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Providing water to the urban poor in developing countries: the role of tariffs and subsidies

Providing safe and affordable drinking water to the residents of rapidly growing urban areas in developing countries has constituted one of the greatest challenges of sustainable development in recent decades. This Brief explores the role of water tariffs and subsidies as key instruments to achieve this objective.

Improving access to safe drinking water has long been recognized as one of the main challenges of sustainable development. The value to households of access to improved water services can be seen as a stream of benefits which are a function of savings on expenses from buying water from alternative providers; of indirect benefits in terms of time freed up to get water into the household; and of other indirect benefits related for example to improved health or education outcomes.

In most developing countries, access to an improved source of water is far from universal, although access rates are higher in urban areas than in rural areas. Taking the example of African cities, in 2000, the proportion of households having access to piped water varied from 27 per cent in Cotonou (Benin) to 85 per cent in Dakar (Senegal). Households not having access to individual piped connections must rely on alternative sources for water. The price of water obtained from those sources is often much higher than that of water provided by utility companies (**Box 1**).

In spite of the diversity of providers, in many countries public policies in the urban water sector are designed within the paradigm of individual water connections provided by a utility company through a network. The precise institutional features of utilities, such as their public or private status, and their degree of autonomy from the government, vary widely across countries. However, the challenge facing governments at all levels is the same: how to ensure generalized access to safe water at rates affordable to the majority, without compromising the financial health of utilities? Water tariffs and associated subsidies have traditionally constituted the preferred instrument by which governments have tried to resolve this issue.

A wide variety of tariffs

Water tariffs charged by utility companies around the world show wide variations. Those variations reflect two different factors. First, given the natural monopoly feature of water supply technology, water utilities which price water at marginal cost would tend to produce financial deficits. This feature is at odds with the objective of cost recovery needed for the long-term financial sustainability of the utility. Therefore, tariffs have to be devised so that this feature can be corrected, taking into

This Brief was written by David Le Blanc, from the Department of Economic and Social Affairs of the United Nations Secretariat (UN-DESA).



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account constraints such as low access to consumption metering.

Second, in practice, water tariffs and subsidies are often not the direct product of market forces. In large parts of the world, the concept of water as a social good prevails over that of water as an economic good. As a result, it is commonly admitted that full cost recovery is not an appropriate objective in the case of water services. Besides, the politically sensitive nature of water provision has

implied a strong drive for “fair” tariffs, associated with policies such as universal service obligations aimed at ensuring access to basic services to the majority of the population.

Among the different price structures used by water utilities, Increasing Block Tariffs (IBTs) are by far the most common. In this price structure, water consumption is divided into blocks and the price of the additional cubic meter, or marginal rate, depends on the block into which it falls. The marginal rate increases with the block. Rates in

Box 1

In many countries, utilities are but one of the water providers

In contrast with developed countries where the provision of drinking water to households is overwhelmingly achieved through utilities, access to drinking water in developing countries encompasses many forms. Other forms of provision include direct access to a water source (underground or surface); access to alternative sources of water, typically provided by the

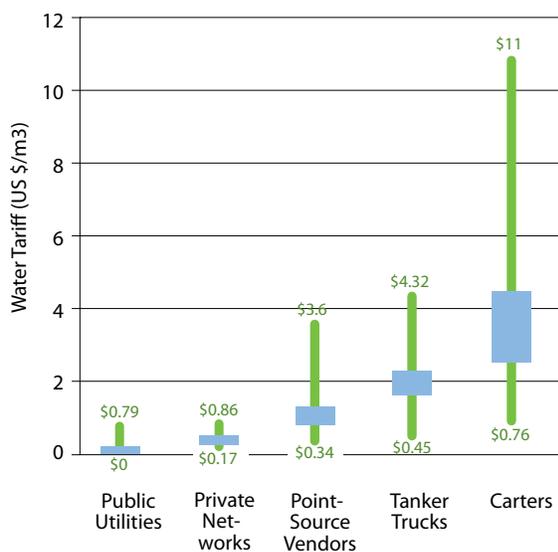
private sector (e.g. water tankers, water carts, kiosks, bottled water); and access to piped water through community taps or standpipes. In many countries, households have to rely on more than one of those sources of water. This is the case even for families connected to the public network because of limitations to the services provided by utility companies, which can take many forms depending on the local context: rationing of certain areas; low water pressure; periodic shortages; or leaks in the network.

