents can give us more of the cooperation we need.
- The atmosphere here is very bad for teaching. No roof. No textbooks. No writing paper. No

teaching aids. No uniforms. Lots of students drop out.

- The government should not neglect the plight of the teacher. The problem is nationwide, not just Barakin Ladi. Barakin Ladi is a relatively good teaching assignment compared to some places.

In Sokoto State in the northern part of Nigeria, we included the Bodinga LGA and Darhela village in our study. The school in Darhela was constructed by the State Government in 1970 and was in a state of bad repair. The roof of one of the three blocks had blown off in early 1990 and remained off. Birds had invaded several of the classrooms and several had no windows or outside doors. None of the 53 students officially enrolled in Class I by the Headmaster had attended school from January through July of 1991. Only one-third of the 36 students who completed sixth grade passed the entrance examination to secondary school. A girl was the only student to actually enter secondary school, located 50 kilometers from the village.<sup>13</sup>

In each village, the capability to devote greater inputs into the educational process was demonstrated by the diversity of community projects in progress. In two of the villages, where parents valued education highly, this ability was focused on the primary schools and enhanced what the teachers could do. In these villages, most children of school age obtained at least six years of primary education and 85% or more of them passed their school-leaving examination. In the other two villages, parents did not value education highly and contributed little to the local primary schools. Without parental support, the teachers were incapacitated and demoralized. In these villages, children obtained a scattered education, if at all, and only a few successfully passed their school-level examination. The number of children from these villages going on to secondary education was also smaller.

When coproduction is discouraged by taking over schools that villagers had perceived as being "their" schools, by creating chaotic changes in who was responsible for funding and running a primary school system, and by top-down administrative command as the style for all decision making, only the most determined citizens will persist in coproductive activities. In Brazil, many urban neighborhoods that had never undertaken collective action were empowered by the action of government officials to make real decisions and coproduce an urban service that was highly valued. In Nigeria, villages that had demonstrated their capabilities to engage in collective action were discouraged by government officials from active engagement in the education of village children.

### 3. COPRODUCTION

The concept of coproduction was initially developed by colleagues associated with the Workshop in

Political Theory and Policy Analysis during the late 1970s as we struggled with the dominant theories of urban governance underlying policy recommendations of massive centralization.<sup>14</sup> Consolidation of all governments serving metropolitan areas was proposed in many urban areas. Scholars and public officials argued that citizens as clients would receive more effective and efficient services delivered by a professional staff employed by a large, bureaucratic agency (see E. Ostrom, 1972). After studying police services in metropolitan areas, however, we had not found a single instance where a large, centralized police department was able to provide better direct service, more equitably delivered, or at a lower cost to neighborhoods inside the central city when these were carefully matched to similar neighborhoods located in surrounding jurisdictions.<sup>15</sup> Our findings were replicated by us and other scholars repeatedly over a 15-year period. A study recently conducted by Parks (1995) replicated the earliest findings in Indianapolis after the passage of a quarter of a century.

In our efforts to understand these strong empirical results, we came to recognize that several myths adversely affected how scholars viewed service production. First, there was the notion of a single producer responsible for urban services within each jurisdiction. We found, instead, many public agencies (e.g., municipalities and counties) as well as private firms (e.g., security services) producing immediate response services. Turning to intermediate police services, we found even more variety. Forensic laboratory analysis was frequently produced in a public or private hospital. Training was often produced in a local community or private college. We were dealing with a public-private industry rather than with the bureaucratic apparatus of a single government (V. Ostrom and E. Ostrom, 1965; E. Ostrom, Parks, and Whitaker, 1974, 1978).

Second, drawing on the work of Lipsky (1973), we recognized that street-level bureaucrats were not simply the pawns of a central bureaucratic machine that would do whatever their supervisors commanded. Riding eight hour shifts with police officers enables one to see their job more as they do and recognize how much discretion they have in how they spend their time. A motivated officer uses time in many ways that enhance the safety of a beat. An officer who is not motivated finds many ways to escape the summons of the police radio and get some sleep.

