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INFORMAL SECTOR IN WATER AND SANITATION
Intervention Strategies for USAID

A Paper Prepared for

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The Informal Sector in Infrastructure and Housing

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2

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Table of Contents

Abstract

I. Introduction

II. The Magnitudes of Need

A. The Stakes in Terms of Health

B. Unauthorized Contributions to Infrastructure

III. Nature and Definition of "Informal"

IV. Policy Domains

A. Household Decisions, Credit, and Risk

B. Winning Technologies and Promising Practices

C. Political and Administrative License of Institutions
and Standards

V. Conclusions

References

3.

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ABSTRACT

Present Situation

Individuals and organized units of workers acting largely outside the purview of government authority, but nevertheless under private or public sector sponsorship, are currently supplying the largest fraction of water and sanitation facilities for the low income residents in the Third World. Informal sector suppliers also reach a large number of middle class and rich homeowners. In addition, they utilize low cost technologies with sophisticated water systems as well as many variations of dry and wet pit disposal systems. These are the most widespread waste disposal technologies in the urban Third World, even though they are shunned implicitly or explicitly by sector authorities and professionals.

The long term debt crisis for most Third World countries, together with the cultural lag of technical institutions and deficiencies of service, compel and order of magnitude change in current approaches and emphases in order to save lives and improve welfare. New approaches should modify formal sector control over service delivery, increase participation by a much wider set of actors in the delivery of services, and accelerate experimentation and testing of technologies and techniques.

Promising Tendencies and Winning Technologies

As with housing over the past few decades, individuals and groups in the private sector are taking the initiative in marking out the broad lines of action that the technical and financial assistance organizations in the public sector should foster and support. Private initiatives refer mainly to marginal increases in water and sanitation facilities financed and built by users. In special cases, promising initiatives include reducing costs of conventional waste disposal systems and gradual introduction of modified technologies such as improved pit latrines and condominal systems in Brazil, India, Indonesia, and parts of Africa. These and other experiments, such as public private cooperation in land development in Guayaquil, are not far from replicability. Other technologies or approaches, such as combined human and household wastes, and conferring responsibility for bill collection and maintenance to neighborhood users, are further from technical and commercial feasibility, but deserve encouragement.

Strategies for Intervention by USAID

Making an impact in urban infrastructural development can be achieved without major programmatic realignments because AID's present structure is adequate to address infrastructure needs in

its housing and land development programs. However, the productivity of AID's assistance can be enhanced, and impacts in urban infrastructure increased, by expanding the volume of AID credit for small scale, short term marginal improvements by homeowners. This requires corresponding changes to strengthen intermediating institutions at the national and local levels. Some of this can be done through AID's microenterprise program targeted for the building industry. AID should coordinate R + D regionally through WASH but with a focus on bringing down unit costs and increasing user participation.

INFORMAL SECTOR IN WATER AND SANITATION
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I. Introduction

The purpose of this paper is to review the role of the so-called informal sector in the provision of basic infrastructure in urban areas of the Third World. Case examples are taken primarily from the Latin American experience because many of the institutionalized overtures are being made there and because the author's experience is strongest in Latin America. In the present discussion, I shall confine the meaning of informal to refer to 'unauthorized,' and 'unregulated' actions and technologies in connection with water and waste disposal primarily. These terms are meant to denote the partial application of legal and administrative mandates of the various authorities responsible for infrastructure. For reasons discussed in more detail below, 'illegal' and 'informal' are usually too strong and too imprecise to be useful descriptively and for policy purposes. I shall also refer (for most purposes interchangeably) to 'self-sponsored,' construction of water and wastes systems to denote the aspects of independence in the finance and construction of infrastructure.

It is the widespread actions of unauthorized persons and even unauthorized institutions to which water companies and urban development authorities object, although it is rare to hear of the "formal" authorities complain of unauthorized maintenance of systems. It is plain from observation and reflection that households everywhere, served and unserved by water agencies and companies, take it upon themselves not only to maintain and repair the most immediate parts of their water and waste systems. Many if not most low and medium income households also play an important role in the construction and operation of basic infrastructure and services, including water, drainage, sanitation, solid waste removal, and other things. Investments such as water connections of course can mean theft of water as well as the consolidation of settlement in illegal, expensive, or inconvenient locations within the city. On the other hand, as in housing experience during the post war era, unauthorized actions in infrastructure can constitute a precursor to new forms of sponsored, authorized, and regulated service expansion.