Alternative providers of water services have until recently received far less attention than utilities. However, a systematic review of the literature undertaken by the World Bank (2005) provides information about the ranges of prices charged by private alternative providers. The study confirms that prices of alternative sources of drinking water tend to be much higher than the price of water provided by utilities. Water provided by carters and tanker trucks is more expensive than that provided by point-source vendors, which in turn is more expensive than private or public networks. This ranking of sources by price proves to be robust across continents.

In many developing countries, water policies have increasingly recognized the role of private providers and have tried to promote cooperation between utilities and existing networks of providers in order to improve coverage of the poorest groups. For example, utilities sell bulk water to intermediaries managing cisterns, who then re-sell the water in small quantities to people coming with their own buckets. By doing this, utilities use already existing networks to reach out to customers not connected to the network, and the authorities can to a certain extent ensure that people not served by the public network have access to safe water at reasonable prices.

Observed price of water by type of service provider

Based on 47 countries and 93 locations*



*Reader's guide: The figure shows the distribution of water tariffs charged by different types of providers. Boxes represent the range of tariffs located in the second and third quartiles of the distribution. The extremities of the bars show the observed minimum and maximum tariffs.

Source: Kariuki and Schwartz, 2005.

the first block are typically much lower than costs, reflecting the notion that a minimal (subsistence) quantity of water should be available to all at low tariffs. In Latin America, IBTs frequently include fixed charges. Importantly, in the absence of metering, only fixed charge tariffs can be implemented, which has important consequences in terms of subsidies.

Water tariffs in developing countries are usually insufficient to recover costs

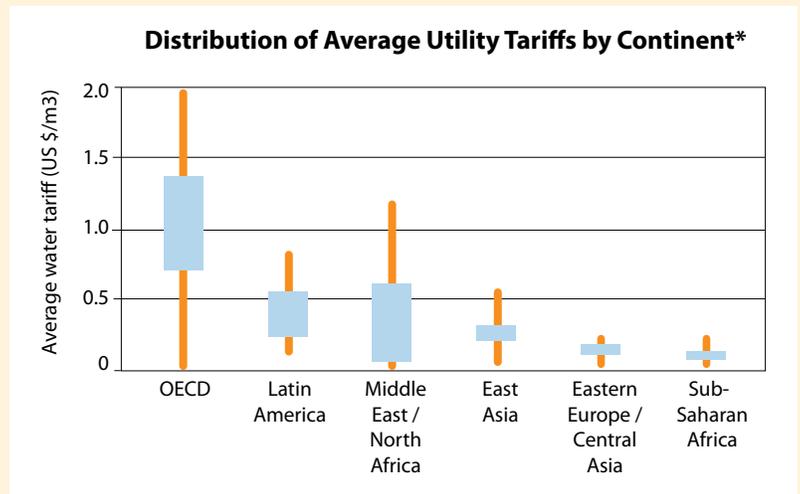
In most of the regions of the world, prices charged by utilities are lower than costs. Water use charges exhibit high variation across regions and across utilities within regions. A worldwide sample survey of utilities undertaken in 2004 found that while in the OECD average water tariffs were above US\$1/m³ for half of the utilities, average tariffs in the other regions of the world tended to be significantly lower than that level. Whereas tariffs in Latin America and the Middle East and North Africa may sometimes reach the US\$0.50/m³ level, virtually all utilities surveyed in East Asia, Eastern and Central Europe, and Sub-Saharan Africa are below this level (**Figure 1**).

