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**" FY91 Sector Review
Water Supply and Sanitation "**

December 1991

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General Operational Review

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Infrastructure and Urban Development Department
Water and Sanitation Division

FY91 Sector Review
Water Supply and Sanitation

December 1991

Preface

This Annual Review of Bank activities in the water and sanitation sector discusses the Bank's lending for FY91, future lending prospects, management of the sector portfolio, and allocation of staffweeks in sector activities. In addition, it highlights sectoral issues that need to be addressed in borrowing countries and within the Bank either more extensively or in different ways.

Three major issues stand out as critical and enduring concerns in the sector:

(1) **Water resources management:** Where delivery systems are inadequate, water is often too expensive or of inadequate quality despite sufficient resources. Competition among different user groups must also be resolved.

(2) **Economic justification and financial sustainability of sectoral investments:** Project analysis of capacity requirements, components of project design, financial risk, and economic justification must be improved to ensure sustainability. At a minimum, Bank experience needs to be considered systematically in identifying and understanding risks and formulating new approaches to reduce them.

(3) **Adequacy of sectoral institutions, operational management, and maintenance of existing facilities:** Poor institutional performance and the need for building institutional capacity must be addressed by the fine-tuning of administrative structures and controls at national levels,

legal and regulatory practices, and the incentives (or disincentives for efficient response by local supply organizations.

Sectoral institutions have performed poorly. Economic resources are often used inefficiently, and utilities in developing countries seldom collect sufficient revenues to cover their recurrent operation and maintenance costs, service debts, and provide for future investments. Poor people and small industries are either denied service or are forced to bear the brunt of unreliable services, while the consumption of others is subsidized.

Service delivery organizations face two areas of institutional weakness:

(1) **Defects in the operating environment that result in inadequate incentives to mobilize investment resources, streamline operations and maintenance, and respond to users.**

(2) **Internal problems (poor management skills and inadequate systems in information management, technical and financial monitoring, and integration of functions) that reduce efficiency.**

Action plans, technical assistance components, and project conditionality are, by themselves, inadequate for institutional reform. In the context of an individual project,

these efforts fail to address the major institutional problems in the sector: the need for both an "enabling environment" and a "demand orientation." Moreover, technical assistance and project-specific conditionality have often increased the dependency of institutions on their technical advisors or on other government departments.

As countries reconsider institutional issues in light of the balance between public and private sectors, they are recognizing the importance of a "market friendly" approach to public sector interventions. This approach focuses on the legal and regulatory practices and administrative procedures and controls that are critical to improving organizational performance; and it also encourages greater responsiveness to user choices. This poses the difficult dilemma of how to engage governments in fundamental institutional reform while pressing forward with project lending.

Complex, politically demanding, and vitally needed, institutional reform requires a strategic approach that provides capacity-building support to supply organizations. One promising effort to develop such a strategy is the "Brazil Medium-Term Strategy Paper for the Infrastructure Sectors" (March 28, 1991). More policy analysis is also needed, and it must focus on how to change behavior through "market friendly" interventions so as to enhance individual and organizational productivity and efficiency.

Lending in FY91 and the FY92-96 pipeline both reflect strong sector interest among borrowing countries; this interest provides a base for seeking institutional changes. FY91 lending in the sector exceeded \$1 billion in support of projects costing \$1.9 billion. Lending in the sector, including water and sanitation components in urban projects, represented 5.5% of total Bank lending. The current pipeline for FY92-96 is estimated to amount to slightly over \$1.8 billion a year in Bank lending, which would represent a substantial increase over previous levels. This will require more effort for project preparation and will necessitate, for institutional reform, an increased pace in sector work and the development of country strategies. FY91 saw a substantial increase in staff allocations to the sector in all categories--lending, supervision, and sector work--and this level of activity will have to be maintained or increased over the next five years.

ries--lending, supervision, and sector work--and this level of activity will have to be maintained or increased over the next five years.

The review of FY91 projects indicates a mixed performance in addressing the three enduring concerns--water resources, economic justification and financial sustainability, and institutional improvement. Also, there was a mixed performance on environmental issues, technology choices, and poverty impact.

Although the incremental cost per cubic meter for system expansions is generally increasing in urban areas, projects continue to deal superficially with the water resource issue. Relatively little has been done to explore economic (pricing) and technical aspects of water conservation and waste reduction. Unaccounted-for water is recognized as a serious problem, and in the seven urban projects, reducing it is an urgent activity.

Demand estimates continue to appear overly optimistic compared to actual performance, and financial sustainability is likely to be threatened in many cases. Also disturbing is the continuing decline in internal cash generation financing, which has dropped from 34% of project costs in FY88 to only 10% in this past fiscal year. Capital cost recovery risk is apparent in most FY91 projects.

Most projects emphasize system rehabilitation, and operation and maintenance issues are being better addressed in general. Training is given better attention and is efficiently dealt with in FY91 projects.

Poverty and environmental impacts are addressed in most FY91 projects. Community involvement and the effective contribution of women receive particular attention, especially in rural projects. For seven of the nine projects that comprise investment of \$775 million, benefits are estimated to reach more than 19 million urban and rural poor. Two projects do not contain a poverty impact analysis. Environmental impact received serious attention in all projects and, despite constituting a positive feature, proper disposal of sewerage will need continuing attention.

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Executive Summary

This is the fourth Annual Review of Bank activities in the water and sanitation sector, since FY87. Each of these reports has discussed the previous years' lending, future lending prospects, management of the sector portfolio, and allocation of staff weeks in sector activities. In addition, they have highlighted sectoral issues that need to be addressed in borrowing countries and within the Bank either more extensively or in different ways.

Of these major issues, three stand out as critical and enduring concerns in the sector:

- **Water resources management:** The availability of sufficient water resources to meet the growing demands in particular localities is an increasingly binding constraint in many countries, given the dramatic increases in population and growing urban concentration. The problem is not an overall shortage—water consumption for all uses is less than a quarter of the actual freshwater available. Rather the problem is water availability and the quality of water at an acceptable cost in places where it is needed, and increased competition among different user groups for the available water. This issue was highlighted in the FY88 Sectoral Review and is a major component in the Water Resources Policy Paper, currently under preparation within the Bank.
- **Ensuring that sectoral investments are economically justified and financially sustainable:** A major effort

continues to be required to improve the analysis which provides the basis for the capacity requirements and components of project design, the financial statements on which both the borrower and the Bank assess financial risk, and the economic justification for undertaking specific projects. At a minimum, the Bank's own experience needs to be taken into account more systematically in identifying risks. Approaches for reducing risks and clarifying their implications through up-graded sensitivity analysis need to be developed. (FY 90 Sectoral Review)

- **The adequacy of sectoral institutions and operational management and maintenance of existing facilities:** Recognition of the problem of poor institutional performance and the need for building institutional capacity is not new in the sector. What is new is increased understanding of the roles of administrative structures and controls at national levels, legal and regulatory practices; and the incentives (or disincentives) for efficient response by local supply organizations (publicly owned and operated or privatized). (FY88 Sector Review, FY89 Strategy Note and Proposal on Capacity Building in Utilities, 1991)

This report focuses primarily on the third of these issues--institutional improvement: why it continues to be important, what its main elements are, and strategies to achieve it.