This assertion, though still not well documented, constitutes the major premise in this paper. The paper's larger themes concern: 1) the promise of new technologies and practices for infrastructure, 2) the predisposing conditions for expansion of an unspoken public private partnership in the provision of water

and waste services, and 3) opportunities for AID to foster greater public private cooperation.

II. The Magnitudes of Need

A. The Stakes in Terms of Health

Public sector responsibility for water and sanitation is deeply rooted in the concept of state responsibility for health and welfare. Mortality and morbidity rates are 30% to 150% higher among the urban poor than in the general urban population. Morbidity rates are reported to be on the order of 130 diarrheas for each death. Although the correlation between water systems and health is generally thought to be strong, there is still much dispute over about it. Merrick (1983) showed in a study of Brazilian mothers that education contributed at least as much to health improvements as did water and latrines. On the other hand, improvements in mortality appear to have grown more quickly in urban Brazil than either income or education; only water connections maintained a similar pace of improvement in the decade of the seventies. There is little dispute that investments in water and sanitation are an effective way to improve health and welfare. For the urban Third World, cutting infant mortality by 30% to 50% would signify saving millions of lives per year. Reducing morbidity in children and working age residents may also have a profound impact on productivity at school and in the workplace.

B. "Unauthorized" Contributions to Infrastructure.

Although no systematic data have been gathered on the role of unauthorized contributions to certain infrastructures in cities, it is possible to gauge the magnitude of the potential contribution. In Brazil, for instance, where water authorities maintain reasonably comprehensive data on investments, and an independent census that records service levels, about 40 million urban residents were connected to water during the seventies, another 20 million to waste disposal. Thirty percent of these connections were not "in the network," suggesting that at least this fraction involved partial or total participation by individuals outside the institutions formally responsible for water supply. These numbers correspond roughly to known investment figures for the period. The long term average cost of connected service is US\$125 per capita for water, probably in excess of US\$150 for waste disposal, depending on the amount of treatment installed. At these rates, future investment would have to be increased by more than two-fold to keep abreast of urban growth and to offset depreciation of old stock. A major part of the problem also is the rapid formation of households. The number of households is growing much faster, up to 20% faster, than cities.

An even more daunting task confronts sector officials in the rest of urban Latin America. By 1990, 130 million new urban

residents will require water hookups if the International Water Decade goals are to be met. An additional 234 million must be added by the year 2000. A total of 293 million would require waste disposal. Calculated at long term average per capita investment costs (of about 237 1980 dollars), these incremental populations alone could represent costs of US\$37 billion by 1990, another US\$50 billion by the turn of the century. These figures amount to between two and five times the annual levels of investment carried out during the seventies. Present and foreseeable capital assistance of this magnitude is out of the question. Can unauthorized or self-sponsored contributions in this area be stimulated to meet some of the need?

III. Nature and Definition of Informal

A rather extensive literature has developed over the past 20 years to describe the growing phenomena of development activities carried out primarily by individuals, but also by groups acting cooperatively but not a part of the formal system of authorities, that is, institutions and agencies authorized usually by law. Acting outside this framework does not necessarily imply illegality, as de Soto maintains. Illegality, like other erstwhile definitional attributes of "informal" -- such as small scale, simple technology, ease of entry, family enterprises, outside the taxing system, and others -- sometimes capture important, policy-oriented characteristics, and sometimes not. Peattie long ago (1978) developed anecdotal evidence which vitiated the veracity of several of the conventional, i.e., ILO definitional components of "informal." Nor does the legal authority principle apply only to individuals and businesses.

The institutional environment in Bolivia provides an example of agencies and even "authorized" institutions which runs parallel to the de Soto principle of illegality of the informal sector. Regional committees in the Department of Santa Cruz, formed by local power groups with the participation of duly authorized political representatives (mayors and council members), have been extremely important in the provision of public infrastructure in the city of Santa Cruz. Under the de Soto definition, these local civic groups would be illegal and informal. They systematically circumvented the wishes of the central government in order to meet local priorities, sometimes in direct contravention to national law. Yet these groups, like contraband traders and drug traffickers, possess formidable economic and political power. This should not mean that illegal individuals, businesses, and civic groups working to improve infrastructure, even if for middle income residents, should fall outside the purview of USAID program initiatives.