This has implications for the sustainability of utilities. According to the aforementioned worldwide survey, overall only 39% of utilities were charging tariffs that allowed them to fully recover short-run and long-run costs. Even in the OECD, only half of the utilities achieved this target. Among the utilities surveyed in Africa, none covered even their operating and maintenance costs (**Figure 2**).

Due to the low tariffs charged, in many countries utilities are in

Figure 1 & 2

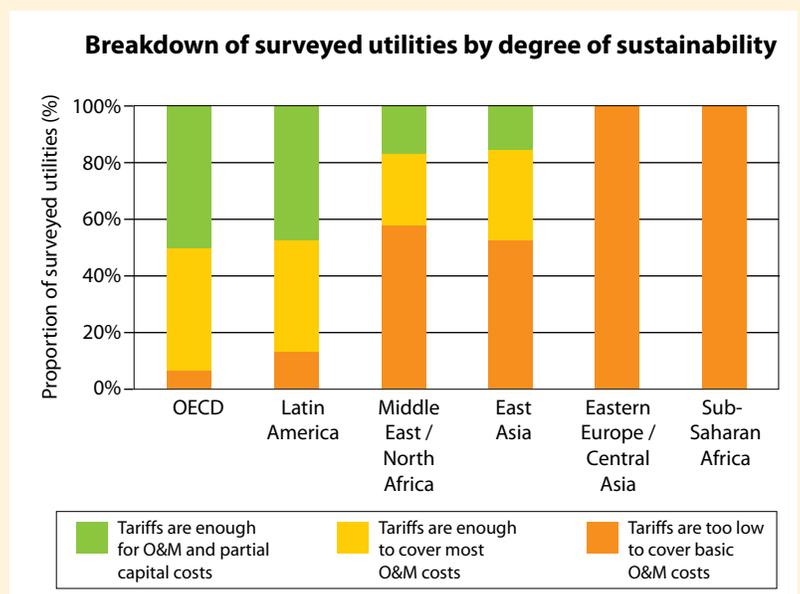
Figure 1:
Distribution of average water tariffs observed in a global survey of water utilities



*Reader's guide: The figure shows the distribution of average water tariffs charged by utilities by continent. Boxes represent the part of the distribution between the 25th and 75th percentiles, while the extremities of the bars show the observed minimum and maximum tariffs.

Source : Global Water Intelligence, 2004, quoted in Komives et al., 2005.

Figure 2:
An assessment of the sustainability of water tariffs across regions



Source: Komives et al., 2005.

structural need of subsidies to balance their budgets. Additional subsidies are often needed because of technical and commercial losses that drive a wedge between the theoretical revenues that utilities could achieve, given the prevailing tariffs, and their real revenues. Available studies suggest that the technical and commercial efficiency of utilities varies massively between countries. As an illustration, in 2002 for a typical utility in South Africa it was estimated that technical and commercial losses represented 60% of total water produced. Figures mentioned for other African countries are even higher. In Kenya, it has been estimated that less than 17% of water is paid for in Mombasa and less than 32% in Nairobi.

In practice, subsidies have often been regressive and badly targeted

The majority of water subsidies to households existing today are delivered to customers connected to the network through low tariffs. This type of subsidy is referred to as a consumption subsidy. A very frequent way of subsidizing water consumption is through IBTs where the first consumption blocks are subsidized, while the highest blocks are priced above cost. In such schemes, high-volume consumers cross-subsidize low-volume consumers. Connection subsidies, by which the one-time cost of connecting new areas and housing units to the network is only partially passed on to the end consumer, have so far been less popular than consumption subsidies, in spite of the often clear social value of extending water services to unconnected households.

Review of the experience accumulated over the last few decades in various countries provides a number of robust lessons regarding water subsidies. The most important ones are detailed below.