It continues to be important because the performance of sectoral organizations remains poor. From an economic perspective, available resources are often used inefficiently. From a financial perspective, water and sanitation utilities in developing countries seldom collect sufficient revenues to cover their recurrent operation and maintenance costs, let alone service their debts or provide for future investments. From an equity perspective, performance is poor, as poor people and small industries are either denied service or are forced to bear the brunt of unreliable services, while the consumption of others is subsidized.

Advances are being made in understanding the sources of institutional weakness. Essentially, they are of two types:

- (1) Defects in the institutional environment in which service delivery organizations operate resulting in too few incentives for supply organizations to mobilize investment resources and become more efficient in their operations and maintenance and responsive to their existing and potential users.
- (2) Problems internal to service delivery organizations, such as poor management skills and inadequate management systems for information, technical and financial monitoring of operations, and integration of functions--e.g. engineering and finance.

Bank staff responsible for sectoral projects have long been aware of the second source of weakness and have proposed action plans, technical assistance components, and project conditionality to address them. This report concludes that these efforts alone are an inadequate response to the needs for institutional improvement and reform. Specifically, they do not (and probably cannot, in the context of an individual project) address either the "enabling environment," which is largely in the control of "rule-makers" other than those who manage supply facilities; nor do they address institutional reforms necessary to make the supply organizations more responsive to their existing and potential users. Moreover, an unintended effect of much of the technical assistance and project-specific conditionality has been to create greater dependency on others (either technical advisors or other government departments) to resolve the internal problems. This discourages a sense of ownership on the part of supply organizations and their staffs.

There are more opportunities now to address institutional issues more comprehensively as many countries are seriously reconsidering the relative roles of the public and private sectors. An important advance has been broader

recognition of the value of a "market friendly" approach to public sector interventions. This approach clarifies the critical role of the "enabling environment"--i.e. greater concern with the "rules of the game" as defined in legal and regulatory practices and administrative procedures and controls in improving organizational performance. It also encourages a "demand-orientation"--i.e. greater responsiveness to users in choices related to service provision--in providing incentives for increasing the efficiency and effectiveness of supply organizations in service delivery. This report concludes that the major institutional problems in the sector are to develop strategies for reform of the enabling environment and the encouragement of demand responsiveness. The additional problem which this conclusion poses for the Bank and project staff, however, is not an easy one to resolve--namely, how to engage governments in the business of fundamental institutional reform while pressing forward with project lending in this and other sectors.

This report recognizes the complexity and the inherently political nature of institutional reform. Nevertheless, a serious strategy for improving the efficiency of supply organizations in this and other sectors requires that such an effort be made. Even successful efforts, in the context of individual projects, will be undermined if not enough attention is given to the "enabling environment" and "demand responsiveness." Substantially greater attention should be given to the design of strategies for reform of institutions as well as the design of capacity-building support to supply organizations. It will also be necessary to spend more time on policy analysis and research on the links between institutional arrangements and the behaviors they induce. The objective of the needed reforms is to change behavior in ways that enhance individual and organizational productivity and efficiency. Although the direction of reforms required is known (toward market-friendly interventions), the parameters of behavioral response in different settings are known with less certainty.

One very promising effort to develop the kind of strategies needed is the Brazil Medium-Term Strategy Paper for the Infrastructure Sectors (March 28, 1991). In addition, a joint INUWS/Regional policy and research proposal, heavily oriented toward the analysis of institutional reform and associated behaviors, has been prepared to supplement INUWS's current policy work on these issues.

This report reviews current and prospective Operations activities against the background of major issues cited earlier. Both the FY91 lending and the FY92-96 pipeline demonstrate strong interest the sector in borrowing coun-

tries; which provides a base for seeking institutional changes to enhance project effectiveness and efficiency. FY91 lending in the sector exceeded \$1.0 billion in support of projects with a total project cost of \$1.9 billion. Lending in the sector, including water and sanitation components in urban projects, represented 5.5% of total Bank lending. The current pipeline for FY92-96 is estimated to amount to slightly over \$1.8 billion a year in Bank lending, which would represent a substantial increase over previous levels. To reach this level of lending will require a stepped up effort for project preparation; and, if this lending is to contribute to improved policies and institutional improvements, an increased pace in sector work and the development of country strategies. FY91 saw a substantial increase in staff allocations to the sector, compared to averages for the past five years, in all categories—lending, supervision, and sector work. This report concludes that the current level of activity in the sector will have to be maintained or increase over the next five years.

The review of FY91 projects indicates a mixed performance in addressing the three enduring concerns described at the beginning of this summary--water resources, economic justification and financial sustainability, and institutional improvement. There, also, has been mixed performance with respect to the environmental issues, technology choices, and poverty impact.

Although the incremental cost per cubic meter for system expansions is generally increasing in urban areas, projects continue to deal with the water resource issue in a rather superficial fashion. Relatively little has been done to explore economic (pricing) and technical aspects of water conservation and waste reduction. On the positive side, unaccounted-for water is recognized as a serious problem

and reducing it is held to be an urgent activity in the seven projects in urban areas.

Regarding economic justification and financial sustainability, demand estimates continue to appear overly optimistic compared to actual performance in past projects; and; since revenue estimates depend significantly on these estimates, financial sustainability is likely to be threatened in many cases. A further disturbing trend is the continuation of a decline in internal cash generation financing in FY91 projects. Internal cash generation was expected to finance 34% of project costs in FY 88, 22% in FY89, 18% in FY90, and only 10% in this past fiscal year. Capital cost recovery risk is apparent in most FY91 projects.

Within the limits of project-oriented capacity-building efforts (discussed above), there are some positive signs as most projects emphasize system rehabilitation and operation and maintenance issues are being better addressed in general. In addition, training is given particular attention and is efficiently dealt with in FY91 projects, although the training component seems to be in a very early preparation phase in one of the nine projects.

Poverty and environmental impacts are addressed in most FY91 projects. In the rural projects, particularly, special attention is given to community involvement and the effective contribution of women. In seven of the nine projects, it is estimated that \$775 million of the total investment will benefit about 19 million urban and rural poor. Two of the projects, however, do not contain a poverty impact analysis. Environmental impact received serious attention in all projects and, although proper disposal of sewerage will need continuing attention, constitutes a major positive feature of FY91 activities.

Water and Sanitation Sector Review, FY91

Institutional Improvement in the Sector

Interest in institutional reform in both the developing world and the Bank reached a high water mark in FY91, and its level promises to be raised further in FY92. This report focuses on institutional improvements in the water and sanitation sector; and also the broader context within which sectoral improvements can be considered and implemented. The period covered by this report includes efforts for large-scale institutional transformation in East Europe and the Soviet Union, as well as substantial rethinking about the role of the state in many developing countries.

