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SUSTAINABLE URBAN WATER MANAGEMENT STRATEGIES

MATCHING LONG-TERM STRATEGIES WITH RATIONAL SHORT-TERM INVESTMENTS AND ENSURING INCREASED EQUITY

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The authors, from the International Water and Sanitation Centre in The Netherlands, debate whether many of the proposed solutions for improving water supply and sanitation to the urban poor fail to address this issue at the right level. The key to a sustainable solution, they argue, is a combination of innovative strategy, partnership and community participation.

1. Introduction

The provision of adequate water supply and sanitation to rapidly growing urban populations is an increasing problem for governments throughout the world.

The expansion of the number of people in cities who need water and sanitation services and who cannot readily get these services by self provision, creates a continuous pressure to invest in additional production capacity or to stretch the available supplies to serve more people.

Population growth will probably add another 2.5 to 3 billion people over the next 25 years. This will be mainly in developing countries. Demographic growth rates are falling but in absolute terms the population will continue to grow. While in 1950, 30 per cent of the world's population lived in urban areas, in 1995 it was nearly 45 per cent according to an estimate made by the United Nations. By 2015, one in five people will live in big cities, as compared to one in nine now.

The increasing GNP per capita is an indicator of the growing purchasing power of the world's citizens. The higher standards of living that result also include increasing demands for better quality services, including water supply and sanitation. This means increased reliability, better quality and larger per capita supply of drinking water, and improved waste water collection and treatment. While significant progress has been

made to provide access to drinking water services, access to adequate sanitation is only growing slowly and is far behind water supply.

At the same time, industrial activity also demands the expansion of urban water supply services. This pressure to invest and stretch production capacity is most often felt in big agglomerations with large areas, where essential services are visibly lacking or clearly inadequate. However, there is increasing pressure on governments and public water utilities to meet the demand in a growing number of small and intermediary towns that aspire to have urban services.

Most countries don't have a viable long-term strategy to meet this challenge and do not invest rationally in this sector. Factors affecting the sustainability of urban water supply systems are not systematically addressed. Most of the time the focus is on expansion of existing schemes or development of new schemes rather than by looking at the management and planning capacity of the water utility. Unsurprisingly, many public water supply companies find themselves in a catch 22 situation where overemphasis on technical and financial issues is almost unavoidable, but at the same time contribute to aggravating their performance problems. One way towards improvement is better use of existing capacities and investments in order to improve the performance of existing systems and the organisations running them.

This is probably the most effective way to create a basis for meeting future challenges and to achieve more equitable access to urban water and sanitation services. This does not just concern differences in access for different income groups, but also differences in access between different urban areas in one and the same country. Increased equity of access to basic urban services for civic society as a whole is, after all, a pre-condition for ongoing development.

One way to address performance problems is to privatise the water utilities. This 'solution' is often based on insufficient analysis of the overall situation from institutional, social, and financial points of view and situated in a project context. A better approach is to address this issue as one of involvement of different stakeholders, including the private sector from a utility capacity, development perspective.

In this article, an analysis is given on a number of issues relating to poor performance in management and planning of utilities, as well as on issues related to inequality of access to services. This is followed by an overview of possible strategies that can address part of the performance problems and that can match the improved performance with increased equity in access to services. The article concentrates on urban water management with a view to sustainable water supply coverage. The main message it aims to carry is that from a longer term perspective an investment strategy to improve the financial and managerial performance of water utilities can be oriented to achieving more equitable access to services and higher coverage, whilst many social investment programmes have had the opposite result. In general, it can be said that the provision of subsidies under such programmes, has unintended side effects, and the subsidies rarely reach those for whom they have been meant.