Third, we realized that the production of a service, as contrasted to a good, was difficult without the active participation of those supposedly receiving the service. If students are not actively engaged in their own education, encouraged and supported by their family and friends, what teachers do may make little difference in the skills students acquire. If citizens do not report suspicious events rapidly to a police department, there is little that department can do to reduce

crime in an area or solve the crimes that occur. We developed the term "coproduction" to describe the potential relationships that could exist between the "regular" producer (street-level police officers, school teachers, or health workers) and "clients" who want to be transformed by the service into safer, better educated, or healthier persons. Coproduction is one way that synergy between what a government does and what citizens do can occur.

All production involves the transformation of some set of inputs into outputs – or a production function. In the conventional way of thinking of production, a principal, such as an entrepreneur or a bureau chief, organizes factors of production (traditionally, land, labor, and capital) to produce varying levels of output. All relevant aspects of these factors are under the command of the principal who decides how much of any one factor will be combined with other inputs based on relative costs and capabilities. Production functions array the tradeoffs that a principal faces in making combinatorial decisions in order to get the most out of one set of inputs given their relative costs and the production technology in use and amount of other inputs allocated to this process.

In some important production processes, however, not all of the inputs that could potentially be used to produce an output are under full control of a single, public-sector principal. In constructing infrastructure facilities, for example, the labor used to construct a facility could all be employed by a public utility, it could all be contributed by citizens, or some of the labor could come from both sources. Whether a production process would best be organized entirely in the public sphere, entirely in the private sphere, or coproduced by both depends primarily on the shape of the production function. The relative role of public or private sector depends on the relative costs of the inputs contributed by these sources of potentially productive labor (and, as we discuss below, the likelihood of motivating either public employees, private citizens, or both).

In analyzing coproduction, we also use production functions. Production functions may involve strictly substitutable processes. If inputs are strictly substitutable, no potential for synergy exists. In Figure 1, for example,  $Q_1$ ,  $Q_2$  and  $Q_3$  represent three levels of output that could be achieved from a combination of inputs from citizens and from government. Inputs by public officials are completely substitutable for the inputs of citizen-producers. In such a situation, no advantage exists to finding ways of coproducing a good using both sources of input. Rather, the decision to produce the good in the public sector (e.g., sending a public truck on a regular route to collect garbage or recyclable materials) or to have citizens produce the good (e.g., require that citizens take garbage or recyclables to a designated location) depends on the wage rate paid to public officials as compared to the opportunity

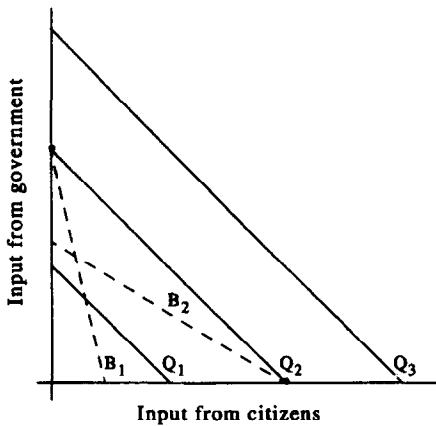


Figure 1. *Substitutable contributions from government and citizens to output.*

costs facing citizens for spending their time in transport.<sup>16</sup> If the wage rate of public officials is lower than the opportunity cost of citizens – as illustrated by budget constraint  $B_2$  – then the most efficient form of production is located entirely in the public sector. The most output,  $Q_2$ , could be produced entirely by the public agency assuming that public officials are fully motivated to work up to their capacity. Alternatively, if the opportunity costs of citizens were comparably lower than the wage rate of public officials, as illustrated by  $B_1$ , the most output could be entirely produced by citizens alone, again assuming full motivation to perform to capacity.

When the inputs from a government and citizen are complementary, as shown in Figure 2, output is best produced by some combination of input from both sources. Now, a potential for synergy exists. With

