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The Informal Sector's Role in Urban Environmental Management

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This paper starts by tracing the origin of the *informal sector* and *urban environmental management* (UEM) paradigms. Their points of intersection in solid waste management and in the provision of water supply and sanitation are investigated based on a large number of published and unpublished studies. In addition to identifying the supply- and demand-side factors, the underlying economic and financial fundamentals and socio-political causes of informal-sector involvement in urban environmental provision are explored. The informal sector's contributions to urban environmental management are highlighted for: the mutually reinforcing roles of the informal sector and UEM, the pioneering role of the informal sector in stimulating private investment in urban environmental infrastructure, the socially crucial transitional function of informal-sector involvement in UEM, and the role of the informal sector in stimulating competition in UEM. The paper proposes two strategies to strengthen the beneficial role of the informal sector in urban environmental management. One strategy seeks to alleviate health hazards associated with the informal sector's involvement in urban environmental service provision. The other seeks to overcome the polarized viewpoints as to suitable institutional options for this provision. A matrix for distribution of responsibility among the competing stakeholders is presented to facilitate finding the optimal role for the informal sector in urban environmental management.

Keywords: Informal sector, Urban environmental management, Waste management, Water supply, Sanitation.

1. Background

In view of the nature of this inquiry, it is worth noting how the *informal sector* and *urban environmental management* paradigms originated in development literature. The literature on the informal sector traces the term to the 1972 International Labour Organization (ILO)-United Nations Development Programme (UNDP) employment mission to Kenya (International Labour Organization 1972), which was undertaken in the middle of a global search for ways and means to create more employment for millions of job seekers in cities of developing countries. Such missions, particularly to the developing countries, were follow-ups to the creation of the World Employment Programme of the ILO in 1969. Since then, the informal sector has been studied from various angles according to respective needs. For example, some authors have found the informal sector to be a helpful analytical mode for studying the nature of segmentation or duality in the urban labor market (Piore 1983; Mazumdar 1983; Amin 1982). Some others have assessed the efficiency of the informal sector as a tool for urban poverty alleviation (for example, Harriss 1989). The sector has also been studied from an urban planning perspective (Amin 1992; Harper 1992, 1996). Recent attention on the informal sector

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has been from the "decent work" perspective (International Labour Organization 1999), which has led to a search for ways and means to bring work in the informal sector up to the standards of decent work (Amin 2002).

The UEM literature is relatively young and has started to grow only in the last decade. Drawing an analogy with the ILO's "discovery" of the informal sector as a possible means of urban absorption of rural migrants, it can be said that the World Bank's urban policy agenda for the 1990s influenced the search for a new paradigm that would move the discourse beyond the *housing and residential infrastructure* paradigm of the 1960s and 1970s and that would emphasize: (i) increasing the productivity of the urban economy and the need to alleviate constraints on productivity; (ii) increasing the productivity of the urban poor by increasing demand for labor and improving access to basic infrastructure and social services; and (iii) reversing the deterioration of the urban environment (World Bank 1991, 3). At this time, problems of water supply, sanitation, congestion, air pollution, and power shortages had started to threaten the leading role played by cities in economic development.

The three policy goals of increasing urban productivity, reducing urban poverty, and improving urban environments contributed to the emergence of the UEM paradigm. Many urban academics and professionals started to pay attention to environmental problems in Third World cities. One of the earliest works in this direction is that of Hardoy, Mitlin, and Satterthwaite (1992). The paradigm of UEM, however, was not yet born. Some planning schools in Asia[1] started to realize that the old paradigms of urban planning and housing alone were no longer adequate to address the problems that were besetting cities in developing countries with huge populations, unabated rural-to-urban migration, vast informal sectors,[2] and rapid economic growth in some cities exacerbating traffic congestion and air pollution (Hardoy, Mitlin, and Satterthwaite 1992). The first explicit use of the UEM paradigm was in two journals: *Regional Development Dialogue* (*RDD*) (vol. 15, no. 2, Autumn 1994) and *Regional Development Studies* (*RDS*) (vol. 1, Winter 1994/95).[3] Four papers (Webster 1994; Shin 1994; Utea 1994; and Lee 1994) together form the UEM sub-theme in that issue of *RDD*. Almost simultaneously, *RDS* published a major paper by Mukoko (1994/5) that traces UEM's origins to "sanitary engineering, environmental health, urban and regional planning, and public administration" (Mukoko 1994/5, 132). Two other distinguished publications on UEM that came out around that time are those of White (1994) and a GTZ publication by Atkinson (Atkinson 1997). Atkinson, jointly with Vorratnchaiphan, also used the UEM paradigm in two journal articles based on research in Thailand (Atkinson and Vorratnchaiphan 1994, 1996).