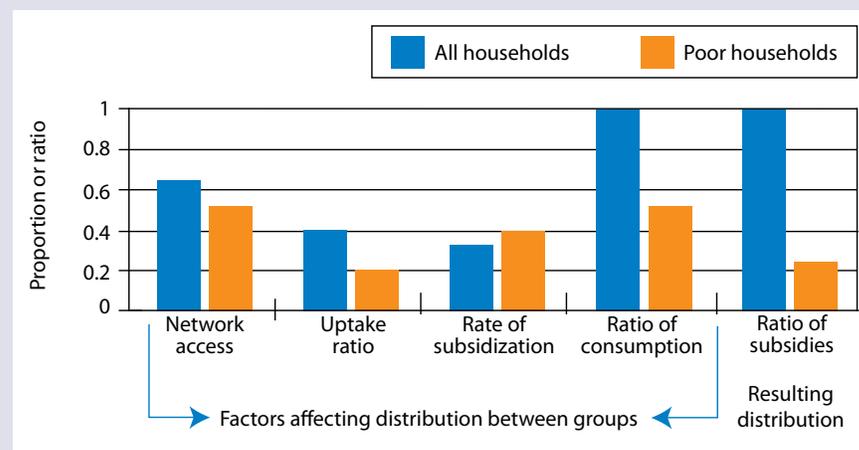
Water consumption subsidies are not a good redistribution tool. First,

water expenditures typically represent a low proportion of the household's budget. Second, access factors biased against the poor make subsidies through low water tariffs unlikely to reach the poor. Third, correctly identifying poor households is often difficult to achieve in a developing country context.

Consumption subsidies delivered only through low tariffs (e.g. IBT) are typically not well targeted to the poorest households. Although IBTs offer clear benefits in terms of incentives to limit individual water consumption, thus contributing to the protection of the water resource base, subsidized IBTs have consistently resulted in regressive redistribution schemes. That is, the implicit subsidies passed on to consumers through the first tariff blocks accrue in large part to house-

Box 2

Impact of differences in access, connection, and consumption on the distribution of consumption subsidies — Cape Verde



Source: Komives et al. (2005).

The prevailing tariff structure in Cape Verde is an IBT. Poor households have significantly less frequent access to the public network than the whole population. Among those with access, the choice to connect is only half as frequent among poor households. Moreover, poor households connected to the network consume only half as much water as the whole population of connected households. Even though, through the IBT structure, the resulting subsidy rate is slightly higher for the former, this does not compensate for the difference in consumption. Thus, the ratio of the amount of subsidy going to an average poor household to that going to all households is only one to four.

holds located in the higher income brackets. This is because the final distribution of subsidies to different groups of households will depend on the proportion of households having potential access to the network; on the proportion of households living in an area with access to the network that choose to connect; and on the consumption of water of connected households, which determines the amount of subsidies they receive. On average, all these successive hurdles appear to disadvantage the poorer households. The proportion of households having potential access to the network is often higher for non-poor households than for poor households. The same is true for the proportion of households that choose to connect to the network, given access. Furthermore, non-poor households connected to the network often consume more than poor households and thus will receive a greater proportion of the subsidies, which are based on unit tariffs (**Box 2**).

Another feature of the IBTs prevalent around the world is that they are often badly targeted because the size of the first, most heavily subsidized block is too large, often well beyond commonly accepted subsistence levels. As a result, a substantial proportion of households, and not only the poorest, fall entirely within the first consumption block and end up paying subsidized tariffs on their entire water consumption.

Cross-subsidy schemes have been faced with various types of problems. First, the division of consumers into subsidized and subsidizing categories in a way that allows a balancing of the costs (no net deficit for the utility from cross-subsidies) is hard to achieve. Over time, the categories defining eligibility for the subsidy may evolve in such a way that the financial health of utilities is compromised, necessitating compensating subsidies from other sources. Problems of this nature have occurred in Colombia. In that country, water utilities suffer structural losses as a result of the subsidy scheme (equal to 20 percent of water sector turnover), and it is necessary for the national government to step in and help cover those losses. Second, consumers facing high tariffs and having alternative supply possibilities (such as firms, which typically pay higher prices than individual consumers) may opt out of the system, leaving in the system a growing proportion of subsidized consumers.