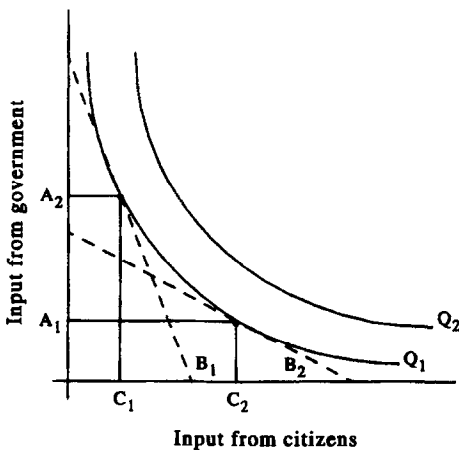


Figure 2. *Complementary contributions from government and citizens to output.*

such production functions, it would be possible to achieve the same level of output with many combinations of input from a government agency and from citizens. A combination of inputs, however, is needed rather than reliance on only citizens or only officials. If the opportunity costs of contributing are high for citizens, as compared to the wage rate of public officials, as shown in  $B_1$ , the least cost combination would be for  $C_1$  inputs from citizens and  $A_2$  from a government agency. The same quantity of output,  $Q_1$  could also be produced by  $C_2$  from citizens and  $A_3$  from an agency, and this would be the least cost combination if the relative costs were reflected as in the  $B_2$  budget constraint.

Analytically, the possibilities of coproduction are clear and of particular relevance in a developing country context. In many developing countries, the shape of a budget constraint is closer to that of  $B_2$  in Figure 2 than to  $B_1$ . Many poor regions and neighborhoods are characterized by severe underutilization of the knowledge, skills, and time of residents – which means the opportunity costs of devoting these inputs to the creation of valued public outputs are low. Obtaining better infrastructure and services generates very high benefits.

Designing institutional arrangements that help induce successful coproductive strategies is far more daunting than demonstrating their theoretical existence. Part of the problem stems from the nature of the goods and services typically produced in the public sector. It is notoriously difficult to specify a clear production technology for education, health, and police services (Wilson, 1989). While production technologies for constructing infrastructure are better known, how to regulate their use and keep them well maintained is a substantial technological puzzle. In addition, as discussed below, part of the innovative aspects

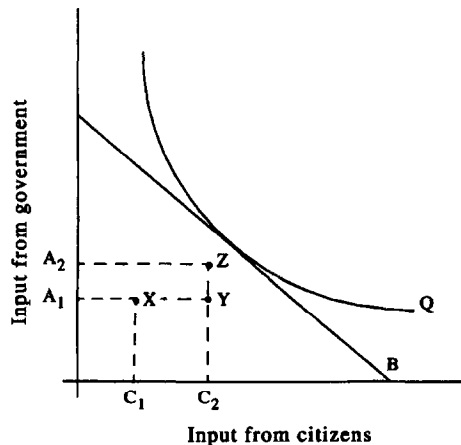


Figure 3. *Output below feasible level.*



of the condominium systems was changing the professionally proscribed production technologies themselves. Public sectors typically rely on incentive systems that send very weak signals about performance to staff who are employed on long-term, low-paying contracts with few legal opportunities for advancement. The signals encouraging citizen inputs are even more feeble.

The operational challenge exists in both developed and developing countries, but the severity of the problems involved is greater in many sectors of developing countries where the importance of central control and direction has dominated official thinking since the end of colonialism. The situation in many cases is illustrated by Figure 3, where the technically achievable production function for combinations of inputs from government and from citizens is shown as  $Q$ , while the current output at  $X$  is far from the frontier of what is feasible given budget constraints. Much less is being generated from both sources of inputs than could be produced if everyone were motivated to exert more effort.

In such a situation, substantial problems need to be addressed in enhancing the productivity of inputs from the public sector itself, let alone finding ways of more effectively motivating citizens and coordinating the efforts of diverse inputs not subject to the command of a single principal. In both the Brazilian and Nigerian cases, public servants receive relatively low wages. In Nigeria, after the devaluation of the naira during the late 1980s, the value of teachers' salaries plummeted. Earlier, they lost the food and housing that local communities used to provide. Now, teachers had to devote even more time to finding affordable housing and in tending their own gardens to provide food for their families. Arbitrary assignments and transfers, little chance for promotion, unkept promises by national and state governments regarding the support of primary education, and frequent top-down changes of relative responsibilities of national, state, and local authority over education, generate few incentives for highly motivated teaching. In villages where parents are relatively uninterested in primary education, who send only a small proportion of their children to school, and where school buildings are left without roofs, neither teachers nor citizens are actively putting effort into the production of primary education. In villages where parents are more supportive of primary education, for example, contributing  $C_2$  of effort in Figure 3 rather than  $C_1$ , output levels of  $Y$  rather than  $X$  could be achieved even without any increase in the effort of teachers. If teachers were to respond positively to increased support by parents and students, and themselves move from  $A_1$  to  $A_2$ , output would increase still further to  $Z$ . The much higher proportion of students attending school and graduating after six years, and passing external examinations in the villages where parents supported primary schools, is evi-

dence consistent with a change such as the one from  $X$  to  $Y$  (and, perhaps  $Y$  to  $Z$ ) in Figure 3.