As indicated in WDR1991, "A consensus is gradually forming in favor of a 'market friendly' approach to development. . . . (The report) stresses the complementary ways markets and governments can pull together. . . . When markets and governments have worked in harness, the results have been spectacular, but when they have worked in opposition, the results have been disastrous." Market friendly approaches emphasize openness, incentives, competition or competition surrogates, and accountability. They focus on government roles in "defining and protecting property rights, providing effective legal, judicial, and regulatory systems, improving the efficiency of the civil service, and protecting the environment" rather than on "managing development in detail."

A key aim of this approach is to improve the productivity of individuals and organizations through creating an enabling environment within which they work. In this context, the central institutional problem is to develop strategies for creating this kind of environment for the sector and its implementing organizations. It is clear that such strategies will require advances of, at least, three kinds: (1) developing strategic approaches to the sector's legal, regulatory, policy, and financial allocation rules, (2) improving the management and operation of supply organizations within the framework of such rules, and (3) devising mechanisms to increase the accountability of supply organizations to their current and potential customers. This report focuses on analysis and tools the Bank should use to make these advances.

Why is a renewed effort warranted to address institutional problems? The most obvious reason for a renewed effort is that the performance of water and sanitation organizations continues to be poor. Existing organizations often provide less service coverage than expected, service is often intermittent and unreliable, facilities deteriorate faster than expected, large quantities of produced water are lost due to distribution system losses or are not sold, and revenues are often insufficient to cover operation and maintenance cost and inadequate to cover past debts or provide a reserve for future investments. PCR's repeatedly

point out that there are substantial shortfalls in most projects between expected and actual outcomes resulting in a difference between appraisal estimates and actual rates of return of about 35% on average; as well as significant shortfalls in water sold and revenue gained from sold water.

OED's recent review cites institutional and management shortcomings as the most frequent difficulty, after poor financial performance (itself often attributed to lack of a commercial approach to financial management) and problems during project implementation. Moreover, these problems persist in spite of institutional development components in almost all projects in the sector (all of the FY91 projects contained institutional development components, for example). OED reports and PCFs show, however, that project performance has been generally declining, while the share of projects with institutional components has been increasing.

The potential payoff from achieving institutional development objectives has been demonstrated in CED's draft report on the Bank's work on institutional develop-

ment across sectors and in background papers for WDR91. Specifically, these reports show that projects which substantially achieve their institutional objectives come very close to achieving expected rates of return and are almost always judged to be sustainable; while those with negligible achievement of institutional objectives achieve less than half the expected rates of return and only about a third of them were judged to be sustainable.

Are we doing enough of the right things? Why, then, the paradoxical outcome of declining project performance while there is an increasing share of projects that have institutional improvement objectives and contain project components to achieve them? First, even though projects have institutional strengthening components, the institutional objectives are being substantially or partially achieved in fewer projects than before. Second, it may be that the institutional objectives are too limited to project management and the components are not directed at enough of the major causes of institutional weakness (e.g. the enabling environment and rules of the game are largely neglected as are mechanisms to increase demand respon-

Relevant Background

Within the Bank, the background work for and publication of WDR1991 "The Challenge of Development" marked the most intensive analysis of policy and institutional roles in development of any recent Bank report. These years also saw the publication and widespread discussion of many significant reports dealing more or less directly with institutional issues. These include:

- "The Reform of Public Sector Management: Lessons of Experience," CED, June 1991.
- "Governance: A Review," PRD, June 1991.
- "The Bank's Work on Institutional Development in Sectors", CED, May 1991.
- "Managing Development: The Governance Dimension," Task Force on Governance, June 1991.
- "Managing Technical Assistance in the 1990's," Working Draft of the Task Force on Technical Assistance, August, 1991.

This generalized interest in institutional improvement was also reflected in the water and sanitation sector in sector reports, some projects, OED reports, INU work, and within INUWS. Of specific relevance are the following:

- "The Bank's Experience in the Financing of Urban Water and Sanitation Projects," OED Draft, 1990 and full report forthcoming.
- "Water Supply and Sanitation Sector Study, Maintenance: the Costs of Neglect and Options to Improve It," LAC TD, 1991.
- "Brazil Medium-Term Strategy Paper for the Infrastructure Sectors," March 1991.
- "Egypt Water Supply and Sanitation Sector Review and Strategy," Interim Report, June 1991.
- "Understanding How Institutions Affect the Water and Sanitation Sector: A Program of Analytic Work," INUWS, Initiating Brief, June 1991.

siveness). The second explanation suggests underlying reasons for failure in the first.

The Bank-wide review of institutional development across sectors shows that in the 1978-79 period 68% of public utility projects substantially achieved their institutional objectives; while the other 32% partially achieved their objectives. During the 1986-88 period, however, less than half of the projects substantially achieved their institutional objectives, while in over 20% of the projects there was only negligible achievement.

The same review pointed out that the institutional issues addressed in Bank investment projects are "usually implementation-related." They focus on providing a variety of support—final engineering design and implementation, management support of the implementing organization, and manpower development in the implementing and operating organizations. The tools primarily employed for this purpose are primarily technical assistance for advisory services or studies and project conditionality—most often this conditionality relates to a tariff increase and financial performance covenants, such as financial rates of return on fixed assets or cash flow covenants. Manpower and training assessments are also included. It is rarely the case that sector strategy development and sector management get much attention. Our detailed review of technical assistance components in FY91 projects reveals, for example, that only \$16.1 million of the \$238 million dollars in technical assistance was devoted to strategy development and sector management. Although the support of organizational improvements and manpower development amounted to more than 12% of total project costs, the share for sector development and management was less than 1%. (See Table 1 for more detailed breakdowns of this data).

Aside from the fact that the kind of technical assistance provided has not generally succeeded in substantially improving the independence and local organization management and operations, conditionality (even when the conditions are met) tends to result in one-time changes (e.g. an initial tariff increase) rather than a change in procedures or "rules of the game" that would help ensure continuation of efficacious practices over time.

It might be thought that this latter problem would be dealt with in adjustment loans or in country economic and sector work. Unfortunately, this tends not to be the case. Most institutional development components in adjustment loans focus on improving the capacity of national organizations for macro-economic planning or for sector management. In relatively few cases do these loans substantially address incentive aspects of national planning and resource allocation on micro-sectoral organizations. Up to now, country economic and sector work tends to overlook the

same subjects. A notable exception during FY91 is the Brazil Medium-Term Strategy Paper for the Infrastructure Sectors. This study develops a clear analytical framework for the infrastructure sectors (transportation, telecommunications, water and sanitation, and urban) and develops sector strategies for each consistent with the, essentially market-friendly, approach of the framework. The paper addresses intra- and inter-sectoral linkages and discusses risks in implementing the strategies.

In most cases, however, there remains a strategic gap between institutional improvement activities at the macro level and at the level of service delivery organizations. The result is that the powerful incentive (or disincentive) effects of the policy environment, legal and regulatory frameworks, and modes for resource allocation receive too little attention.