The credit for first investigating the role of the informal sector in urban environmental management goes to Romanos and Chifos (1996) and Perera and Amin (1996). Romanos and Chifos document a

1. For example, the Asian Institute of Technology (AIT) and the Office of Housing and Urban Program of USAID organized a workshop on "The Role of the City in Environmental Management", 21–24 September 1992, in Bangkok, which culminated in AIT developing a UEM curriculum (Parenteau and Foo 1993) and its presentation to a USAID-AIT Research Triangle Institute workshop, 5–7 May 1993 at AIT, Bangkok. The actual birth of UEM as an academic program, however, did not take place until the Canadian International Development Agency (CIDA) approved the CUC (Canadian Universities Consortium)-AIT proposal for establishing UEM as an academic program in November 1996.
2. In view of the huge presence of the informal sector in the urban economies and environments, Amin (1992) and Perera (1994) stress the need to accommodate the informal sector in urban planning paradigms.
3. Both journals are published by United Nations Centre for Regional Development (UNCRD), Nagoya, Japan.

wide variety of studies that clearly suggest the informal sector contributes in (i) solid waste collection, disposal, and recycling; (ii) water provision; (iii) improving air quality; and (iv) greening through urban agriculture. Perera and Amin report the results of an assessment of the potential of informal enterprises to contribute to UEM. They also identify enterprises with the potential to adversely affect environmental quality, which is intended to help in the design of public policies and actions that mitigate the adverse effects while allowing the enterprises to continue operating. It should, however, be noted that the pollution implications of the informal sector were addressed even in the 1980s (for example, in Sethuraman 1981; Omuta 1986), and this continues (for example, Blackman 2000).

Having set the context, the rest of this paper looks at: definitional issues (section 2); deprivation that creates an association between the informal sector and UEM (section 3); the supply- and demand-side factors that lead to the informal sector's involvement in UEM (section 4), and their underlying causes (section 5); the informal sector's contributions to UEM (section 6); and proposed strategies for enhancing the informal sector's role in UEM (section 7). Some concluding remarks are made in section 8.

2. Informal sector and urban environmental management defined

In view of the problems associated with definitions and lack of consensus not only on the definitions but even on the utility of the *informal sector* and *urban environmental management* paradigms, it is in order to explain briefly the senses in which they are used in this paper.

2.1. Informal sector

Depending on whether the analytical focus is on people, activity, or habitat, the informal sector is distinguished from the formal sector by: (i) certain labor and employment characteristics (such as lack of official protection/recognition, lack of coverage by wage legislation and other social security systems, predominance of own-account work; absence of trade union organization, low income and wages, little job security, and absence of fringe benefits from institutional sources); (ii) enterprise operation characteristics (such as very small-scale operation, unregulated and competitive market, reliance on locally available resources, family ownership, labor-intensive and adapted technology, and absence of access to institutional source of credit and similar support or protection); and/or (iii) land and housing characteristics of settlements (such as unauthorized use of vacant land, illegal subdivisions/renting of land, unauthorized construction, reliance on cheap and locally available scrap construction techniques, lack of application of safety standards and regulations, and non-availability of mortgages or any other financing) (Amin 1996, xvii). Such settlement characteristics sometimes lead to restricted access to basic services, which can also be used as a criterion for distinguishing between informal and formal land and housing settlements. Such lack of access to basic services gives rise to rudimentary service provision by informal labor and enterprises—what Montgomery (1988) calls the informal service sector.

All three of these dimensions for distinguishing the informal sector from the formal sector are, to some degree, relevant for this paper. Enterprise and service provision characteristics certainly are. Labor and employment aspects of the informal sector might, in the first instance, appear to be irrelevant. Their value, however, will be appreciated from section 7, particularly from the strategy proposed for reducing

occupational hazards and improving working condition of informal-sector labor engaged in waste recycling and sanitation services. Thus, all three dimensions of the informal sector noted above are of some relevance for the issues addressed in this paper.

In case readers are confused by the several areas of application and the use of so many characteristics for drawing distinctions between the formal and informal sectors, let me note that despite the diverse composition and varying defining characteristics, the different entities of the informal sector have a basic common denominator: a lack of solid legal or official status that the state machinery and institutions bestow upon formal-sector employment, businesses, and settlements. This lack of solid legal and official status should not, however, be equated with illegality. Also, its transitory nature is a characteristic hallmark of informal-sector employment, enterprises, and housing, although they may exist for considerable periods of time. This transitory nature emanates in part from the aspirations of many of its participants to one day graduate from the informal to the formal sector. It also reflects the attitude of the state, which sometimes seems to wish for the demise of the informal sector. Again, this does not mean that the informal sector will one day disappear; in some places it may, while in others it may not. More importantly, new types of transitory employment, activities, and settlements may appear. Increasing subcontracting and outwork practices in the formal sector, which are giving rise to new forms of informality, are two examples.