At any one point in time, it is useful for analytical purposes to conceptualize production functions as a fixed technology. Entrepreneurs in both the private and public sectors can change the shape and components of production functions over time. Creative entrepreneurship is itself more likely in environments that encourage innovation and allow for a wide array of options in the organization of public service production. The innovative condominium program in the Brazilian case brought together several crucial ideas that expanded the level of services made available to poorer residents of Brazilian towns and cities. First, the idea to split sanitation systems into two linked systems — large-scale public works and small-scale community works — allowed for the separation of what had been one production function into two component parts. The effectiveness of the public sector inputs into the construction of systems requiring deep trenches and large pipes is considerable. This advantage disappears in the construction of shallow trenches and small pipes. Further, the opportunity costs of organizing residents to construct condominium systems in one neighborhood are much lower than trying to coordinate residential work teams for a citywide project. The money saved by minimizing the length of trunk lines to serve any one system could then be applied to the construction of trunks in other neighborhoods as well as to pay for staff to work with communities in the time-consuming process of negotiating local contracts.

Another innovation of the condominium system is the intensive involvement of citizens in the initial design and continuing maintenance of these systems. This changed the *shape* of these production functions so that what citizens did made the efforts of public officials more efficacious and *vice-versa*. Developing new production functions and changing the shape of others was indeed a major breakthrough for the condominium systems. Even more important, however, is motivating both public officials and citizens to work effectively together in settings where coproduction has rarely occurred and considerable distrust exists. This has been accomplished in the more successful systems by a slow building of citizen organization that, in turn, has affected the incentives of officials in a positive direction. Officials designing and operating infrastructure projects are usually supported by large construction firms interested in receiving more contracts. The incentives of this system are well known and do not lead to quality construction, good monitoring, or effective operation (E. Ostrom, Schroeder, and Wynne, 1993).

The condominium systems depend more on satisfied users to mobilize political support to construct still more condominium systems. Those systems performing at higher levels have solved some of the difficult

problems of operating and maintaining these systems over time. According to Watson (1995, p. 41), the key elements of successful operation of these systems are "(1) staff continuity between the construction and operations phases; (2) a specialized condominium maintenance crew; (3) face-to-face contact with residents; and (4) ongoing network monitoring and repairs and customer education." These elements change the nature of information available as well as the incentives of participants. It also generated social capital in the form of urban residents learning how to work with each other and with public agencies. This social capital is then a potential asset to be drawn on to obtain other kinds of urban goods and services.

Coproduction is not, of course, universally advantageous. Nor, is it a process that will occur spontaneously simply because substantial benefits could be achieved. Several conditions heighten the probability that coproduction is an improvement over regular government production or citizen production alone. First, the technologies in use must generate a complimentary production possibility frontier (such as in Figures 2 or 3) rather than merely a substitutive one (as in Figure 1).<sup>17</sup> When coproductive inputs are legally owned by diverse entities and complements, synergy can occur. Each has something the other needs. In the condominium systems, citizens had information, skills, time, and other resources essential to constructing the condominium works. Officials had the capabilities for constructing the public works and connecting the feeder lines to the trunk lines and treatment plants. By obtaining a modest cash contribution from the community, they are more motivated to make sure the system works.

Second, legal options must be available to both parties. In centralized systems, many potentially productive options are restricted. Teachers are not authorized to change a curriculum to make it more relevant for their students. Headmasters do not have the authority to change the timing of the school year so that school is open when children are not essential for the agricultural activities of their families. Parents who must wait many months to obtain permission before building a school latrine are hindered by such restrictions in their efforts to make their children's school a healthier place. The condominium system broke through such restrictions to open up a much wider set of options for both officials and citizens.