There is, moreover, another significant strategic gap between institutional improvements (at both the macro and the micro level) and the interaction between supply organizations and the users of their services. The CED study of institutional development work across sectors states:

The scope of institutional development does not seem to cover, except in a minority of cases, issues of demand which are relevant to the design of the project service and hence essential to sustainability, its fit with beneficiary needs and the choice of institutional alternatives for delivery consistent with the nature of the services. . . . The goals of sustainability and sector-wide institutional strengthening with a focus on client groups are thus addressed only in a limited way.

This is a significant gap for two primary reasons. First, project reviews in the sector by OED and others have repeatedly shown that significant shortfalls between demand expected at appraisal and the actual demand have been partly responsible for poor financial performance and a challenge to sustainability. Second, one of the most powerful incentive effects for efficiency of organizations is the need to mobilize financial resources from its customers. This is, indeed, a significant source of the strength of "market friendly" approaches to institutional reform. Inadequate attention to resource mobilization from customers divorces resource allocation decisions and resource mobilization strategies. As supply organizations increasingly become dependent on non-user sources of funds for their survival, they will tend to respond more to the requirements of these sources than to the demands of their customers.

It has now become clear that heavily project-oriented institutional development efforts are only part of what is

Table 1 Technical Assistance for the Water and Sanitation Sector

Countries	Management Support and Operational Management		Strategy Development and Sector Management		Manpower and Training		Total	
	\$ Million	% share ¹	\$ Million	% share	\$ Million	% share	\$ Million	% share
Argentina	90.0	36.0%	2.5	1.0%	7.5	3.0%	100.0	40.0%
Bolivia	2.0	3.5%	0.7	1.2%	1.0	1.7%	3.7	6.5%
Chile	11.8	8.4%	0.1	< 0.1%	0.8	0.6%	12.7	9.1%
China	2.15	1.7%	1.9	1.5%	0.8	0.6%	4.8	3.8%
India	10.2	7.3%	0.0	0.0%	8.9	6.3%	19.1	13.6%
Mexico	21.0	3.7%	4.5	0.8%	9.6	1.7%	35.1	6.2%
Nepal	6.1	8.5%	0.4	0.5%	1.8	2.5%	8.3	11.5%
Nigeria	38.0	13.0%	6.0	2.0%	2.3	0.9%	46.3	15.9%
Pakistan	6.5	17.0%	0.0	0.0%	1.7	3.5%	8.2	20.5%
Total by Components	187.8	9.7%²	16.1	0.8%	34.4	1.7%	238.2	12.2%

¹ Percentage share of country project costs² Percentage share of total project costs (\$1933 million)

needed. The gap between strategic macro concerns and the micro concerns of local supply organizations must be closed as must the gap between these organizations and their customers. Moreover, these gaps cannot be closed solely through TA and conditionality for individual projects. Generally, the leverage of an individual project is too weak to achieve the broader reforms necessary. Increased emphasis, therefore, will have to be given to the development of strategies for such reforms and the utilization of more powerful tools. Our findings support the recommendations of the draft CED study of institutional development and the draft report of the Technical Assistance Review Task Force. Specifically, from the CED study, it is essential to:

- Strengthen the diffusion process and staff capabilities in institutional development work;
- Support expanded upstream work in institutional development in selected operations; match sector strategy with institutional development strategy to facilitate consistency and sequencing of actions;
- Undertake periodic institutional assessments in the sector in particular countries; and
- Promote multiple lending approaches/instruments to support complex ID reforms.

From the Technical Assistance Review, the pertinent recommendations are:

- Greater emphasis on institutional development in the policy and research agenda;
- Explicit consideration of TA risks caused by governance constraints and lack of government ownership of TA activity;
- Increased selectivity of TA interventions to focus on areas where strategic objectives are agreed; and
- Improved treatment of institutional development issues in country assistance strategy and planning documents.

Each of these recommendations has direct relevance to the water and sanitation sector and should be considered in the efforts to enhance not only sector management and operation of supply organizations, but also, to close the gap between macro treatment of institutional reform and such organizations and to encourage all sectoral organizations to be more demand-responsive. (For an excellent set of rules for implementing institutional reforms, see Box below). Project conditionality and technical assistance are inadequate tools to close the gap. A concerted effort is needed to develop the necessary strategies and mechanisms to close these gaps.

Rules for Reform

A recent paper by Anthony Churchill, "Implementing Reform: Strategy and Tactics," provides an interesting and useful set of "rules" for institutional development and change.

Rule 1 Never assume that the need for reform is obvious.

Rule 2 Objectives must include a clear statement of the institutional changes required.

Rule 3 Reforms in a sector must be undertaken within the context of overall reforms in the economy.

Rule 4 Immediate results are required if the impetus of the reform process is to be maintained.

Rule 5 The adverse impacts of reforms must be carefully targeted to avoid the formation of political coalitions that will undermine the process.

Rule 6 Always spread political costs to the maximum number of groups possible.

Rule 7 Financial expectations must be clear and short term problems resolved right from the start.

Rule 8 Start the process as dramatically as possible and be firm about goals but do not try to control the implementation details.

This effort must contain two major elements: (1) the design of country-specific strategies for institutional reform (dealing with the enabling environment as well as capacity building within supply organizations) and (2) additional policy analysis and research efforts to increase our understanding of the behavioral responses associated with specific institutional reforms. The INUWS research program is designed to make a significant contribution to this effort.

Policy Analysis and Research on Institutional Issues. The INUWS research program emphasizes three sets of research activities: (1) resolving technical, economic, and institutional issues in the provision of urban sanitation; (2) analysis of policies and practices in the

management of water resources--with special emphasis on the policy and regulatory frameworks affecting urban water supply and the economics of demand management and the opportunity cost of water in alternative uses; and (3) analysis of institutions (legal and regulatory systems, policies, and sectoral service organizations), with particular emphasis on strategies for institutional development to enhance the efficiency and effectiveness of service delivery.

The design of this research program has been strongly influenced by and has had an influence on the development of policy and project work within the Operations Departments. For example, INUWS staff conducts case studies on the above issues in countries where Operations staff are attempting to develop policy and program strategies--in the sanitation area, we are working with the Brazil Department to introduce and learn from schemes for sanitation that are alternatives to conventional sewerage; in the water resource area we are working in Indonesia and India to produce case studies of water resource management to inform Bank policy reviews and investigate possible changes in institutional roles; in the institutions area, we are also working with the Bangladesh Country Department to assess the need for institutional reform in urban water supply and to suggest possible strategies for reform.

In addition, INUWS is contributing to the Bank's Learning Group on participation and conducting case studies on alternative approaches (which emphasize community management and participation) to the provision of rural water supply. One of the critical institutional issues is to improve supply organization interaction with users. The

Division's past and current work on willingness to pay for water and sanitation services has substantially improved the methodology for doing such work and is beginning to have an impact on the design of urban and, especially, rural projects. The work has demonstrated the need for substantial rethinking of how both the Bank and other external donors approach the provision of services--specifically with regard to choice of level of service and the feasibility of user charge systems.