2.2. Urban environmental management

Instead of explicitly defining UEM, White, in his book *Urban Environmental Management: Environmental Change and Urban Design* implies that UEM means the study and practice of urban planning and management from an environmental perspective (White 1994, xii). Writing around the same time, Mukoko states that UEM means "the systematic and conscious effort on the part of city or municipal government or any other public institution to influence human activities susceptible of damaging the environment" (Mukoko 1994/95, 132). For this paper, urban environmental management is defined to include a set of concepts, tools, public policies, and actions that allow urban environmental problems to be addressed. These problems include those related to water supply, sanitation, waste, and air pollution.

3. The magnitude of water and sanitation deprivation

Given that improving access to clean water and to sanitation are two key targets in the Millennium Development Goals and that they are also two of the three UEM subsectors that are addressed in this paper, it is worth examining their present status:

- Two billion people have no access to safe water or adequate sanitation (UN-HABITAT 2003).
- More than half the population in most large cities in Sub-Saharan Africa, and many in Asia, still lack water piped to their home and good quality toilets (ibid.).
- Some 100 million urban dwellers worldwide have to defecate in open spaces or into waste paper or plastic bags ("wrap and throw") (ibid.).

Table 1 provides data from UN agencies on lack of water.

Table 2 compares the definitions used for assessing the status of water and sanitation in developing countries with the definition of *adequacy* used for high-income countries. Two points should be noted here. First, no matter which definition is used, the number of people without such basic necessities as water and sanitation is huge. Second, the definitions of both *improved* and *adequate* are very modest compared to what is considered adequate for urban resident in high-income countries. Although in many instances applying different standards according to level of income is wholly justified, on closer examination it would appear that what is seen as adequate for high-income countries should really be the norm for water and sanitation everywhere for all people; these are basic needs for which setting different standards is probably not acceptable because they have implications for health, productivity and income, life expectancy, child mortality, and maternal care.

Table 1. Different estimates of the proportion and number of urban dwellers lacking water and sanitation provision in 2000

Region	Percentage and absolute number of urban dwellers without improved[1] provision of…		Percentage and absolute number of urban dwellers without adequate[2] provision of…	
	water	sanitation	water	sanitation
Asia	7 % 98 million	22 % 297 million	22 % 297 million	35–50 % 100–50 million
Africa	15 % 44 million	16 % 46 million	16 % 46 million	35–50 % 500–700 million
Latin America and Caribbean	7 % 29 million	13 % 51 million	13 % 51 million	20–30 % 80–120 million

Source: World Health Organization and UNICEF data on improved water and sanitation and UN-HABITAT data on adequate access to water and sanitation provided in Environment & Urbanization 2003, p. 6.

1. "Improved" water supply here was defined as access to water through household connection, public standpipe, borehole, protected dug well, protected spring, and/or rainwater collection. Unprotected well, unprotected spring, vendor-provided water, bottled water, and water provided by tanker truck as means of meeting water demands were not considered as improved. Access to "improved" sanitation was defined as meaning being connected to a public sewer, connection to a septic system, a pour-flush latrine, a simple pit latrine, and/or a ventilated improved pit latrine. Service or bucket latrines (where excreta are manually removed), public latrines, and open latrines were not considered improved sanitation.
2. "Adequate" access to water and sanitation, according to the definition used here, requires continuous, good-quality piped water supply into the house or house yard; hygienic, well-maintained, easily accessed toilets that are used by all family members; and safe and convenient disposal of wastewater.

Table 2. Differing definitions for assessing adequate water and sanitation

Term	Water	Sanitation
Adequacy for high-income countries	• Potable water is piped into every home; • This water is distributed by internal plumbing to toilets, bathrooms, and kitchens; and • Piped water is available 24 hours a day.	• At least one water flush toilet in every house or apartment; • Guaranteed supply of water for flushing; • A water basin in the bathroom or close by where hands can be washed; and • Facilities for personal hygiene: hot water and a bath or shower.
Adequate for developing countries	• Continuous and good quality water piped into the house or house yard.	• Hygienic, well-maintained, easily accessed toilets that are used by all family members, and safe and convenient disposal of wastewater.
Improved for developing countries	• At least 20 liters available per person per day; • From a source within 1 kilometer of the person's house: - Household piped water connection, - Public standpipe, - Protected spring and rainwater collection, - Water from standpipes, - Boreholes, and/or - Protected dug wells (no stipulation that this water is safe to drink).	• Shared pit latrine, with no stipulation that they are easy to access or clean; • Connection to a public sewer; • Connection to septic system; • Pour-flush latrine; • Simple pit latrine; and/or • Ventilated improved pit latrine.

The paragraph above should not, however, be understood to imply that a universal standard is being advocated for immediate implementation irrespective of income level of a country, city, or household. The intention is simply to show that the measures used for determining access to water and sanitation are indeed very modest. This means that the above aggregated data do not fully reveal human deprivation in terms of water and sanitation. Only micro-level household survey data can reveal how many people really are able to meet their water and sanitation needs. One household survey (Islam 1998) reveals that on average, a toilet in a Dhaka slum is used by 61.3 people, who wait for about an hour to get a chance to use it. It goes without saying that these toilets are very makeshift arrangements. The same survey also reveals that more than half an hour is required for travel to and from a water hydrant and once again, an hour's queuing is required. This situation is by no means atypical for a low-income country's slum residents.