Third, participants need to be able to build a credible commitment to one another so that if one side increases input, the other will continue at the same or higher levels. Clear and enforceable contracts between government agencies and citizens enhance that credibility. The complementarity of their inputs is analytically similar to the production of a local, public good that is jointly enhanced if either side increases its inputs. In the condominium system, residents signed a formal contract outlining what they were willing to do in order to obtain a connection to a major trunk line. In

the Brazilian cities where this petition was fully recognized as a dual commitment (at least after experience with the system over time), higher performance levels were achieved than where citizens did their part only to find that the trunk lines were shoddily constructed and poorly maintained. It is also important to make a credible commitment not to undertake actions. If citizens come to believe that a government agency will bail them out if they do not perform according to their side of an agreement, citizens will be more likely to break the promises they make.

Fourth, incentives help to encourage inputs from both officials and citizens. Such incentives may be little more than the opportunity for officials to get to know citizens and *vice-versa* in an open and regular forum. Teachers who are feted when the children they teach excel in competitions are more motivated than those who are ignored no matter what their students do. One lesson from the Nigerian cases is that coproduction will be quite uneven when it is officially discouraged.

The last three of these conditions are more likely to be met in a polycentric political system than in a monocentric (or, highly centralized) political system. A polycentric polity offers citizens opportunities to organize not one, but many, governing authorities (see V. Ostrom, Tiebout, and Warren, 1961; V. Ostrom, 1987, 1991). Each unit in a polycentric system exercises independent authority to make and enforce rules within a specified area for particular policy areas. A condominium system is one example of a polycentric system. In this case, the smallest unit of the system is only one or two blocks in size. It is nested in a municipal, state, and national regime that can complement the activities of citizens organized in these mini-polities (see E. Ostrom, Schroeder, and Wynne, 1993, chapter 9).

In a polycentric system, rules at a large-system level can be written in a general form that can then be tailored to local circumstances. In regard to the school year, for example, a large unit can specify the number of days that schools must be open while smaller units can specify the particular dates to fit the local agricultural seasons. A larger unit can specify a series of textbooks that are authorized for a decade or so at a time. Then, smaller units can pick those books that have examples of most relevance to the students in the smaller units. In other words, many more actions tailored to local arenas can be authorized in a polycentric system than in a monocentric system that tries to establish uniform rules for all settings. Incentives that encourage coproduction are easier to design when some of the units in a polycentric system are relatively small and encourage more meaningful contact among officials and citizens.<sup>18</sup> The overlap of governmental units could perform the oversight needed to reduce the threat of arrangements that are "too cozy" in a smaller unit.

#### 4. IMPLICATION OF COPRODUCTION FOR SYNERGY AND DEVELOPMENT

Let me be more radical than Peter Evans expects and suggest that coproduction of many goods and services normally considered to be public goods by government agencies and citizens organized into polycentric systems is crucial for achieving higher levels of welfare in developing countries, particularly for those who are poor. Prior efforts directed at improving the training and capacity of public officials have frequently had disappointing results. Efforts directed at increasing citizen "participation" in petitioning others to provide goods for them have also proved disappointing. Efforts directed at increasing the potential complementarities between official and citizen production or problem-solving activities may require more time at the initial stage of a process, but promise a much higher, long-term return.<sup>19</sup>

In regard to physical infrastructure, the potential complementarities may be great, especially when those facilities involve major "trunk" lines and "feeder" lines. This is the case for highway systems, water and sanitation systems, and most communication systems. Planning the location and specification of the major trunk lines is a task requiring the input of larger agencies in a polycentric system because of the economies of scale, the need to raise large sums of monetary resources, and the capability of larger units to deal with externalities. When the construction and maintenance of feeder lines is then planned by a smaller unit in a polycentric system to meet reasonable general standards, but also local needs and capabilities, the large and small polycentric units complement each other. Each perform tasks the other cannot perform well. Small limits cannot effectively plan the backbone of a large network. Large units do not have the relevant information about local time and place information.

As long as public officials and citizens in developing countries continue to see a great divide between them, however, potential synergies will remain mere potentialities. Contemporary textbooks contribute to this artificial wall. Many textbooks on public administration stress managerial skills within the bureaucracy itself and few discuss the skills needed to work effectively in problem-solving activities with citizens. Economics textbooks that address problems of market failure assert that "the" government must provide in those cases where the market fails.<sup>20</sup> Textbooks in political science tend, in recent times, to focus on the formal aspects of national governments, on how party systems work, and on struggles to achieve dominance in a legislative body. They seldom discuss how ser-

vices are produced and delivered, or how agencies work at levels below that of national government. The role of citizens is depicted as casting ballots and watching the action. Even books comparing local government in Nigeria and the United States focus entirely on the formal structure of authority in both countries (Aborisade and Mund, 1995).<sup>21</sup> No mention is made of village governance, which is the only governance that has an impact on the lives of most Nigerians. Textbooks that focus on local governance tend to posit the presence of a large number of local units of government as evidence of fragmentation and overlap of authority (and thus a detriment to good governance) rather than as the existence of organization on many different scales (and thus an asset for good governance).