The research initiatives for the future will continue to be focused on the three major areas cited in the opening paragraph. We will make a contribution to the inter-departmental policy paper on Water Resources based on our own work described above as well as broaden the scope of the work to analyze other aspects of efficient management of water resources. We intend to launch a new initiative aimed at the restructuring and strengthening of formal urban water supply and sanitation institutions in collaboration with Regional TDs and Country departments. The emphasis will be on the generation of innovative institutional development models, and cross-regional exchange of experience and ideas. Of particular importance in this regard, is the introduction of greater private sector involvement in water and sanitation or, more generally, more "market friendly" approaches to policy and regulatory frameworks as well as supply organizations, even in those cases where the supply institutions remain publicly owned and operated. It is expected that this work will lead to a Water and Sanitation Policy Paper in FY94. The potential sector significance of the work and its operational relevance to Bank activity will remain central criteria.

Operational Activities in the Sector, FY91

Lending and the Portfolio

Lending Volume. Although the total number of projects approved was less in FY91 than in FY90 (Figure 1), a larger number of sector projects in the past fiscal year pushed the lending figures for the nine projects past one billion dollars, well above last year's US\$883 million and 44% higher than the average for FYs 86-90 of US\$786 million. Bank lending and total project cost averages in FY91 went up to record levels of US\$125 million and US\$215 million per project respectively, compared to averages of only US\$68 million and US\$181 million per project in FY90.

The four loans and five credits approved by the Board during FY91 (listed in Table 2) for a total of US\$1125 million (5% of total Bank lending--see Table 3) were the highest Bank lending level ever. Total project costs reached US\$1.93 billion, 18% less than FY90, but well within the three-year average (Figure 2). The five projects addressing sector-type operations in urban and rural areas account for 80% of the lending and a sixth project in Bolivia contains a strong sector policy framework approach.

Low levels of cofinancing (only 6% in FY91 compared to 25% in FY90 and 28% in FY89) pushed up Bank financing participation to 58% of project costs; substantially higher than the 38% average Bank share in FYs 88-

90. This shift may not indicate a trend since the annual variation is normally quite large.

Urban Development and Transport projects in Ecuador, Somalia and Indonesia contain substantial water supply and sanitation components (for example, the sector components in Ecuador are close to 80% of total cost) with an estimated total sector cost of US\$313 million and US\$117 million Bank financing. Consequently, with these additions, total lending in the sector is estimated at US\$1.25 billion (5.5% of total Bank lending), financing projects costing US\$2.25 billion. There are a few agriculture sector projects with an integrated rural development orientation, containing water supply and sanitation components. These lending and cost figures are not included in the above numbers.

Project Pipeline. Lending prospects in the sector are showing a substantial increase for the next five-year period (FY 92-96) to \$1,820 million/year in Bank lending from an estimated \$1,400 million/year (FY91-94) cited in our last review (Figure 3 and Table 4). Bank investments in the sector will be dominated by projects addressing urban needs in EMENA and LAC. In LAC, recent cholera epidemic outbreaks indicate serious weaknesses in water and sanitation services provision for the poor in peri-urban areas and precarious disposal practices of huge untreated sewage volumes, which pollute coastal waters, commercial fishing areas, beaches and fresh water bodies.