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2. Challenges faced by utilities

2.1 Autonomy

Faced with growth in demand, the tendency of public utilities has been to address the most urgent needs from a political point of view. This is especially true where the management of water utilities lacks autonomy. This often goes together with the state and public institutions being the largest, most demanding and worst paying customers. With reference to the social objective of water supply provision, some politicians put forward unrealistic demands and force the management of public utilities to make irrational investment decisions. As a result the cash positions of public utilities deteriorate, and their capacity to invest erodes. This, in turn, makes it impossible to gain more autonomy. In such situations, management becomes "defensive" It no longer applies sound business principles to the water supply operation, and becomes fully occupied in solving day to day problems. Because they do not perceive opportunities to redress the situation, they do not develop or use the management information needed to develop the right sort of marketing or consumer relation strategies. In order to maintain a capacity to serve less solvable population groups, and areas that have not yet been connected, such strategies should elementarily aim to:

- sell more water where it is available, and where profits can be made without negative social or environmental effects
- save water by selling less where it is scarce and where it has to be sold at a loss
- communicate with the public regarding problems and their causes whenever the services cannot be provided or extended
- Protect different water sources in use by appropriate sanitation measures, sound urban and regional planning, and establishing appropriate regulatory frameworks and control mechanisms

In many cases, it would seem that such strategies do not exist and that opportunities to serve more people in a sustainable way are not seized. However, some public companies have gained more autonomy, and seem to do increasingly well (see below) in spite of the difficulties faced.

The "Office National de l' Eau et de l' Assainissement (ONEA)" in Burkina Faso has been more or less permanently in a process of reorganisation for 15 years. It saw its responsibilities increase and gradually gained the autonomy needed to meet the new challenges. The number of small and intermediary towns served increased from 7 to 34. Demand in the two main cities

Ouagadougou and Bobo Dioulasso increased rapidly. It is required to apply a solidarity principle and serve all population groups. Under these circumstances, it succeeded to almost double the percentage of water sold through stand posts to over 25% while improving its cash position and investment capacity. The ONEA's old contract with the state stipulated that it was expected to ensure a piped water supply service in all centres with a population above 10 000. The new contract states that it is only obliged to do so if a feasibility study shows that the new investments are potentially profitable. Right now most small town water supply systems are operated at a loss that is partially compensated by operating profits in the main cities. This is expected to become more difficult if more small towns have to be served. The ONEA is the only national actor which has the technical and managerial competence to ensure adequate water supply services. So, there is pressure on it to become active in more small towns. Demographic data from different sources indicate that the number of centres with a population of 10 000 or more could increase to about 80-100 by 2010. The new legislation on decentralisation mentions a figure of 350 to 400 urban centres in 2015. Municipalities will be required to play a more important role in ensuring water supply services, and several management options are envisaged (public, associative, private, communal). The ONEA has chosen to continue its effort to redress itself, and position itself as a utility on the one hand, and as a technical support agency providing back-up services to small water and sanitation service providers on the other. To achieve success it has developed a five year action plan which involves more strategic planning of investments, acquiring better knowledge of potential demand, and strengthening its management system to better cope with the specific conditions of small and intermediary towns (Ministry of Foreign Affairs of Denmark, (1998). Etude Organisationnelle pour l'amélioration de l' exploitation et de la maintenance des centres auxiliaires de l' ONEA," Volume I. Copenhagen. COWI)

2.2 Operation and Maintenance

One of the major difficulties faced by national providers of water services is recovering the full cost of their operation. The first step to increasing revenues is to have good cost and revenue data over a period of several years. This data should preferably be available on a scheme by scheme, and area by area basis, to allow for good analysis of the financial performance of the utility as a whole, but also of different schemes or branches. Combined with technical monitoring data this can help to identify specific measures to reduce costs, improve O&M and

increase revenues, even without touching the tariff structure.

A good operation and maintenance system is the key to reducing costs and increasing revenues. Most countries still lack precise and accurate data on O&M performance and costs, and it is therefore not always possible to compute the financial losses due to poor operation and maintenance. However, it seems evident that where unaccounted for water represents, say, 25% of the total production (In many cases the percentage is higher), the costs of poor O&M are really considerable, and investing in O&M is a very rational decision. There is also ample evidence that users or customers are less and less willing to pay for poor and intermittent service, whereas even in the poorest and underprivileged strata of populations, there is a willingness to pay for adequate and reliable water supply.