Consumption subsidies delivered through the utility network cannot reach households not connected to the network. Utilities are only one of the water sources used by the poor. One of the main lessons from a recent World Bank review study is that access factors constitute the main constraint to reaching the poor with consumption subsidies through low tariffs. Given that poor households are less likely to be connected than richer ones, subsidies through tariffs miss a substantial part of the potential beneficiaries. This feature can have important implications for both the targeting of water subsidies and their redistribution effects in developing countries.

New approaches to tariffs and subsidies for water provision

Drawing on the lessons from past experience, new practices in the design and delivery of subsidies have emerged (**Box 3**). Interestingly, available studies seem to suggest that consumers would often be willing to pay significantly higher water tariffs than those charged by utilities, in exchange for improved reliability of service. Notwithstanding detailed investigations at the country or city level which constitute a necessary step in the design of any subsidy mechanism, this suggests that subsidies could often be much better targeted than they currently are. There is also increasing recognition of the need to reach households not connected to the water network.

An increasingly common form of water provision consists of a menu of services, differentiated by quality, e.g. private connection and community taps or standpipes. Another possibility is a menu of connections with different technical characteristics (pressure, debit, etc.), associated with different tariffs. For example, community taps located in poor neighbourhoods have constituted an alternative to individual connections in recent projects in urban Nepal. Typically, subsidies are associated with the lower quality service. The objective of differentiated services and subsidies is to target subsidies to the poorer households or neighbourhoods, by allowing households to self-select the form of service they prefer to use, the implicit assumption being that poor households are more likely to use the (subsidized) lower-quality service. Another objective is to achieve a greater coverage with the same amount of investment, lower quality services such as community taps being less costly to

provide and covering the needs of more households than private connections.

Administrative targeting in various forms is increasingly used and can significantly improve the performance of tariff-based subsidies. There is a range of targeting methods, going from categorical targeting popular in the former Soviet Union, to selection based on family structure and location, with the most sophisticated methods relying on means testing. Selection based on family size alone is usually found to perform poorly in targeting the poorest households. The power of geographic targeting depends in large measure on the correlation between poverty and location of households. The

level of detail of geographic information available to the administration will play a crucial role in defining adequate priority areas for subsidy eligibility. Geographic targeting has given interesting results in Nepal, but seems to have limited potential in Colombia and Senegal. In the latter country, although the average water consumption did not vary much across neighbourhoods, there are huge variations of individual consumptions within neighbourhoods. In such cases, targeting based solely on geography will fail to identify the poorest households.

Direct consumption subsidies are paid directly to households meeting certain eligibility criteria (low income being the most obvious criterion) to

Box 3

Some lessons from the available evidence on water subsidies

More data are needed

Micro-level data on household incomes, water consumption, and expenditure patterns, as well as assessment studies, are a prerequisite to sound policy formulation in the water sector. In particular, they should be used to determine the level and structure of the water tariffs that can be supported locally; the necessity of subsidies; and the type of subsidies needed and their probable incidence. In many contexts, such basic data and assessments are lacking.

Many of the current subsidy schemes would need to be better designed in order to improve targeting and increase coverage of poor populations

Water tariffs and subsidies are only one facet of development challenges in water and sanitation. In order to devise more equitable schemes, governments need to consider the big picture, including all the factors that potentially influence the provision of basic services to the poor. Those include in particular:

- low network access rates;
- disparities in rates of access between urban, peri-urban and rural areas;
- legal and administrative constraints (e.g. urban planning and zoning documents in peri-urban areas; legal limitations on the provision of basic services to dwellings not complying fully with the law);
- unclear and/or anti-poor regulation of the sector (e.g. by giving legal monopolies to utilities over areas which they currently do not serve).

