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REACHING THE UNREACHED: CHALLENGES FOR THE 21ST CENTURY

Tools to promote financial sustainability

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FOR MANY PEOPLE in developing countries access to adequate water supply, sanitation and solid waste disposal is crucial to achieving improvements in their quality of life. These services also have dramatic health and environmental impacts: more than two million deaths from diarrhoea alone could be avoided each year if all people had reasonable water and sanitation services (World Bank, 1992). In order to achieve the great improvements in environmental quality, health, equity and economic returns which these services can bring, an approach is needed which recognises that it is essential for services to be provided in a financially viable and sustainable manner. There is widespread evidence that without an emphasis on appropriate levels of service,affordable charges and proper financial planning, service delivery fails and the poor are once again worst off.

In the light of this, a financial modelling tool has been developed to assess the impact of investments in water and sanitation services, and the implementation of different tariff and subsidy policies, on the long term financial viability and sustainability of service agencies.

Why undertake financial modelling?

Modelling can provide a transparent policy analysis tool which enables decision makers to examine the implications of a wide range of policy choices and input parameters on the financial viability of service provision at the local, regional and national levels. In particular, financial modelling can help financial planners to:

- Make all assumptions transparent.
- Identify and highlight the key input variables which impact on the viability of services provision.
- Identify and highlight the key policy choices which impact on the viability of services provision.
- Compare alternative scenarios with relative ease by varying the assumptions, input variables and policy choices.
- Test sensitivities of the various assumptions, input variables and policy choices.
- Incorporate an analysis of the recurrent cost implications of capital investments in their investment planning.
- Take a medium and longer term view of investment planning and services provision.
- Adopt a systematic, comprehensive and rigorous approach to investment planning.

Scope of models

The investment - tariff models evaluate the impact of different investment scenarios and financial policies on the financial viability of a "water utility" and "water and sanitation utility" which have overall responsibility for water supply and sanitation in an urban area.

The key model outputs are: future capital investment requirements, future grant finance requirements (both capital and recurrent), future borrowing requirements at the service provider level, tariff levels required to maintain financial viability, and future net cash flows of the service provider.

These outputs assist in the more qualitative assessment of affordability which needs to be examined at fourlevels - household affordability, service provider affordability, central government affordability and macro-economic affordability.

Principles underlying the models

The model conceptually comprises three components:

- Definition and costing of an investment program.
- Analysis of the capital account.
- Analysis of the operating account.

The development of the investment program is based on the definition of service levels. For example, for water, typical service levels might be: unplanned supplies (a "catch-all" minimal service category), planned communal water points, yard taps and house connections. The key parameters which impact on the investment program are existing service deficits (an independent variable) and future service level goals and time frames (an important policy input). Rehabilitation and asset replacement are also taken into account.

The analysis of the capital account examines the sources of capital required to meet the capital expenditure requirements which follow directly from the defined investment programme. The key policy choice relates to the incidence of payment, that is, the respective "burden" placed on the three primary sources of capital - household capital contributions, local service provider borrowing and central or provincial government contributions (in the form of capital grants to the household and / or service provider).

The analysis of the operating account examines the income required to match the ongoing costs of operating and maintaining the services, including debt servicing. In

particular, the model examines the impact of the capital investment programme on tariff levels and the requirements for recurrent subsidies.

It is important to note that both the nature of the investment programme (scale, timing and levels of service provided) and the incidence of the payment for capital (in particular, how much local service providers are required to borrow) impact on the recurrent costs of the service provider.

Basic tenets of the model

There are a number of "givens" in the modelling process which must be borne in mind by the user:

- Services provision must be feasible (the required capital can be raised and the services constructed) for the investment programme designed by the user.
- Service providers must remain financially viable (income raised must equal expenditure, within a defined tariff policy and subsidy framework).
- Capital investments in municipal infrastructure have important operation and maintenance implications which need to be taken into account when developing municipal infrastructure investment programmes.
- Subsidy and tariff policies are highly interconnected and must be considered holistically.
- The subsidies and tariff levels required to meet the criterion of financial viability must be affordable and sustainable at the local and national levels.

Understanding the key linkages

The linkages between the investment programme and recurrent costs are of considerable importance, and it is therefore worthwhile examining these in more detail. They are best illustrated through tracing all the factors impacting on recurrent costs.

The four principle components making up the costs are:

- Consumption.
- Maintenance.
- Interest and redemption charges on borrowed capital.
- Administration and overheads.

Each of these are discussed below.

There is a relationship between consumption levels and recurrent costs. The level of consumption is, in turn, a function of two factors:

- The level of service provided.
- A combination of the (effective) tariff levied and households' disposable income (where tariffs are linked to consumption as is usually the case for water).

The impact of level of service on consumption is of prime importance. Consumers with a high level of service are likely to have relatively high levels of consumption irrespective of affordability. This is because consumption is physically unconstrained and, in the context of generally low levels of affordability, the political pressures for recurrent subsidies to maintain these consumption levels are likely to be high.