2.3 Pricing

Water pricing has to be based on an analysis of real costs (including chemicals, fuel electricity, O&M, repairs, all salary costs, depreciation on investments etc.) which results in a cost per m³ produced. The decision to subsidise or to cross-subsidise is a political or commercial one. This affects the tariffs but not the cost or the price of water. The real price ultimately has to be paid by the consumers themselves, more affluent consumers, users of systems which produce water more cheaply, the government (that means indirectly the taxpayers), or by a donor. Donor or government subsidies have proven to be unsustainable with increasing demand. Thus the only good tariff structures are those which ensure full cost coverage at the level where this is feasible. This can be done at national level if the policy and regulations are based on the premise that water is not only an economic good or commodity, but also a social service to be provided to all citizens at unified tariff rates.

2.4 Water resource management

As mentioned in the introduction, water demand is increasing and putting great strain on the available resources. Water resources are threatened by this rapidly increasing demand and by pollution. Other factors are saline intrusion, over-exploitation of existing sources, changes in catchment areas, and competition of different types of water demand, for agriculture, people, power, and industry. The predominant approach towards meeting these increasing water demands has been towards increasing availability of water by exploitation of new sources. Now that the most accessible water sources are fully used, the cost of developing new sources or expanding existing sources is getting higher and higher. The real cost of water

per cubic meter in second and third generation projects in some cities has doubled between a first and the second project and then doubled again between the second and third. (Bhatia, Ramesh and M. Falkenmark (1993) Water resources policies and the urban poor: Innovative approach and policy imperatives. Water and Sanitation currents, UNDP-World Bank Water and Sanitation Program).

2.5 Water demand management

The rising investment costs make it more difficult for utilities to meet these from user charges. Furthermore, there are countries

where, even at high costs, no new fresh water sources can be developed. Treating salt water can be a solution in certain situations, but so far the costs are often prohibitive.

A basic condition to make the most of the available resources is to have the best possible hydrological and hydro-geological data. Strategic urban planning which takes these data into account can help to delay or avoid a more serious water crisis. However, as can be concluded from the above this is not enough. Saving water rather than the development of new sources is often the best 'next' source of water, both from an economic and from an

environmental point of view. So far, however, there is little experience in combining supply management with demand management.

Most countries have a policy aimed at achieving full urban water supply coverage with different service levels. The basic condition for satisfying needs and demands is the availability of water, but sometimes availability of water in the urban area is insufficient to cover the whole population. Demand management measures to reduce water consumption in high income and middle income areas are usually not taken because of political reasons or because the consumers are too powerful in their resistance. The combination of the above factors results in unsustainable urban water management, inequitable access to water supply services and environmental deterioration affecting health and living conditions in low-income urban areas, secondary urban centres and small towns.

3. Strategies

There is no standard recipe to meet the challenges. The main principle to be applied, however, is one of stakeholder involvement and shared learning. In such an approach it is essential that there is good non-hierarchical communication, and that realism overrides ideology. The following trends can be observed:

3.1 Improving performance of existing water supply systems and building capacities for additional coverage.

Improving performance of water supply operations starts by strengthening the organisation of utilities and developing the human resource capacities needed to make them more effective and more efficient. The World Bank and some other international credit providers advocate privatisation to achieve this. However, there is no evidence that this gives the right kind of results. Private companies may be performing well financially but they do not use the generated surpluses for the social goal of equitable access to water supply and sanitation services. More innovative ways to deal with the challenges mentioned are needed and should be tailored to local situations. Flexibility is required where multiple actors enter the sector, without having the technical and organisational capacities to play their roles in a viable way. This puts up the question of how to organise the processes of establishing these capacities using existing sector support institutions' knowledge in a better way.