4. Supply and demand for informal-sector involvement in UEM

In simple terms, the deprivations, noted briefly above, have given rise to the presence of an informal sector in the cities of developing countries, and this has also created new opportunities for UEM in these

cities, particularly with respect to solid waste management, water supply, and sanitation provision. This section of the paper elaborates these new opportunities in a supply-and-demand framework.

4.1. The supply side

The presence of unemployed populations, urban youth, a constant flow of migrants from rural areas, and retrenched workers from the public and private sectors, along with increased participation of women in the labor force, are some of the key factors that have created a huge urban labor pool whose only way to survive in the cities is to create their own jobs. They do this by providing services to urban residents, businesses, and industries. This has led to an expansion of the informal sector to a vast size: 40 to 60 percent of the urban "employed" labor force in developing countries is actually in the informal sector (see Amin 2002, 12–20).

4.2. The demand side

No matter how powerful the supply side and how true the classical dictum that supply creates its own demand, laborers cannot continually create their own jobs indefinitely—no matter how ingenious they are in doing so. There must be enough demand-side development for the supply to make sense. To the traditional demand for cheap labor from business and industry, a new dimension has been added by the huge concentration of wealth, assets, income, purchasing power, and investment in cities, which have been described by McGee (1996) as "theatres of accumulation". In these theatres, demand for labor is diverse. Hawkers, peddlers, rickshaw drivers, construction workers, a variety of people providing services for tourists, and piece-rate workers in slums and low-income settlements in cities of developing countries have been widely familiar for some time. Just as familiar is the work of waste-pickers in the city waste-collection points and dump sites. What are still not so well known are all the different informal-sector activities centering on various phases of waste collection, disposal, recycling, and processing, or, particularly, those in the provision of water and sanitation. Table 3 provides a catalogue of informal services in subsectors of UEM.

5. Underlying causes of informal sector involvement in UEM

The immediate supply- and demand-side factors do not fully reveal the underlying causes of informal-sector involvement in UEM. The interplay of powerful economic, social, and political forces is also shaping the nature of informal-sector involvement in UEM.

5.1. Economic and financial fundamentals

The fundamental reason for the informal sector's involvement in UEM is, simply, the inadequacy of the financial resources available to build and operate urban environmental infrastructure. The huge costs of building a water supply system, drainage and sewerage lines, and wastewater treatment facilities is often an insurmountable barrier for countries at early stages of development with huge urban populations. In an increasingly globalized world with free capital flow, domestic capital shortages can, however, be overcome with capital inflow from abroad. Indeed, foreign direct investment (FDI) flow has increased tremendously, but it is not being invested in the urban environmental infrastructure and services sector (Minh and Amin 2002). Like all capital, FDI opts for profitable sectors. One major

Table 3. A catalogue of informal-sector activities in UEM subsectors

UEM subsector	Informal sector activities
Solid waste management	*In waste collection and separation* • Buying of reusable and recyclable wastes from households by itinerant buyers, which provides incentives for waste separation by household members. • Separation of waste by waste-pickers (also called rag-pickers) at the primary collection points and dump sites. *In waste recycling* • Waste-buying shops around dumpsites, neighborhoods, and commercial centers (buying from waste-pickers and sometimes from municipal waste collectors). *In waste processing* • Informal-sector workshops and factories process or manufacture recovered materials into recycled goods (in all cases there are links with the formal sector too; see Sinha and Amin (1995) and Thepkunhanimitta and Amin (1998). • From simple, outright reuse of recoverable waste to buying and selling to processing and manufacturing (Siddique 1996).
Water supply	• Hawkers selling bottled water in trains, buses, and steamers. • Water vending (Kyessi 2005, 9). • Independent providers. • Truckers with private wells providing quality water when public service companies' water is of doubtful quality (Solo 1999, 122). • From simple water vending or selling of bottled water as hawkers to becoming full-fledged "water entrepreneurs". • On the basis of a review of several francophone African countries, Collignon (1998, 3) notes that a variety of operators, "often in the informal sector, take over various water functions" when public authorities abandon their role of providing water. These are: • The concessionaire (young and college-educated, not craftsmen or tradespeople, obtain concessions as private operators). • The pump operator (with six months' training on required skills: competence as mechanic, plumber, and electrician). • The carter (carters transport small volumes of water—200 to 600 liters—from one supply point to another. This is a well-established profession in Sahel towns). • The standpipe manager (whereas carters are typically below 25 and little educated, and have not much social standing, standpipe managers are typically older, more educated, and more established in the community). • The repair company (including mechanics, plumbers, pump repairers, and others).
Sanitation	• Sweepers who also collect and dispose of night soil; • Sewage-removal services; • Septic-tank emptiers;. • Night-soil carriers;. (Solo 1999, 122; Amin 2004) • Private wastewater treatment plants, such as SIBEAU in Contonou, which charges septic-tank-pumping trucks to receive and treat sullage, dumping the products into the ocean after secondary treatment (Solo 1999, 122). • Moving from traditional ways of collecting night soil to becoming operators for Vacutug machines (which collect sullage through a pump) (Amin 2004).

reason for inadequate capital investment in urban environmental service provision is an enduring sense that these are public services, which are associated with a "culture of non-payment". Economists have even rationalized public ownership, citing the natural monopoly characteristics of these services and their subsidization, and the positive externalities that the services generate.