Nor is the point to controvert the de Soto premise. Rather, it is to recognize the expanded dimensions his work contributes to the policy domain we address. In this respect, the evidence

from Peru is not so much new as robust in its application and suggestive of new policy directions. De Soto's work serves to recall the point of Perlman's argument about "marginality" more than a decade ago: the terms illegal, unauthorized, and self-sponsored, much like marginal, signals the need to rethink professional practice and institutions and bring them into line with the financial, economic, and personal circumstances of the times. Understanding the policy significance of unauthorized contributions to urban infrastructure, at least for policy purposes, requires social and technical adjustments in the unwritten standards of "formal" institutions and the respective roles of state and citizen. One important implication is that the responsibility for welfare is shifted from the state to user. This is not exactly revolutionary, but it has deeper significance for the contract between state and society.

IV. Policy Domains

To better understand the prospects for shaping a new environment for investment in infrastructure requires a closer look at the forces which shape the forms of building and using infrastructure in cities. Three major areas touch sponsors and users of urban infrastructure. These are: 1) the decision processes of households relative to risk and credit, 2) the technology of infrastructure. and 3) the political and administrative license of institutions and standards. I shall discuss each of these in turn, providing illustrations and identifying opportunities for intervention by USAID.

A. Household Decisions, Credit, and Risk

Two characteristics are decisive in the environment of those participating in the unauthorized contributions to infrastructure. First is the multifaceted kinds and variation in volume of resources brought into the household economy, particularly for low-income households. Incomes are not necessarily small, but they are rarely predictable. Also, household resources take many forms. Besides cash, labor, and materials, self-sponsored builders of infrastructure count on political support, promises, influence and other resources to trade, barter, and negotiate in the process of planning and building. Most important, households rely on information such as tips and stock of personal knowledge to gauge when the commitment of resources, that is investment, is safe from the risk of loss. This leads to the second decisive factor in the environment: uncertainty and the risk of losing invested resources. Uncertainty refers to the unknown and unknowable aspects of ones resource environment such as the intermittent nature of income; vagaries of nature in health, welfare, and natural catastrophe; the local and national political scenes; and the like. Thus, households in all income levels-- like businesses, bureaucrats, and tycoons-- constantly adjust, activate, or withhold from expenditure their resources, options

and investments in accordance with their perceptions of risk.

These considerations lead to several things. First, households invest when they think it is safe, and second, they do so bit by bit as circumstances and resources permit. As demonstrated repeatedly, significant resources are mobilized and invested under the right circumstances, most notably, the conferral of title. But other forms of security, for instance the implied legitimacy conferred by neglect of squatments, can lead to reductions in perceived risk and the transformation of resources into investments. Strassman (1982) documents the "zeal to transform and expand" housing and facilities in Cartagena once the city water company connected squatter households to water service. In 25% of the cases, toilets or septic tanks replaced latrines after water connections were made. This phenomenon is by now well known, except it has not been exploited strategically by authorities to induce investment. On the other hand, as I shall point out later, most water companies are not equipped to trigger nor guide this kind of investment. Technically, companies do not usually possess the planning and social skills required; politically, they are not in a position to take initiative on sensitive legal matters such as tenure.

As for the pace of development, infrastructure investments are governed more by the environment of risk than the availability cash, materials, tools or credit to finance infrastructure expansion. Under these circumstances, a strong demand for credit is not unusual. Large loans are rare, not because people are poor or because interest rates are high, although these conditions are true. More important is that uncertainty regarding income and other factors affecting the ability to repay loans makes it smarter to keep credit in small chunks.

AID's options are limited in relation to the environment of uncertainty and risk, but there is much scope for action in credit, training, and influencing the approach of local institutions. First, merely by including a community development approach to urban water and sanitation, as it has done for rural water in Honduras for instance, would help to orient sector authorities towards the social skills needed to elicit sweat equity investment in basic sanitation. Specific skills are needed in several areas which AID could address. First, is training and technical assistance to plan for and engage community groups in water and sanitation works in connection with Food for Work, housing, and land development. Water companies are comprised mainly of engineers and bureaucrats not accustomed to the complications and frustration of community inputs. When direct interventions are made however, as in Villa Mexico in Cochabamba or Aguas Blancas in Cali, where neighborhood groups were organized to work as partners with the water companies, the results encourage both sides.

As regards credit, AID can work on both the supply and demand ends, making small scale loans to households, larger ones to businesses and builders interested in producing equipment (see next section) or contracting for construction. For the owner-builder, the direction of credit policy seems clearly toward the small. As with microenterprises, the challenge for AID and its partner institutions in country will be to administer small scale portfolios in large volumes. Loans of \$50 to \$250 are sufficient to make a substantial difference in indoor sanitary environment.