Financing needs of utilities need to be separated from subsidy issues

In many countries the “traditional” way to deal with utilities has consisted in mandating low tariffs, in exchange for compensating for the losses incurred through various means. Such transfers to utilities mix utility financing needs and social equity considerations. In practice this has often meant unfunded subsidies, lack of incentives for utility efficiency, or both, resulting in declining quality of service which further undermines the viability of the utility. For the regulator or the government, it is difficult to sort out, in the financing requests of the utilities, how much relates to efficiency problems and how much relates to actual consumer subsidies.

While social concerns are highly legitimate, the responsibility to assist poor customers should belong to the government, not to the utility. Utilities should be allowed to charge sustainable tariffs (properly monitored), and subsidies to needy customers should be provided by the appropriate level of government. The advantages of such an unbundling are manifold:

- it provides better incentives for utilities and governments;
- it makes consumer subsidies more transparent;
- sustainable tariffs are the best guarantee to sustained services in the medium to long run.

cover part of their water bill. The main advantages of direct subsidies are that they are transparent, explicit, and minimize distortions in the behavior of water utilities and their customers. The main drawbacks are the difficulty of defining suitable eligibility criteria, as well as the administrative cost entailed in identifying eligible households. The direct subsidy system was pioneered by the Chilean government in 1990, when it was successfully used to soften the distributional impacts of a convergence towards cost-reflective water tariffs.

Connection subsidies have become more and more frequent, based on the recognition that, for some groups of the population, the main obstacle to connection to the network was not that of paying the monthly water bill but rather paying the initial connection fee. Connection subsidies also provide a strong incentive for water providers to extend the network.

A popular way of delivering such subsidies in recent years has been so-called output-based aid (OBA). Under that approach, project financing and subsidies are delivered based on the completion of performance targets in terms of new connections to the network rather than as general support to the utility. Such schemes can be combined with administrative targeting, the subsidies being reserved to poor households. Usually, the subsidies are associated with competitive bidding. For example, the government sets an amount of subsidy per new connection and asks water providers to bid on the total cost of connection; the contract is awarded to the firm presenting the lowest bid. Such schemes have been used recently in Paraguay and Cambodia (Box 4). An alternative approach consists in setting the price that will be paid by end users of individual connections and having firms bid on the subsidy amount they require from the government.

Under OBA, the service provider is paid the agreed bid amount regardless of the ex post cost of the connection, thus creating an incentive for efficiency. Moreover, under OBA the bulk of subsidies are disbursed after connections have been verified, as opposed to traditional schemes where disbursements are not tied to output targets. Better incentives and increased transparency provided by OBA schemes may constitute the main reason why multilateral donors have increasingly shifted their water access projects towards output-based finance and subsidies.

Box 4

Output-based aid in water and sanitation: the case of Cambodia

Cambodia's per capita income is \$320. Approximately 40% of the population lives below the poverty line. After decades of war and social disruption, less than one-third of Cambodia's population has access to improved water services. Access to sanitation facilities is even lower. In order to achieve the MDGs in Cambodia's water and sanitation sector, it has been estimated that investments of at least \$600 million would be needed by 2010. However, current investment, funded entirely by donors, averages only a fraction of this figure.

In the past decade, communities have been relying increasingly on unregulated and unlicensed water vendors, including those providing piped water supply. The government has been trying to license and formalize the private sector providers. Customers of those private providers seem more satisfied with the service provided by them than public utility customers, because of better availability, higher quality, and less frequent service interruptions. However, weak regulation, high tariffs and especially high one-off connection fees still limit access of the poor to water services.

The Provincial and Peri-urban Water Supply and Sanitation Project funded by the World Bank, which aims at providing services by building and rehabilitating infrastructure, includes an output-based aid component in four towns. Under these OBA arrangements, design, build and operate (DBO) contracts receive targeted subsidies, financed by a \$3.1 million IDA grant, where operators receive a payment for each poor household connected.