One reason given for creating a divide between public and private sectors is controlling corruption. Corruption is a threat to the effectiveness, fairness, and growth of all polities and economies (Wade, 1984, 1985). Other forms of opportunistic behavior — including free-riding, shirking, deception, and untrustworthy behavior — are also threats. If the remedy to corruption is seen as the creation of a strict bureaucratic structure to separate the servants of the public from the public, it is likely that behind the closed doors of a centralized system corrupt practices can flourish without much fear of exposure (Klitgaard, 1988). The efforts to control corruption by creating a gulf between polity and society may encourage other forms of opportunistic behavior to proliferate along with corruption. When public officials and the citizens they are supposed to serve work together in diverse sets of open, nested arenas, productivity can be higher and all forms of opportunistic behavior are more likely to be exposed, but never totally eliminated.<sup>22</sup>

The experience of success of coproduction also encourages citizens to develop other horizontal relationships and social capital (Putnam, 1993). Those working with condominium systems report that local activism through coproduction rapidly spills over to other areas. Alert citizens are able to increase the quality of services they obtain from multiple government agencies and not just the initial project.

Thus, let me recommend that the bridging of the gulf between the analysis of private activities apart from those of government agencies needs to be high on the agenda of development theorists and activists. No market can survive without extensive public goods provided by governmental agencies. No government can be efficient and equitable without considerable input from citizens. Synergetic outcomes can be fostered to a much greater extent than our academic barriers have let us contemplate.

## NOTES

1. Tendler and I are, of course, not alone in bridging this gulf. See also Klitgaard (1991); Bates (1987); D. Korten (1980); F. Korten (1982, 1985); Levine (1980); and Evans (1995a).
2. Bates (1976) stresses the investment of Zambian parents in their children's education as a rational strategy to ensure income when the parents are no longer able to provide for themselves.
3. Jon Van Til (1982) stressed the importance of coproduction of energy by citizens in conjunction with public and private energy producers — a field that also requires major investment in infrastructure facilities.
4. It appears that several fortuitous circumstances came together to support this program over the hurdles that would normally prevent it from ever moving from paper to practice. Natal is where the first systems were developed. A World Bank loan to support the effort of the state water company CAERN to provide sanitation services to poor neighborhoods made the funds available. de Melo obtained the enthusiastic support of the President of CAERN and a small group of entrepreneurial and social-minded engineers in his division.
 