It should be added that economic argument has not so much been for public ownership as for finding suitable solutions to the problems associated with private monopolies. As long as a private monopoly can be regulated to ensure competitive pricing and quality of services, there is no economic argument against allowing private provision of infrastructure and services. Unfortunately, the pendulum has swung so far that privatization of these infrastructure-based services is now undertaken without consideration of the economic and welfare implications. The irony of all this is that despite built-in cost advantages associated with urban infrastructure and services (arising from economies of scale and agglomeration), there is a large gap between their supply and demand. Why this is the case is difficult to answer. However, it appears that different positions and counter-positions on institutional options for providing these services do not make the task easier. This point is briefly addressed in the next section.

5.2. Unhelpful positions and counter-positions on institutional arrangements

Near-polarized views on suitable institutional and organization arrangements for building and delivery of infrastructure and services also seem to have contributed to the informal sector's involvement in urban environmental service provision. These views are briefly noted below:

- *Government cannot do the job*: In spite of strong economic considerations that favor public-sector provision of basic infrastructure and services, the current political mood around the world is clearly against it. This view has got the upper hand in recent years, partly because of governments' failure to deliver and partly because of the political views of the powerful. There is reason to believe that, in the absence of this powerful backing, non-governmental organizations (NGOs) and even UN agencies would not be so much against government provision.
- *The private sector can do the job*: Organizations like the World Bank and the Asian Development Bank (ADB) advocate private-sector provision of urban environmental services. In a report published by the ADB, Pernia and Alabastro lament that "private enterprises currently account for a smaller share in total capital spending for urban services than that is generally believed to be their maximum potential given appropriate incentives" (Pernia and Alabastro 1997, 24). They firmly believe that: "A move toward privatization and decentralization can improve the current coverage of water and sanitation" (ibid., 35).
- *Community organizations can do the job*: Perhaps because of the failure of the governments and mistrust of the private sector, a strong lobby has emerged globally for community-based organizations (CBOs) to provide basic services. Proponents of this position argue that the economies-of-scale case has been overstressed by economists. Issues of financing and cost recovery do not feature much in this argument. Solo, particularly, argues strongly against the involvement of foreign companies with an interesting "fairy tale" (Solo 1999, 117–118).

- *Small, competitive, private-informal enterprises can do the job*: Citing examples of informal-sector service provision for the poor and by the poor, many people are excited by the idea of relying upon informal-sector-type small, competitive enterprises for urban environmental service provision (see, for example, Solo 1999; Katui-Katua and McGranahan 2002; Collignon 1998).

Each of the above positions has some merit. But they can be counterproductive if together they result in indecision and inaction on the part of the decision-makers and political leaders. In fact, the best option is not one or another of these positions, but a complementary mix of different options. Perhaps there is not a single country or city where urban environmental service provision does not reflect a mix of local government, private sector, and CBO/NGO involvement. In cities of developing countries, the informal sector's contribution is also in this mix.

In summation, it can thus be said that inadequate drives to attract capital investment for urban environmental infrastructure and services, reluctance to adopt user charges for cost recovery, and unhelpful polarization of views on institutional arrangements have all left many urban residents without institutional service provision. The emergence of the informal sector has been defined, at least in part, by these realities in cities of developing countries. In a fundamental sense, this phenomenon also reflects the kind of response expected at low levels, or during early stages, of the development of a country.

6. The informal sector's contributions to UEM

As table 3 briefly catalogues informal-sector activity in the three UEM subsectors and Romanos and Chifos (1996) provide a more detailed documentation of the informal sector's contributions to UEM, this section is limited to highlighting the end results of these contributions, as follows:

- *Mutually reinforcing relationship between the informal sector and UEM*: The increased gap between urban environmental services provided by institutional sources and urban residents' requirements creates opportunities for informal-sector involvement in provision of these services, particularly for the poorer urban residents.
- *Cost-minimization*: Perhaps the single greatest contribution of the informal sector is reducing costs in the provision of urban environmental infrastructure and services, in numerous ways. The best-documented instance is the informal sector's role in waste reduction, reuse, and recycling, which substantially reduces municipal costs for solid waste management. These contributions, particularly in waste separation, facilitate waste recycling and composting of organic wastes, which results in reduction of environmental costs. A growing trend of involvement of informal-sector enterprises in selling water, and the resulting competition, reduce the retail price of water to households in communities without piped water supplies.
- *Paving the way for private-sector investment in urban environmental infrastructure and services:* Those who want to see private-sector investment in urban environmental infrastructure and services and lament its current limited role (for example, the Asian Development Bank, USAID, and the World Bank) may view informal-sector activities as heralding eventual private-sector investment. Indeed, the informal sector serves a testing role, assisting the private sector to reduce the risk of investment. Those who cite limited private-sector investment as evidence that urban

environmental infrastructure and services are unattractive to private enterprise (for example, Budds and McGranahan 2003, 35) may lose some ground if informal enterprises appear to do brisk business in waste, water, and sanitation provision. This vanguard role of the informal sector should be a lesson also for local governments, encouraging them to move in the direction of cost recovery for their municipal services.

- *Socially crucial transitional role*: The vanguard role of the informal sector described above is also transitional in the sense that the informal sector remains active until the formal private sector finds it attractive enough to invest in waste management, water supply, and sanitation provision. But this transitional role holds equally, if not more, for local governments taking over provision of such basic services to all citizens of a country or city, which usually becomes possible at a certain level of economic development and when the local government commands more financial resources and has better management capabilities. In the interim, the informal sector serves a crucial social role, meeting the basic service needs of low-income and poor urban residents.
- *Stimulating competition*: Although this point does not apply only in the context of the informal sector's role in UEM, it is worth noting that informal-sector contributions to UEM have brought a good deal of competition in basic urban environmental service provision, which has traditionally been without it. As noted previously, economists even rationalize monopolies in such service provision as long as public welfare considerations are guaranteed either by public ownership or by regulation of private monopolies.

The above by no means is an exhaustive list of currently prevailing or potential roles of the informal sector in UEM. They are simply some examples based on the author's understanding of the roles and documentation provided by Romanos and Chifos (1996) and Perera and Amin (1996).

7. Strategies to enhance the informal sector's role in UEM

In a market economy with democratic polity and pluralistic values, it would be expected, to an extent, that the informal sector would automatically contribute to UEM, and this is what happens. Because of this, laissez-faireists advocate doing nothing. This is, however, not a healthy strategy. On the one hand, a total non-interventionist approach would entail ignoring the harsh realities faced by informal-sector labor (for example, waste-pickers working in open dumpsites without any protective gear); on the other, total absence of public policy or action may lead to non-optimal outcomes (for example, not rewarding the informal sector's role in waste separation and reduction will mean positive externalities are not internalized, with the theoretical risk that the informal sector's involvement will be less than environmentally and socially desirable). With the above premise, the author suggests adoption of strategies that enhance the informal sector's role in UEM. Since such strategies can never be comprehensive when they come from only one mind, even if they are based on review of many scholars' contributions, I will note two guiding principles that underline the two corresponding strategies proposed in sections 7.1 and 7.2 to enhance the informal sector's role in UEM:

1. Making optimal use of informal-sector labor and enterprises, while paying due care and attention to the basic urban service needs of these people and their enterprises.

2. Adoption of an objective approach in choosing a mix of options in urban environmental service provision.

7.1. Strategy to alleviate health hazards

There are many doubts, concerns, and questions relating to the role of the informal sector in general, not just to its contributions to UEM. Most of these are justified, and many, if not all, can be meaningfully addressed. Again, a few examples only will be presented. One legitimate concern is the health hazards associated with many informal-sector occupations and activities. There are many good examples by now of public action to alleviate these concerns. One example is the work of Waste Concern with waste-pickers in Dhaka, which resulted in their wearing protective gear while working in the waste dump sites or during waste separation. What was a policy recommendation in an academic work (Sinha 1993; Sinha and Amin 1995) was made real by establishing an environmental NGO, Waste Concern. The result drew national and international attention[4]. Many such works in other cities have been documented by the author (Amin 2002, 115–123).

Another concern is that informal-sector enterprises can be polluting. Bartone and Banavides (1997), among others, raise this alarm. Their research reveals that hazardous wastes are generated by some small-scale and cottage industries, and the same is true of informal-sector workshops. Two points should be made here. One, few informal-sector activities linked to environmental service provision appear to be polluting. There is, however, a segment of the informal sector (informal-sector manufacturing enterprises or informal workshops) which does generate industrial waste, some of which can be hazardous (Maldonado and Sethuraman 1992). But Sethuraman (1981) and Omuta (1986) argue that pollution by the informal sector is "actually a manifestation of an unresponsive physical planning system" that does not allow space for informal-sector businesses to operate (Omuta 1986, 183). Perera (1994) has demonstrated, with case studies in Colombo, that accommodation of the informal sector in the urban built environment is a good strategy for urban environmental management.