Figure 1 Sector Projects by Region

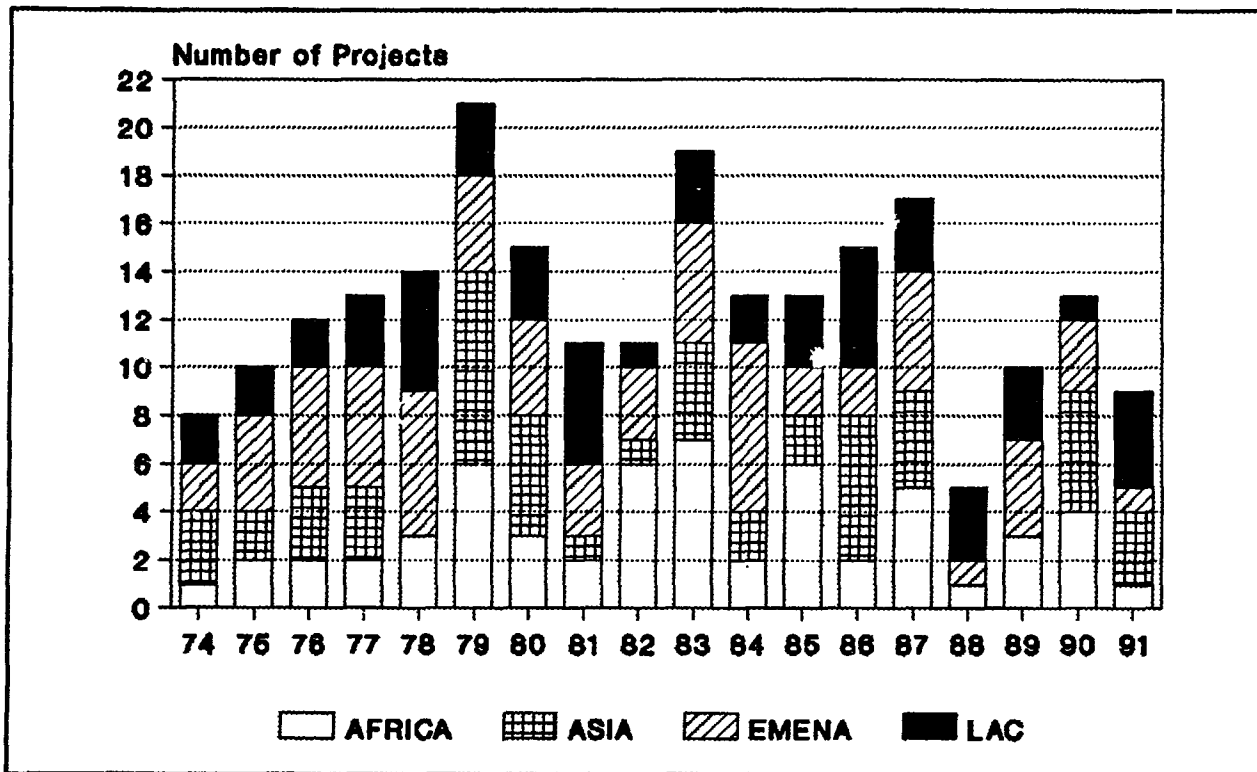


Figure 2 Project Costs and Bank Sector Lending

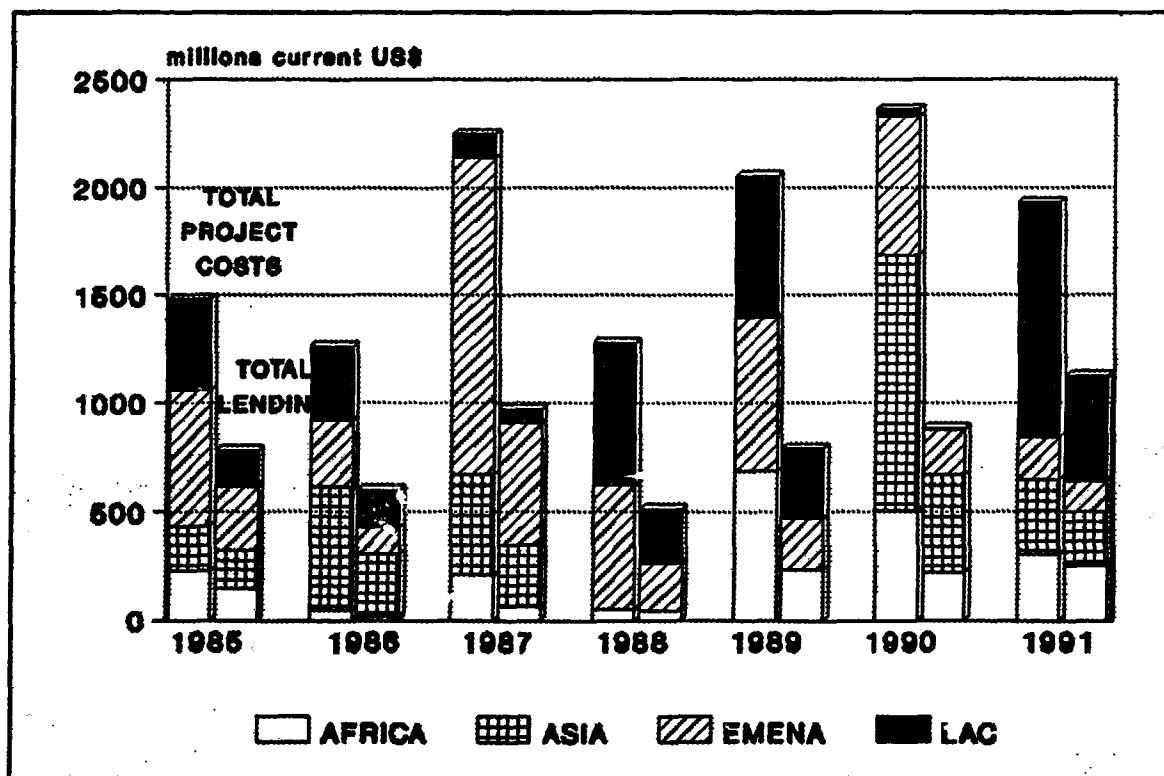


Table 2 Lending Projects, FY91

Country	Project	Amount (in \$ mil)	Total Project Cost (in \$ mil)
IBRD Projects			
Argentina	Water Supply II	100.0	250.0
Chile	Valparaiso Water I	50.0	141.5
Mexico	Water Supply and Sanitation	300.0	950.0
Nigeria	Water Supply Rehabilitation	256.0	306.7
	Sub Total	706.0	1648.2
IDA Projects			
Bolivia	Water Supply and Sewerage	35.0	57.0
China	Liaoning Urban Infrastructure	77.8	129.7
India	Maharashtra Rural	109.9	140.7
Nepal	Urban Water and Sanitation	60.0	69.5
Pakistan	Rural Water Supply	136.7	194.2
	Sub Total	419.4	591.1
	TOTAL	1125.4	2239.3

About half of the pipeline are sector-type projects that would amount to two thirds of the expected lending. As a result of the close cooperation between country governments and the UNDP/World Bank Program an increase of Bank-supported rural water supply and sanitation projects in Africa and Asia is apparent. During the next four years about 50 % of projects in these two regions will address the needs of the poor and actively involve women in rural areas with lending amounting to near US\$1.1 billion (Table 5).

Thirty projects are in active preparation. With 15 projects expected to go to the Board in FY92 and, possibly 20 in FY93, it will be necessary to increase the preparation pace to reach the regions' ambitious goals. The sector portfolio had a head start in FY92 with three operations already approved in the first quarter. The Lesotho Highland Water Project, prepared under close Bank supervision, is the most costly project financed with Bank participation (US\$2.7 billion) and represents a productive exploitation of a country's water resource as a supplier to satisfy needs of another country under what is expected to be a mutually beneficial demand/supply equation.

Sector Work: Studies and Country Strategies

Only three sector studies were completed in FY91; two water supply and sanitation sector studies undertaken in Africa by the Sahelian Department (AF5IN) and an excellent and sorely needed Infrastructure Strategy Paper for Brazil. With these exceptions, only sporadic sector studies efforts associated with project preparation have been made, although there will be additional studies in FY92. As indicated above, this state of affairs hinders our capability to establish Bank-Country dialogues that would lead to a better identification of sector issues and agreed-upon proposals for action plans and investment strategy as well as institutional reform.

The studies that were done, however, address important issues with implications for future Bank/Country investment strategy:

- Water resource studies (evaluation and management) in

Table 3 Bank Lending, FY91 (in US\$ millions)

SECTOR	IBRD	IDA	TOTAL	% BANK
Agriculture & Rural Development	1913.1	1794.2	3707.3	16.3%
Development Finance Co	1695.0	156.8	1851.8	8.2%
Education	1515.5	736.2	2251.7	9.9%
Energy - Oil, Gas & Coal	1570.0	160.2	1730.2	7.6%
Energy - Power	1189.0	155.0	1344.0	5.9%
Industry	1767.1	215.9	1983.0	8.7%
Nonproject	1940.0	881.9	2821.9	12.4%
Population, Health & Nutrition	657.0	920.6	1567.6	6.9%
Public Sector Management	636.0	5.7	641.7	2.8%
Small Scale Industry	166.0	45.0	211.0	0.9%
Technical Assistance	284.5	82.2	366.7	1.6%
Telecommunications	270	69.8	339.8	1.5%
Transportation	915.9	472.1	1388.0	6.1%
Urbanization	1177.1	178.3	1355.4	6.0%
Water Supply & Sewerage	706.0	419.4	1125.4	5.0%
BANK WIDE TOTALS	16392.2	6293.3	22685.5	100%