Maintenance costs are a function of level of service, consumption, overall levels of investment and the efficiency of the service provider. Of these, level of service and consumption are the most important. Lower levels of service may have higher maintenance costs, but these cost increases must be offset against the higher interest and redemption charges associated with higher capital costs.

Interest and redemption costs are directly related to the level and cost of borrowing with the former linked to both the level of capital expenditure and available capital income. In the context of severe constraints on the availability of capital from household contributions and government grants, the overall level of capital investment will undoubtedly have an important impact on recurrent costs.

Administration and overhead costs account for a proportionately smaller share of recurrent costs than each of the other three components but are nevertheless significant. Agency efficiency is the most important factor affecting these costs.

The modelling process

The user of the model would generally undertake the following steps:

- **Understand the current status quo**
  The model user must begin by developing a thorough understanding of the current status of service provision in the area being modelled, including existing service coverage, capital and recurrent and maintenance costs, service consumption patterns etc.

- **Input service goals and time frames**
  On the basis of existing service levels and coverage, the model user would decide on service level goals and time frames. Typically, three scenarios should be chosen initially: an ambitious scenario, a financially "safe" scenario, and a "middle" scenario.

- **Design investment programme**
  The model user would then typically design three investment programmes to meet different service level goals and time frames: one that is ambitious, one that is conservative and a median one. It should be noted that the way in which the investment programme is input is very flexible and it is possible to achieve the same service level outcomes using quite different investment programmes.

- **Design income and tariff policy**
  The model user should input existing tariff structures and levels for the planning year and then adjust tariff

structures and levels so as to fit intended tariff policy and to ensure financial viability of the supply agency over the period of analysis.

- **Assess outputs**
  The two key outputs provided by the model are: the capital account balance sheet, and operating account balance sheet. These outputs need to be assessed in terms of the financial viability of the agency over the period of analysis, the physical feasibility of the investment programme proposed, the affordability and willingness to pay the tariff levels proposed, and the political acceptability of the service goals and required tariffs levels and tariff increases to maintain financial viability.

- **Undertake a sensitivity analysis**
  The model user may then make adjustments to inputs to determine sensitivities of various parameters on the key model outcomes.

- **Select likely scenario and refine analysis**
  The scenarios would then be presented to the decision makers (both political and technical) of the service provider, who should choose the most appropriate investment scenario for further investigation. The data input for the chosen investment scenario should be further refined and various options within this general scenario explored. These more detailed options within the chosen overall scenario would then again be presented to the decision makers who would make investment and tariff policy decisions taking this analysis into account.

Affordability and incidence of payment

The cost of the proposed municipal infrastructure investment programme will ultimately be borne by households and the business sector through a combination of direct payments for services and taxes (both local and national). The relative weighting of these two primary "payment routes" is a key policy issue which has important implications both for the economic impact of the investments as well as their affordability.

The two primary affordability constraints are:

- The level of taxes that can be raised at the national level, and the proportion of this that can be set aside for municipal infrastructure.
- The amounts that households are able and willing to pay for services provided.

It is often argued that it is preferable that local services are paid from local resources. In the light of this, it may be desirable that policies are pursued which maximise local payments for services. However, where income distribution is highly unequal, redistribution may also be an important policy goal. Redistribution may be addressed at a national or regional level through transfers, preferably made directly to low income households.

Typical modelling outcomes

Services deficits have a major impact on capital investment requirements. Typically, areas with large service deficits (more than a third of households without adequate services) would have more than double the investment requirements per capita compared to relatively well served areas (less than 10 per cent of households without adequate services).

Investment time frames to make up service backlogs have a significant impact on peak investment requirements. Where service backlogs are significant, short time frames to make up the backlogs will require significant increases in annual investment requirements with a high peak, followed by a rapid drop in investment activity once the backlog has been made up. A high early peak also adversely affects the interest and redemption charges, resulting in earlier and higher increases in recurrent expenses and hence tariff levels.

Service goals

The mix of service levels chosen has a major impact on total capital investment requirements, recurrent costs and financial viability.

Tariff increases are dependent on a number of factors, the most important of which are: the existing degree of cost recovery, the increase in interest and redemption payments arising from borrowing for new investments, the level of service provided in the future and its affordability to households, and future payment levels. Where high levels of service are provided which are not affordable to households, payment levels will drop requiring increased tariffs to compensate for this. These tariff increases are likely to be met with political resistance, increasing the likelihood of unsustainable service delivery. Where service levels are matched with household incomes and willingness to pay, the tariff increases required to fund the investment programme are usually modest, provided that current tariffs are recovering costs and that the long run marginal cost of supply is not significantly greater than the average historical cost.

Conclusions

The models developed to assess the financial viability and sustainability of investments in water and sanitation provide a useful policy, strategic planning and tariff setting tool for managers and planners in developing countries involved in the provision of urban services. The models provide a framework for a systematic strategic planning process to assess future infrastructure investment requirements and impacts.

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