7.2. Strategy for promoting optimal roles for the informal sector in UEM

As was pointed out in section 5.2, the apparent discord among the international community, donors, national governments, local governments, the private sector, NGOs, and the informal sector as to adoption of institutional mechanisms for urban environmental infrastructure and service provision is unfortunate and counterproductive. Politicians and policymakers are bewildered by conflicting ideas and recommendations coming from many sides. All concerned need to avoid the polarizing tendency in their viewpoints. To this end, table 4 presents a framework to highlight what is probably an optimal distribution of responsibilities in the provision of urban environmental infrastructure and services with respect to solid waste, water supply, and sanitation. The guiding principles here are making the most of the comparative advantages of respective stakeholders and avoiding the tendency to consider one option superior to others in all respects.

4. For this and many other good works on Waste Concern, see the organization's website: www.wasteconcern.org.

Table 4. Toward defining the optimal roles of the informal sector and other stakeholders in key UEM subsectors

Role of …	Solid waste	Water supply	Sanitation
Households	• Separating waste (the informal sector's buying reusable and recyclable of waste serves as an incentive to households). • Composting at least some organic waste for gardening.	• Giving higher priority to the value of water supply for personal hygiene. • Being willing to pay for water. • Not underestimating their own ability to pay. • Taking into account all direct and indirect expenses for obtaining water in estimating individual household ability to pay. • Conserving water and harvesting rainwater.	• Valuing highly sanitation's benefits for health and productivity.
Communities, CBOs, and NGOs	• Organizing environmental awareness campaigns encouraging households to reduce and separate waste (it is crucial that this takes place at household level). • Organizing unemployed youth in a community to collect waste from households (at a charge) and deliver it to the primary collection point. • Assisting informal-sector workers in protecting themselves from health hazards. • Considering the feasibility of undertaking composting at community level.	• Raising households' awareness of the contribution of water to health and safety, and simultaneously of the importance of conserving water. • Undertaking collective initiatives to obtain connections to water supply pipes and making necessary investments for the connections.	• Campaigning to raise households' awareness of the value of sanitation. • Educating children, women, and men on sanitation in general and toilet use and hand washing in particular.
Informal-sector workers and entrepreneurs	• Active involvement in recovery of resources from waste. • Taking advantage of opportunities to buy and sell recyclable wastes. • Organizing to obtain better prices for resources recovered from wastes • Protecting themselves from health hazards.	• Carrying water. • Vending water (buying water from institutional and private sources and then selling to households without access to water supply). • Working with local governments and the private sector to establish a market niche in water supply.	• Acquiring the necessary skills to seize market opportunities in building toilets, cleaning pit latrines, and emptying septic tanks for households in slums and low-income communities. • Setting up shops with labor who have necessary skills for providing sanitation services to households and communities.

Table 4—*continued*

Role of …	Solid waste	Water supply	Sanitation
The private sector	• Taking advantage of market opportunities opened up by informal-sector labor and enterprises in waste collection, transportation, and disposal. • Seeking complementarities with informal-sector workers and enterprises instead of considering them competitors.	• Making use of informal-sector operations to learn about the market. • Seizing market opportunities from residents' increasing demand for water. • Making necessary investment for water supply infrastructure.	• Private-sector enterprises should seize the huge market opportunities of investment in sanitation infrastructure in general and toilet business in particular.
Local governments	• Providing necessary infrastructure for delivering waste to the primary collection points. Safe transportation of waste. • Dumping and disposal of wastes in environmentally sound ways (e.g. sanitary landfills). • Supporting all stages of solid waste management. • Considering subcontracting of some services (e.g., collection and transportation of wastes, billing and collection of payments).	• Being willing to charge for water. • Making use of the informal sector and private sector. • Being ready to extend water supply in a businesslike fashion (i.e., seize opportunities when there is new demand and make sure costs for extending the service are recovered). • Being willing to adopt cross-subsidization principles for reducing the cost burden on the poor while still ensuring cost recovery.	• Allowing informal-sector operators and unemployed youth to build toilets (suitable locations should be determined by environmental assessment, but this should not stifle initiative and enterprise). • So-called unauthorized settlements and informal business locations should not be barred from building sanitation facilities (after all, many of these settlement have stood for a long time and in all likelihood will stand for years more). • Charging user and service fees for use of public toilets and all sanitation services, including drainage and sewerage. • Allowing informal-sector and private operators of toilets to charge their users. • Making use of informal-sector labor and enterprises to build and clean drainage and sewerage lines and to clean public toilets.