The major strategic challenge facing governments is the attainment of affordable access to clean water for all residents by bringing about organisational strengthening of water utilities. They have to get to a point where self-financing is introduced. The question of who owns them is irrelevant in terms of achieving

| MANAGEMENT OPTIONS | MAIN CHARACTERISTICS |
|---|--|
| Public management | |
| Direct municipal management | Management by a municipal department, with direct control by the municipal administration |
| Direct supra-municipal management | Management by a supra-municipal department created under an agreement between a group of municipalities |
| Autonomous municipal or supra-municipal management | Management by a (supra)municipal department, with a high level of administrative and financial autonomy |
| Service Contract | (Supra)municipal management with time bound service contracts with the private sector for specific tasks |
| Parastatal | This parastatal utility is usually named board, corporation or authority, and is established by a special act. The governing boards are usually composed of senior public officials. Being subject to public law, the autonomy is often very restricted. |
| Public-Private partnerships | |
| Management contract | The municipality is responsible for investments and operation, but contracts the management out to a private party, against a fixed fee, or a percentage of the collections |
| Lease contract | The municipality is responsible for the investments, but the operation and maintenance of the system is contracted out for a fixed period of up to 10 years to a private party. The private party collects the tariffs and transmits part of this to the municipality. |
| BOOT (Build-Own-Operate-Transfer). Other, similar options: BOT (Build-Operate-Transfer); BOO (Build-Own-Operate); reverse BOOT. | BOOT: under a contractual agreement, a private firm is responsible for the financing, construction, management, operation and maintenance of a part of the system, and will transfer the assets to the municipality at the end of the contract, which is usually 20 to 30 years. |
| Concession | Under a contractual agreement between a private party and the Municipality, the private party will take full responsibility for investing and operating a complete system. The private party can be a commercial firm, an association of users or otherwise. |
| Public Water PLC | The system is managed by a private company under the prevailing private company law. The shares of the private company are exclusively owned by (local) government |
| Joint Venture | A private company is established for the expansion and operation of the system. The shares are divided between public and private owners. Usually, private owners bring in investment funds and management capacity, and the public owners the assets and the staff. |
| Private management | |
| Direct Private management | A Private party owns and operates the system, within the confines of a regulatory framework set by government. The private party can be a commercial firm, an association of users or otherwise |

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this key policy objective. (Nickson Andrew (1997). *The public-private mix in urban water supply*. In: International review of Administrative Sciences. SAGE publications. London, Thousand Oaks, CA and New Delhi).

Thus, the current trend is to develop management options tailored to local needs and capacity, with an equation between local authorities, private sector and communities. These options are being described in various recent publications, and in many countries experience is being built. Interestingly these management options are being tested in many small towns, but could prove very valuable for meeting the challenges of big agglomerations where water producing utilities are required to enter into partnership with different private and semi-private smaller service providers. A summary of these options is given opposite.

3.2 Adopting marketing and private sector management practices, including efficient customer relations

Optimising satisfaction of users and willingness to pay requires a strong link with users and consumers. The link between users and the water enterprises relies on a proper information flow on both sides. Customers have the right to know about the quality of service (pressure, quantity, tariffs structures, adjusting tariffs, financial aspects, contracts, etc.) and the enterprise the obligation to solve user's complaints and inform them. This requires a change in attitude with both the customers, and even more so with the water enterprise. Staff need to listen to customers needs and views instead of making all decisions themselves and giving instructions to the customers. They need to answer questions that customers ask on technical options, costs, reliability and service levels. In addition, they have to become flexible and able to make compromises between the technical efficiency of a scheme and the non-technical factors influencing the wishes of the customers. With regard to customers living in low-income areas, who often do not have individual connections, the setting up of a special unit in the water enterprise is working well in a number of Latin American countries.