B. Winning Technologies and Promising Practices.

A growing number of technological alternatives are available to address the need to lower costs of urban infrastructure. In fact, the main barriers to improved sanitation are not technological, except perhaps in water conservation and hazardous waste disposal. Rather, the main task ahead now is to evaluate the social and economic feasibility of various technologies and find ways to implement the most promising among them. As with housing several decades back, the best technological alternatives have grown out of native genius in design.

1. Water supply. This is nowhere more apparent than among the clandestine connections for water found throughout low-income settlements in the Third World. A great deal of experience has been accumulated in tapping major water mains, distributing water sometimes in the form of a small business, avoiding detection and by-passing meters, collecting tariffs for personal profit, and maintaining systems in working order, among other technical and commercial skills. In a few places--Bolivia, Sudan, Liberia--authorities have investigated or experimented with the concept of licensing local vendors in order to cut administrative and engineering costs. Licensing arrangements of this kind, although they have drawbacks, are the most cost-effective way to distribute and collect for service in areas where technical, economic, or financial barriers impede direct household connections. SEMAPA in Cochabamba has adopted this strategy in low-income areas. In effect, SEMAPA's arrangements set up mini branch offices. The concept could be made more elaborate.

Another possibility, though still questionable technologically, are devices to restrict water flow, especially where metering is unaffordable. A number of manufacturers--in India, Chile, Ecuador, and the US--have produced water conserving, self-closing valves applicable for residential use where hot water is not used.

2. Waste Disposal. Pit latrines are by far the most widely used form of sanitary waste disposal and most widely understood technology in Third World urban settings. Much of the construction carried out by unauthorized participants in this sector is pit latrines. The World Bank has promoted an upgrading strategy

using this technology, and it is being adopted increasingly in India, Indonesia, many parts of Africa, and the northeast of Brazil. Materials for lining, sealing, and covering sheds are easily produced locally. The upgrading strategy can lead to increasing levels of sanitary disposal and eventually to offsite disposal and treatment. Waste removal of course involves greatly increased cost, but even where it is unavoidable, these costs have been brought down by increasing participation and modifying standards of construction.

Condominial systems in Brazil represent a promising variation on quasi-conventional sewerage. Adopted first in the northeastern city of Natal, the condominial systems builds on the organizational structure of local communities. Residents must understand, through community meetings and discussion, how the system works because their cooperation is required to build, and their participation needed to maintain, condominial systems. In this respect, condominial systems are tailor made for the informal sector. To build the system access to sanitary facilities is gained from the rear yard, rather than the street. Residents help plan and build the system by constructing a "path of least resistance" waste disposal line on or near the surface. This strategy cuts costs of excavation, construction, and maintenance. Users are responsible for excavation on their lots and for the maintenance. Around 40,000 users are presently served by this type of system in Natal, Petrolina, Rio de Janeiro, Sao Paulo, Cuiaba, and Joinville.

Several other candidates deserve mention. First is the anaerobic digester of human and organic solid wastes. Several neighborhoods in Mexico City and Merida have installed communal digesters (known as "SIRDOS"). As with other systems, feasibility turns on social and cultural factors. In the Mexican cases, the results have been surprising. After initial resistance, operation of the system has subtly transformed the role of women in the neighborhoods. They have gradually inherited responsibilities for operation and maintenance devolving from their traditional role as "managers" of household wastes and gardens. Gardens, and by extension, the marketing of mulch and soil conditioners from the digester, have also been managed by women at a profit. This system is far from widespread replicability, but its characteristics as a locally built and self-operated technology make it worth exploring further.

The disposal of solid waste by SIRDOS offers one alternative to a growing waste problem which has received relatively little attention by the international development assistance community and quite a lot of attention by scavengers, usually from low-income households, and relatively wealthy middle-level operators. Though preliminary studies have been done on scavenging and recycling in Third World cities (Cairo, Manila, Mexico City, Cali), much remains to be done to understand "informal" systems

of recycling wastes. My estimates are that waste provides income for a substantial number of low-income households, that the labor intensive methods of sorting and recycling, while hazardous in their present, unregulated form, as evidenced in Goiania, are nevertheless significant also from the standpoint of materials economies.