Table 4—*continued*

Role of …	Solid waste	Water supply	Sanitation
National governments	• Allowing the initiatives of local governments, CBOs and NGOs, the private sector, and the donor community, and recognizing informal-sector workers' right to work. • Adopting necessary policies to attract FDI in urban environmental infrastructure and services. • Promoting cost recovery measures to encourage capital investment.	• Giving top priority to water. • Investing in water supply systems. • Allowing charging for water. • Legislating cost-recovery provision. • Providing incentives for FDI in water supply systems.	• Taking overall responsibility for ensuring all related agencies and stakeholders prioritize sanitation. • Depending on the situation in the country and city, deciding whether having separate and independent drainage and sewerage authorities is necessary. • Attracting necessary investment, particularly FDI if domestic capital is not enough. • Requiring cost recovery for all sanitation services. • Facilitating cross-subsidization wherever possible, to reflect that societies are made up of different classes with different ability to pay. • Freeing state agencies of responsibility to provide free services. • Promoting a culture of payment for services, especially among the public. This should lead to generation of new revenue that can be invested in operation and maintenance and in new infrastruture.
International development agencies and donors	• Instead of seeking to weaken national governments and their agencies and adopting a we-know-it-all attitude, international development agencies and donors should support good initiatives by CBOs/NGOs, the informal sector, the private sector, and local governments.	• Supporting financially and environmentally sound initiatives by all stakeholders. • Facilitating transfer of financial resources (both official development aid (ODA) and FDI) for investment in water supply systems.	• Instead of seeking to weaken national governments (at least those that are democratically elected and practice democratic polity), encouraging them to give high priority to sanitation and find optimal roles for the private sector, the informal sector, CBOs, and NGOs. • Directing ODA and FDI toward infrastructure for sanitation. • For donor institutions and agencies committed to promoting domestic private-sector investment, recognizing the vanguard role of the informal sector in opening new market opportunities, and supporting and promoting domestic private-sector and informal-sector involvement in providing infrastructure and services for adequate sanitation provision to the urban poor in low-income communities.

Note: This exercise is inspired by Montgomery (1988). Despite focusing on the informal sector as a means of basic urban service provision, Montgomery's article reflects his deep and comprehensive understanding of comparative advantages of national and local governments and the informal sector in different aspects of service provision.

8. Concluding remarks

The informal sector and urban environmental management are two paradigms that have their origins in two different kinds of urban crises that are experienced by developing countries: the informal sector in growing urban unemployment and rural–urban migration, and UEM in the environmental problems that threaten the quality of urban life. It is still surprising that the two have become intertwined in our cities. Documented evidence clearly shows that the relationship between the informal sector and UEM has become one of mutual benefits. Nobody imagined until recently that so many income-earning opportunities would be created for informal-sector labor by urban environmental service provision. Likewise, urban development professionals did not anticipate that the informal sector could be a potential supplier of environmental services required for solid waste management and for the provision of water and sanitation. For those of us urban development professionals who have worked on both areas, the intersection between the informal sector and UEM has been rewarding. Hopefully this has not affected the objectivity of this investigation.

With the above disclaimer, let me note that the piled-up studies and research—by a combination of (i) those who work on the informal sector (International Labour Organization 1972, 1991, 1999; Rakowsky 1994); (ii) those who work on urban environmental management (Hardoy, Mitlin, and Satterthwaite 1992; White 1994); (iii) some who have done work on both areas (Sethuraman 1981; Perera 1994; Amin 2002); and (iv) a few who have worked connecting the two (Omuta 1986; Amin 1991; Romanos and Chifos 1996; Perera and Amin 1996)—show that informal-sector contributions to UEM are substantial and could potentially be even greater. This is due to impetus from market forces that have never been so powerful as they are in contemporary world. As limited scope of planning has made UEM more relevant to urban development professionals, fewer jobs in the public sector and even in the formal private sector have made the informal sector of greater significance from an employment point of view. But this does not mean that planning has become irrelevant for enhancing the quality of life in cities or that secure jobs in the formal sector are not essential for people to be able to afford a decent standard of living.

Having noted these two qualifications, let me end by restating the main points made in this paper. The informal sector's contributions to UEM are substantial, as was noted in section 6. This paper, however, raises two concerns. The first is that when informal-sector workers contribute to UEM, in many instances it is at the cost of their health and often entails sacrificing their children's education. This in turn entrenches intergenerational transfer of poverty. Thus, informal-sector work must be turned into decent work, which requires job security and safety, increased productivity and income, and improved working conditions. For the purposes of this paper, the foremost issues are reducing health hazards and improving working conditions. Public policy and action in this regard are not expensive. Simple awareness campaigns on risks to health and some assistance in obtaining protective gear can make a lot of difference. There are very many good practices in this area, but these are still limited to demonstrations by a few successful NGOs. Local governments must now take these up for citywide implementation.

The second concern is the tendency of stakeholders to take polarized positions on options for institutional arrangements for service provision, which is unnecessary and unhelpful. This paper has given considerable attention to seeking compromise. Table 4 sets out a proposed distribution of responsibilities between the informal sector and other stakeholders.

The two strategies proposed in section 7 to address these concerns are only examples; there could be others. It should also be noted that in actual implementation, these will generate several sub-strategies. The point is that recognizing and supporting the role of the informal sector in urban environmental service provision is essential for ensuring and enhancing the positive impacts of the informal sector's involvement, and for reducing its negative impacts.

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