“The team had considerable autonomy of action: they developed their own work plans, ordered materials without going through lengthy procurement procedures, and hired consultants as they saw fit. It was mission-oriented and composed of young, eager engineers, who saw their work as providing previously excluded groups access to critical social benefits” (Watson, 1995, p. 19).
5. See Watson (1995) for an analysis of the difference between the high- and low-performing systems. See Tendler and Freedheim (1994) and Tendler (forthcoming) for other positive developments in the tropics.
6. Relevant books include: McCay and Acheson (1987); Fortmann and Bruce (1988); Wade (1988); Berkes (1989); Pinkerton (1989); E. Ostrom (1990); Sengupta (1991, 1993); Blomquist (1992); Bromley *et al.* (1992); Tang (1992); Martin (1989/1992); Thomson (1992); Dasgupta and Mäler (1992); V. Ostrom, Feeny, and Picht (1993); Netting (1993); E. Ostrom, Gardner, and Walker (1994); Keohane and Ostrom (1995).
7. See in particular Milgrom and Roberts (1992); Alchian and Demsetz (1972); and Marshak and Radner (1972).
8. But see Lam (1995) and the literature cited therein, WECS/IIMI (1990), and the works cited in section 3.
9. Implementation teams have frequently involved both engineers and social workers and over time have involved a larger number of paraprofessionals so as to keep the costs of these time-intensive activities lower (see Watson, 1995, p. 23).
10. The fieldwork was part of the Decentralization: Finance and Management project, which was jointly conducted by Associates in Rural Development, Syracuse University, and Indiana University and funded by the Research and Development Bureau of the Agency for International Development (DHR-5446-Z-00-7033-00). I was the team leader for a Nigerian-American team composed of Dele Ayo, Kenneth Hubbell, Dele Olowu, and Tina West. I am deeply appreciative of the good fortune of working with such talented and productive colleagues. Parallel studies were conducted in Ghana (Fiadjoe *et al.*, 1992), Ivory Coast (Garnier *et al.*, 1992b), and a synthesis report comparing experiences in all three countries (Garnier *et al.*, 1992a). See also Green (1994).
11. After our study, Oyo State was further divided into two states and Atakunmosa ended up in Osun State.
12. That the community could repair the roof is evidence that they had the skills and capability of doing so. The community had also built a public health clinic. When the supply of medicine and facilities to that health clinic turned out to be inadequate, the community was able to attract a private pharmacist to the area who ran a very successful private clinic. The community, and our research team, was also fortunate to have an action-research team from the University of Durham and the University of Jos in the area helping collect relevant information and providing useful input to community problem-solving skills. That the community was waiting for the Government to repair the roof is a reflection of the perception that the Government had taken over the school in relatively good repair and promised them to provide higher quality education than they had had previously.
13. The problem of getting good data in the field, especially for an adequate managerial picture of what is happening, is illustrated by the following description of our team's effort to obtain data in this school:
 

“The data on enrollment had to be fished out from enrollment registers which were thrown in different classrooms and were in tattered shape. In spite of the spirited assistance of the teachers and the Headmaster, we were not able to establish enrollment data for any year besides 1990 and 1991. Diaries, school record books, files and ten copies each of textbooks supplied by the Federal Ministry of Education through the State Ministry of Education (for English Language, Mathematics, Social Studies, and Hausa) were found in various cupboards in the Headmaster's office” (Ayo *et al.*, 1992, p. 124).
14. See Parks *et al.* (1982); Kiser and Percy (1980); Percy (1978); Rich (1979, 1981); and Whitaker (1980).
15. See E. Ostrom and Whitaker (1973); E. Ostrom and Parks (1973); E. Ostrom, Parks, and Whitaker (1974); Parks and Ostrom (1981); and Parks (1984).
16. An example of “own production” of major infrastructures is that of farmer-constructed irrigation systems where the farmers design, finance, construct, operate, and maintain an irrigation system (see E. Ostrom, Lam, and Lee, 1994; E. Ostrom, 1996).
17. There is, of course, still a further logical possibility of a concave relationship where what one source of inputs interferes with the inputs of the other. There was, after all, an era

in the history of US education when parents were told not to "interfere" with their children's learning. The consistent finding in study after study is that parent's SES is strongly associated with children's educational performance (see Hanushek, 1986 for a review of this literature). This leads one to conclude that this relationship operates in practice via the type of encouragement given to students in middle-class families and the help extended to children in such families who are having difficulty with some subject at school. If some process did have a concave production relationship, coproduction would be inefficient rather than synergistic at any level.

18. Even though Nigeria is formally a federal nation, the control of the national government over state governments, and of state governments over LGAs, has been so extensive that little effective polycentricity exists other than in the village setting where what goes on is largely ignored by the formal units of government.

19. Recent efforts to rethink management, training, and institutional development congruent with local cultures led

by Mamadou Dia at the World Bank reflect the general effort to rethink development processes that bridge previously defined gulfs. See Serageldin and Taboroff (1994) and Bryant (1994). See also Dia (1993) for an application to the reform of civil service systems in Africa.

20. As Sugden (1986, p. 3) indicates: "Most modern economic theory describes a world presided over by a *government* (not, significantly, by governments), and sees this world through the government's eyes."

21. For a completely different and important approach to the importance of indigenous as well as governmental governance structures, see Wunsch and Olowu (1995) and Olowu and Erero (1995).

22. Most game-theoretical analyses of complex opportunistic behavior agree that such behaviors are never completely eliminated in social dilemmas or games of trust (see, for example, Weissing and Ostrom, 1991, 1993; Güth and Kliemt, 1995; and Laffont and Tirole, 1993).

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