AID's contribution regarding the technology of water supply and waste is probably best directed towards technology research, evaluation, and development. The informal sector, with help from limited outside assistance, has developed widespread experience in the simplest technologies and broad capability to respond to assistance in design, construction systems, operation and maintenance. Some important questions concern 1) social acceptability and long run impacts in the cases of the condominial and upgraded waste systems, 2) production possibilities and costs in the cases of water conservation valves, condominial systems, and the SIRDOS, and 3) participation in, and the extent of risk related to, the handling of waste recycling.

C. Political and Administrative License of Institutions and Standards.

By far the most important feature of infrastructure systems in Third World cities is the institutional and policy apparatus set up to guide the system. Water companies are everywhere weak and water policies and investments woefully inadequate. But the most difficult parts of this system as far as the informal sector is concerned is the core of assumptions and operational principles that guide water companies, sector authorities, and law and policy makers. To encourage informal activity in the sector means confronting the intrinsic resistance represented by assumptions and standards such as that water and waste are responsibilities of the state, that private participation, especially by the disenfranchised, are unwanted intrusions, and that inherited standards of engineering must be maintained. These institutional values represent real barriers to entry of informal participation. The unwritten assumptions are reinforced by codified practices which are impossibly expensive and complicated and again reinforced by a burdensome bureaucratic structure which makes response times slow to authorized actions, practically blind to unauthorized interventions.

One promising approach to penetrate this ossified institutional system follows from reform pressures applied under circumstances of external debt. Most of the Latin American countries are adopting adjustment mechanisms in operational and commercial aspects of service which are forcing public sector institutions to make changes. With some outside stimulus from AID, Guayaquil began to modify the standards and procedures governing new land developments. For instance, private developers can obtain permits on a priority basis by paying special rates. Developers

also enjoy relaxed standards for roads, telephones, drainage, and public lighting, and can expect assistance from city authorities to expedite approvals through the city council. This cuts the turnaround and construction costs and promises to bring the cost of serviced land to a range which is competitive with squatter settlement lots on the other side of town. The city fostered this process in order to make available privately developed land in easy to serve areas at prices comparable to squatter land. The procedures and rule for this process, though not documented thoroughly, are adopted and published. This Guayaquil approach represents one promising model to which may be added innovations concerning water and waste service.

AID can make a contribution in the planning and institutional areas, part of which were discussed earlier under the section on household decisions, credit, and risk. AID could gear training and technical assistance to address the planning and community organizational tasks required with low cost technologies and user participation in service extensions. Master plans for water and waste are another area where AID can make an impact. Most master plans are obsolete before they are published. But the valuable data they contain need not be wasted. AID could help in the development of strategic water and sanitation plans, a kind of short range view geared to identify the most pressing needs and diffuse intentions and requirements to interested parties in the community. A similar area of need is in developing what might be called "appropriate urban development guides," including new sections on water and sanitation standards and procedures, following the lead of Guayaquil. Plans and procedures of this kind need first to be reviewed and documented and then gradually elaborated and published as a kind of manual or handbook on what can be done administratively, technically, and socially. Later, AID would be in a position to incorporate in a wholesale basis, land and infrastructure development as a part of its housing guarantee loans.

V. Conclusions

The barriers to making an impact on urban infrastructure are not so much around the actions or inactions of the informal sector as around the policies, assumptions and practices of the institutions responsible for building, operating, and maintaining water and waste facilities. AID can affect both sides in this equation without major programmatic realignments. The Housing Guarantee Program, with appropriate emphasis on land and infrastructure, can significantly affect the pace and kind of building in infrastructure. But the approach in credit must be toward the small end, it must be combined with assistance to micro-enterprises in construction and facilities, and with the Food for Work Program in community participation. But the bulk of work must also be in the software areas of training and technical assistance of city agencies and water companies, of

revising planning and administrative standards of the kind being explored in Guayaquil, and in research and development of the social, economic, and in a few cases, technical aspects of technologies presently being employed in many Third World cities.

REFERENCES

- De Soto, H. 1987 El Otro Sendero: La Revolucion Informal.
Bogota: Editorial La Oveja Negra.
- Merrick, T. 1983 "The Effect of Piped Water in Early Childhood Mortality in Urban Brazil, 1970-1976." World Bank Staff Working Paper No. 594.
- Peattie, L. 1980 "Anthropological Perspectives on the Concepts of Dualism, the Informal Sector, and Marginality in Developing Urban Economies." International Regional Science Review, 5(1):1-31.
- Strassman, W. P. 1982 The Transformation of Urban Housing.
Baltimore: Johns Hopkins University Press.