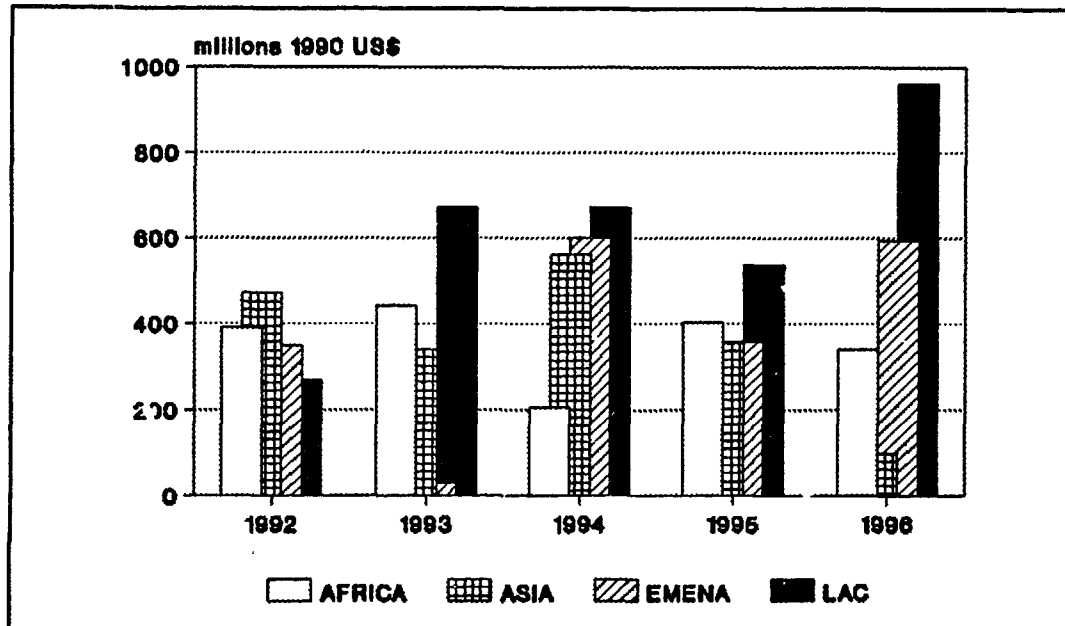
the two Sahelian countries (Chad and Burkino Faso) and a proposed strategy paper for Algeria seek to improve and optimize the allocation of scarce resources;

The Brazil strategy paper recommends a framework for sectoral reform and policy change emphasizing "market friendly" interventions and more effective use of investments by rehabilitating systems, using the finan-

cial intermediation of commercial Banks and targeting scarce grant resources to serve the poor.

Institutional weaknesses were identified, such as poor staff technical capabilities, dispersed sector responsibilities, and lack of definition of national policies and objectives. The reports recommend improving implementation strategies to mobilize resources and rehabili-

Figure 3 Proposed Sector Lending, FY92-96



tate services, sector planning, operations management and financial capabilities. The Brazilian report is noteworthy for developing a framework for sectoral institutional interventions in the sector.

Staff Allocations

Staffweeks allocated to the sector increased by 30% to 3175 staffweeks, the highest amount ever, representing an accelerating pace in project preparation and a conservative increase in project supervision and sector work. The annual average for FY86-90 is 2440 staffweeks (Table 6).

Lending activities increased in ASIA and EMENA far above their averages while LAC and AFRICA remained within usual figures. Overall staff time devoted to project identification, preparation and appraisal substantially increased to more than 1750 staffweeks in FY91; a 58% increase over the average for the previous five years and the largest figure in Bank history. New areas opening to external financial assistance in eastern Europe and expected requests from heavily populated nations in Asia have caused these regions to devote more staff to WSS operations.

Thirty years of Bank lending experience in the WSS sector demonstrates that, for both sector-wide and individual projects, appraisal should take place only when substantial components have sound final engineering and have agreed-upon and enforceable cost recovery policies.

This is not uniformly practiced. The additional time spent in project preparation could save essential Bank resources (supervision time) and borrower outlays (costly revisions and financial difficulties) during implementation. Excellent examples of satisfactory implementation are ongoing projects in Korea (Juaan Regional Water Supply) and Mali (Rural Water Supply).

Supervision intensity per project (Table 7) was augmented in all regions compared to FY89-90 figures, which brings this activity back to normal inputs and reverses the decreasing trends pointed out in our FY90 report. The OED's 1990 Annual Review concludes for the Bank WSS sector that "the Bank tailors its limited supervision efforts according to pressing needs, providing less supervision time for well-prepared, high-quality projects and as much as needed for troubled projects. At issue is whether these troubled projects would substantially improve implementation and more fully reach objectives with more intensive Bank's supervision. (See Figure 4 for regional allocations of staff to supervision). Borrowers respond positively since they relate project implementation improvement to higher Bank supervision inputs.

Regional Approach to Sector Issues

As indicated above, lending amounts and staff allocations to lending in FY91 have surpassed any previous year's figures in the water supply and sanitation sector. Not surprisingly, the concentration on lending has elicited a strong project pipeline and lending prospects have reached

Table 4 Proposed Bank Sector Lending Program, FY92-96

Year	Region	No. of Projects	IBRD	IDA	Total	Proj Costs
FY92	Africa	4	110.0	180.2	290.2	2942.3
	Asia	4	40.0	366.0	406.0	940.0
	EMENA	5	600.0	0.0	600.0	1354.3
	LAC	2	250.0	0.0	250.0	725.0
	TOTAL	15	1000	546.2	1546.2	5961.6
FY93	Africa	10	30.0	292.5	322.5	404.3
	Asia	7	170.0	320.0	490.09	1352.5
	EMENA	7	595.0	24.3	619.3	1212.5
	LAC	4	520.0	0.0	520.0	1465.0
	TOTAL	28	1315.0	636.8	1951.8	4434.3
FY94	Africa	5	125.0	142.5	267.5	299.0
	Asia	6	200.0	265.0	465.0	708.0
	EMENA	5	550.0	0.0	550.0	550.0
	LAC	4	668.0	0.0	668.0	925.0
	TOTAL	20	1543.0	407.5	1950.5	2482.0
FY95	Africa	7	140.0	264.1	404.1	624.9
	Asia	5	135.0	220.0	355.0	465.0
	EMENA	4	350.0	9.1	359.1	921.3
	LAC	7	517.7	18.5	536.2	1078.5
	TOTAL	23	1142.7	511.7	1654.4	3089.7
FY96	Africa	4	280.0	60.0	340.0	370.0
	Asia	1	0.0	100.0	100.0	200.0
	EMENA	6	595.0	0.0	595.0	936.0
	LAC	7	960.0	0.0	960.0	1460.0
	TOTAL	18	1835.0	160.0	1995.0	2966.0
FY 92-96	Grand Total	104	6835.7	2262.2	9097.9	18933.6

Table 5 Proposed Bank-Financed Rural Water Supply and Sanitation Projects, FY91-95