Service providers must connect any household within their service area that requests a connection. Providers use the subsidies to connect the targeted poor which have been identified by communities themselves, but charge a connection fee to non-poor households. End-users pay agreed water tariffs equivalent to about \$0.50 per cubic meter. The bid is structured based on the lowest cost per connection. The first contracts were awarded in March 2004. The winning bid had connection costs about 25% less than the public sector comparator of \$500 per connection.

Preliminary evaluations of the project are encouraging. The OBA scheme has allowed incorporating private sector financing as well as technical and managerial expertise, while effectively reaching the poorest households and keeping subsidies well targeted. Community participation and ownership has been instrumental to the success of the project.

Another dimension which has been explored by many countries reforming their frameworks for the provision of water service is the use of subsidies of various types as instruments to manage the transition from one tariff schedule to another. Typically, the new tariff schedule will aim at better recovering the costs, and its application will result in sudden jumps in water bills for connected households. Temporary subsidies, which decrease over time as consumers' incomes increase, might help smooth this transition.

Conclusion: towards a broader view of government interventions aimed at increasing access to improved water services

Designing tariffs and subsidies for water has proven to be a challenge almost everywhere. Conflicting economic objectives (cost recovery versus affordable tariffs), social constraints (low incomes coupled with the fact that water is seen as a necessity), and incentive problems linked to the nature of the industry combine to create a range of issues, the importance of which varies across countries.

The traditional paradigm of consumption subsidies passed on to consumers through utilities via low tariffs has repeatedly shown its limits. Access rates have often remained low and are systematically lower for poor households than for the rest of the population. Due to the need to rely on other types of providers, many consumers pay for their water a substantially higher price than they would if the

service provided by the utilities was universal and reliable. Yet, there is generally no subsidy going to households not connected to the network.

In many countries with low per capita income, tariff subsidies are arguably needed, at least for the poorest segments of the population. This is particularly necessary when the cost of sanitation has been or will have to be progressively added to the water bills. Within a development perspective where consumers' incomes are supposed to increase over time, subsidies may be provided initially and progressively phased out.

Public policies should be focused on increasing access to improved drinking water broadly, rather than being limited to subsidizing consumption of tapped water provided by public utilities. Public interventions should aim at balancing a range of other levers, such as providing connection subsidies or more generally focusing on service extension; providing differentiated services; and incorporating alternative providers in the overall picture. The latter point includes devising an enabling framework for water provision; considering appropriate regulation of alternative providers; and considering the provision of subsidies to low-income households not relying on the public network.

Key reading

Coady, D., M. Grosh, and J. Hoddinott, 2004, *Targeting of Transfers in Developing Countries: Review of Lessons and Experience*, World Bank, Washington, D.C.

Drees-Gross, F. J. Schwartz, M. Sotomayor, 2005, *Output-based Aid in Water — lessons in implementation from a pilot in Paraguay*, OBAApproaches note number 07.

Kariuki, M., and J. Schwartz, 2005, *Small-Scale Private Service Providers of Water Supply and Electricity: A Review of Incidence, Structure, Pricing, and Operating Characteristics*, Energy and Water Department, World Bank.

Komives, K., V. Foster, J. Halpern, Q. Wodon, with support from R. Abdullah, 2005, *Water, Electricity, and the Poor — Who Benefits from Utility Subsidies?*, World Bank.

United Nations Development Program (UNDP), 2006, *Beyond Scarcity: Power, poverty and the global water crisis*, Human Development Report 2006, New York.

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**United Nations Department of Economic and Social Affairs
Division for Sustainable Development
Policy Integration and Analysis Branch
2 UN Plaza
New York, NY 10017**

Voice: (1-917) 367-3269

Fax: (1-212) 963-1267

E-mail: carpio@un.org

<http://www.un.org/esa/sustdev/publications/innovationbriefs/index.htm>



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