3.3 Improving planning capacity

The importance of establishing a planning capacity in utilities and water management bodies has long been underestimated. Better planning can contribute to diminishing the performance problems mentioned. Efforts to establish improved planning capacities generally concentrate on:

- Better collection and analysis of incremental costs and revenues in case of investments
- More systematic collection and use of water resource data

- Capacity to develop and use demographic forecasts
- Link up short- and long-term investment programming
- Integrating the planning of water and sanitation infrastructure with urban and regional planning
- Environmental impact studies
- Integrated water resource planning

3.4 Alternative financing

Appropriate financial mechanisms are those that ensure full cost coverage. If all costs cannot be covered by user's fees or if there is no investment capacity due to lack of savings, alternative but sustainable funding modes are necessary. Below, an overview is provided of different financing mechanisms which could be used, beyond tariffs and rates.

Subsidies from local / national government:

- Taxation (municipal resources)

Municipalities can collect the necessary funds through local taxes; Payment can be linked to income level, but charges may not reflect the level of water consumption. This option represents a limited scope for community involvement in decision-making and financial system management. One way to raise taxes is to have consumer pay highly for waste water disposal rather than water consumption. This system is applied in Denmark.
- Cross - subsidy

One way to make the service equitable and affordable for all is to subsidise the poor and surcharge the high-income consumers. Another way to cross-subsidise is between sectors, but within the same community or municipality. Finally cross subsidy can be between different cities or regions whereby consumer in regions with lower water production costs pay the same rates as in the high cost regions or towns.
- Government subsidies

Central government and local authorities allocate part of their budget to operation and maintenance activities. Subsidies can also come through the reduction of spare part and chemical prices, free technical personnel available to communities if requested.

Credit - loan mechanisms

- Bank loans

Many local banks do not have experience with provision of credit for water supply investments. Many are also not interested because they concentrate on short-term

credit. However, in countries where investment opportunities are scarce, the water sector may soon become attractive. Co-operative banks are coming up partly as a result of partnerships between banks in the North and in the South. These banks may be interested to work with water associations and small service providers.

- Micro-credit schemes

Communities organise through local associations, micro-credit schemes, where individuals and groups can borrow money with pre-determined and agreed interest. These schemes are adapted to community needs and realities, but have a limit to their lending capacity in volume. However, they can be very important in that they allow services to be extended to those without access on the basis of contractual agreements between a water producer and a small distributor.

- Social and Development Funds

Many developing countries have put in place, special funds that give access to money for social and development purposes, with an interest rate which can be much lower than on the financial market.

3.5 Reducing costs per m³

The key to reducing costs is to rationalise investments and to reduce O&M costs. Rationalising investments relates to improving the planning capacities of utilities and is discussed above. The cost of operation and maintenance can be significantly reduced by:

- Choosing a technology with non expensive spare parts or expensive operation costs
- reducing the transport costs to go and buy spare parts and chemicals (making spare parts more accessible and available)
- reducing dependence on chemical use (alternative water treatment technology for instance, such as multi-stage filtration system)
- reducing dependence on fuel or electric consumption (Solar; gravity)
- by installing firmly a maintenance culture within the community and professional staff
- by organising preventive maintenance activities where users are also involved
- by a systematic leakage control
- by applying economies of scale for larger systems (reduces costs for the consumer)
- by applying a control for unaccounted for water (both because of leakage and of bad management)
- by installing proper administrative and financial control mechanisms

3.6 Increasing revenues and equity through demand responsiveness and communication

As mentioned increasing revenues is only possible with appropriate tariff structure and an efficient system of collecting fees, which this article does not cover. But, revenues can also be increased by small incremental investments in production capacity or in the distribution network with a short pay back period while responding to expressed demand on the basis of good communication. This increases equity of access to services at the same time. Although the term 'Demand Responsive Approach' (DRA) is relatively new, there are already many experiences and examples of feasible and profitable service options for urban communities that have been involved in their own water supply provision. These show that effective information is crucial and that water enterprises can very well enter into some form of partnership with communities. For instance in Honduras, the communities select in consultation with the water enterprise which type of water supply system suits their conditions best:

SANAA (the water agency in Tegucigalpa, Honduras) helps the communities in low-income urban areas to set up their own water service associations. These associations install independent water supply systems which residents pay for and operate and maintain and which in the long run cost less than continued buying from unregulated water vendors. Water source options promoted are: direct sale of water from the main network through a master meter; construction of community wells provided with electric pumps, leading the water to a communal tank for further distribution; and water trucks from the SANAA distribution centres which fill up communal tanks from which the community distributes further and pays for the bulk delivery.

The advantage of such a process to the service provider is clear; the feasibility of the community taking over the responsibility of operation and maintenance is high and this reduces dependency on the service provider and also reduces the risk of abandonment and/or deterioration of the hardware.

Community based systems vary in degree of community ownership, responsibility for operation and maintenance and of community organization needed as a basis for the service. Examples of systems progressing in levels of autonomy, are group taps, communal water points, community managed vending kiosks, autonomous local distribution nets and finally the autonomous water supply system in which the water enterprise only takes the role as technical advisor.

It is not justified to assume that all communities are interested in or capable of managing their own systems; many prefer not to be bothered and to pay for a regular service based on a service level they want. However, similar systems or service provision could also be provided effectively by utilities or private water vending enterprises, as long as the community has been involved in the process of decision making on the service according to DRA principles. In this process, transparency with the utility and the private enterprises is a key issue. (M. Wegelin-Schuringa (1999) *Water demand management and the urban poor*. Paper presented at the International symposium on Efficient Water Use - Innovative Ways for Finding Water for Cities, IETC (UNEP), Kobe, Japan, June 1999).

3.7 Effective water resource management

It is now widely recognized that effective water resource management means integrated water resource management. It is in fact the main subject of an ongoing international consultation process. The vision on this subject for the coming decade "Vision 21" will be discussed during the 2nd World Water Forum that will take place in The Hague in March 2000. This vision will not just cover urban areas, but specifically management at the level of a catchment area, which often has international dimensions. Already, at the local and community level, much can be done to preserve water resources and diminish environmental degradation. Measures can be taken jointly with the population and other stakeholders, provided there are good communication and information programmes planned and implemented. Measures which can be taken at low cost include appropriate management and control of used water, monitoring of water resource quality and quantity using simple indicators, agreeing on saving measures and tariffs which discourage water wastage, community social control on illegal use of water. Good communication and information programmes can result in generally raising awareness about the different aspects of water resource management, but also in capacities among individuals and communities to develop appropriate strategies themselves.

4. Conclusion

Though the challenges of ensuring sustainable urban water management are tremendous, more opportunities exist to meet them based on better analysis of local situations and involvement of stakeholders. There are no shortcuts to solving the problems and meeting increased demand while preserving water resources for future needs and demand.

Currently there is a debate between those who believe that privatisation will bring the

solution to all problems, and those who believe that equitable access can only be ensured by maintaining a high degree of government involvement. This debate is irrelevant in a long-term perspective and does not take into account lessons learnt in different countries. Specifically, it does not take into account that whether they are private or in the public sector, water enterprises in developing countries need to remember that in many countries a majority of the urban population is living in low-income areas. These areas are not served adequately and only application of non-conventional strategies and a partnership approach will assist in reaching these. This will require a change of attitude and a major effort in capacity building in these enterprises. Realising the community potential to act in full partnership with either the public or the private sector will require sustained effort in: sharing of information between enterprises and communities; consultations with communities to assess effective demand; and enabling of communities to participate in the decision making process.

In addition, the application of sound business principles by enterprises is a "condition sine qua non" if all population groups in all urban areas are to have access to urban water supply services. So, whatever the enterprise, whoever the owners, and whatever its legal status, this has to be given priority, even from the point of view of those who advocate equity.

Biography:

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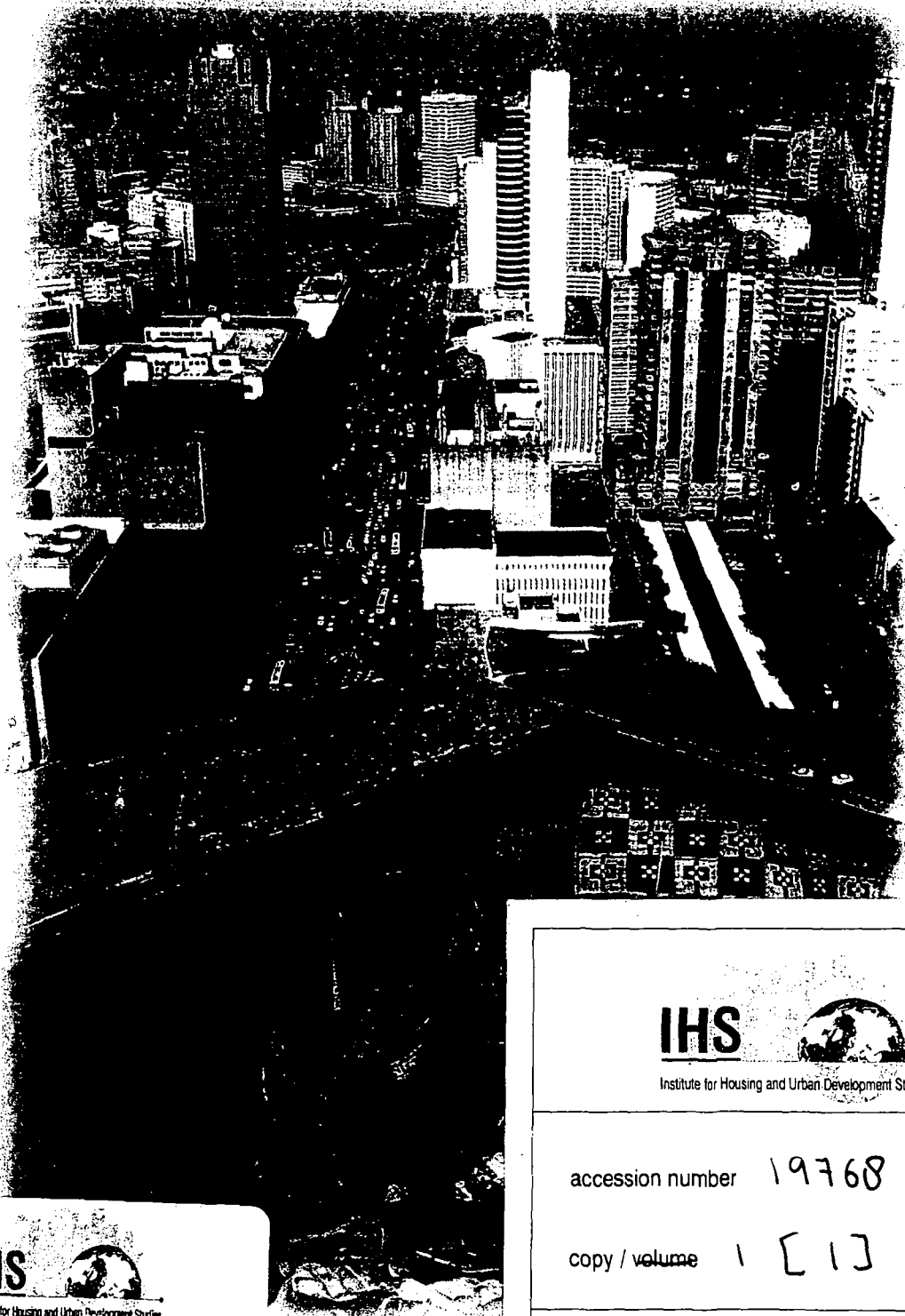
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