	Fiscal Year	Country	Name	Status	Loan Total \$ Mil	Proj Cost \$ Mil	Project Officer
1	1991	India	Maharashtra Rural WSS	Under Implementation	109.9	140.7	Schaengold
2		Pakistan	Rural Water ¹	Under Implementation	137	194.2	Read
3	1992	Burundi	Water Supply Sector ²	Under Preparation	30.2	55.3	Dreau/Grimes
4		China	Rural WSS	Under Preparation	110	190	Cheng
5	1993	Bangladesh	Chittagong Water ¹	Under Preparation	40	52.5	Kamkwala
6		Ghana	Rural Water	Under Preparation	35	35	Roach
7		India	Karnataka WS	Under Preparation	80	100	Schaengold
8		Rwanda	Water supply III ¹	Reserve	37.5	37.5	Wilôt
9		Srilanka	Rural Water Supply ¹	Under Preparation	20	20	Plant
10		Tunisia	Water Resource Management	In lending Program	130	300	Velderman
11	1994	Guinea	Water III ¹	Reserve	30	50	Verspyck/BAS
12		Lesotho	Infra Maint ²	In lending Program	25	25	Zeijlon
13		Madagascar	Water Sector ²	In lending Program	53	55	Dreau
14		Nigeria	Rural Water ¹	In lending Program	125	125	Rasmusson
15		Romania	Rural Infrastructure	In lending Program		100	
16	1995	Algeria	Water Sup III ¹	In lending Program	150	700	Ben Slimane
17		Cameroon	Rural WSS	In lending Program	40	52	Ah-Sue
18		Kenya	Rural Water ₁	In lending Program	50	50	Almassy
19		India	Rural Water III	In lending Program	100	210	Kleiner
20		Paraguay	Water Supply ¹	In lending Program	12.7	24.5	Chang
21		Yemen	Rural Infrastructure	In lending Program	9.1	21.3	Banerjee

¹ Includes sanitation component

² Includes water supply and sanitation

Table 6 Total Staffweeks on Lending, Supervision and Sector Work, FY85-91

Lending

	85	86	87	88	89	90	91
AFRICA	357	506	434	392	351	200	364
ASIA	386	211	120	176	341	393	714
EMENA	241	293	334	254	207	150	376
LAC	327	261	243	237	303	239	297
TOTAL	1312	1270	1131	1058	1202	982	1751

Supervision

	85	86	87	88	89	90	91
AFRICA	308	314	331	314	268	301	286
ASIA	262	316	368	296	266	293	351
EMENA	250	234	213	239	234	215	259
LAC	245	283	355	281	206	274	298
TOTAL	1065	1151	1267	1129	904	1083	1194

Sector

	85	86	87	88	89	90	91
AFRICA	49	40	47	49	28	79	136
ASIA	12	3	15	189	27	58	21
EMENA	15	18	24	104	5	46	76
LAC	32	31	49	64	11	10	-
TOTAL	106	92	135	405	72	193	233

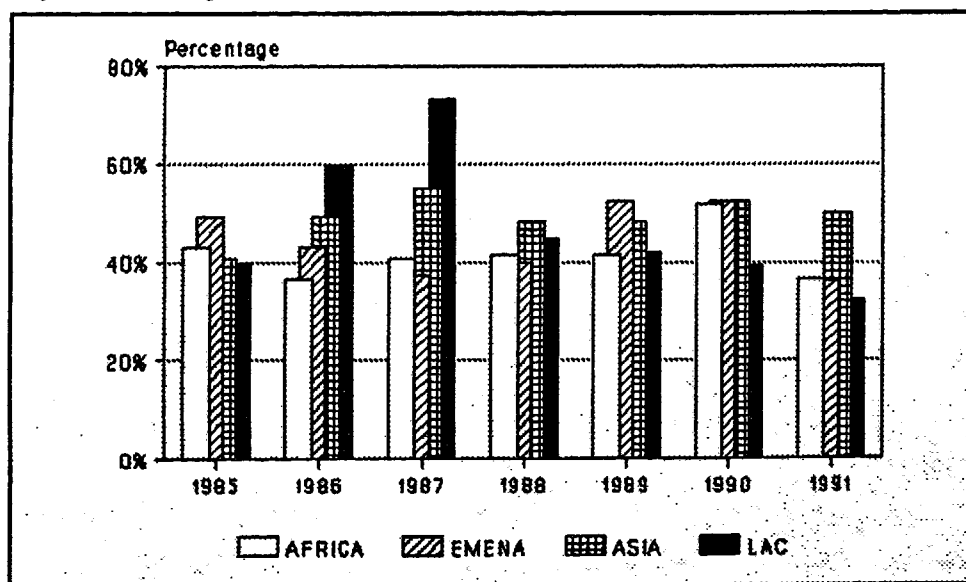
Total

	85	86	87	88	89	90	91
AFRICA	714	860	812	755	647	580	786
ASIA	660	530	503	661	634	744	1086
EMENA	506	550	571	597	496	411	711
LAC	604	575	648	582	520	587	595
TOTAL	2484	2515	2534	2595	2247	2322	3178

Table 7 Average Number of Staffweeks on Supervision (per project)

	85	86	87	88	89	90	91
AFRICA	9.0	10.9	11.4	12.9	8.6	8.6	8.9
ASIA	11.4	11.7	12.1	12.6	8.3	9.1	11.7
EMENA	8.2	7.1	8.1	8.8	8.7	9.0	11.7
LAC	9.7	11.2	13.4	13.8	7.9	8.0	11.9
AVERAGE	9.4	10.2	11.3	11.9	8.4	8.7	11.1

Figure 4 Supervision as a Share of Total Regional Staffweeks



record levels in both urban and rural areas. However, achieving increased productivity, efficiency, and effective provision of services to the public requires more than a strong project pipeline. Getting all of this right is a very complicated activity; partly because of sector characteristics (such as the public goods aspect of water and sanitation in preserving life and health, the more nearly private good aspect of the sector in promoting development, the complex technology necessary to achieve a reliable product, substantial economies of scale in investment, and relatively high capital and operating costs); and partly because of the inertia of past policies and legal, regulatory, and administrative control structures and practices.

Nevertheless, the regions, PRE and OED are aware

of the main issues in the sector and joint efforts are being undertaken to improve the response to these challenges.

- Achieve institutional changes to reinforce “market friendly” approaches that may help turn relatively ineffective supply organizations into dynamic enterprises, providing the community with reliable services of water supply, sewerage/sanitation, and water pollution abatement/control. More has to be done to determine needed reforms in “the rules of the game” and to encourage “demand responsiveness.”
- Address water availability and increasing costs of water to satisfy basic needs in urban communities. The challenge is to overcome haphazard water resource manage-

ment and lack of water conservation technology and practices in the agriculture, industry, and water supply sectors.

- Respond effectively to rapid urban population growth, which creates serious management problems as well as large increases in service demand.
- Improve economic and financial performance of sector institutions.

Regional actions to deal with these issues are summarized below:

Water Resources and Environmental Impacts.

- While the marginal costs of alternate water sources keep increasing in urban areas, Bank projects are dealing superficially with water resource issues even though references to the subject are made in most projects. In Nepal the measures proposed to deal with resource scarcity are not reassuring, although a program to reduce water losses in the system is included. However, the Pakistan rural WSS project includes a proposal for a comprehensive water resource study in the project area.
- Environmental impact is analyzed in almost all projects, and constitutes one of the high points in FY91 (for example, the Pakistan rural project proposes qualitative and quantitative analysis and ongoing monitoring of environmental impact). However, continuing attention to the impact of sewerage discharges on receiving waters is required. In most cases this will require more continuous monitoring of water quality and uses made of water near outfalls than has been normally the case.

Economic Analysis and Financial Sustainability.

- Demand estimates continue to be overly optimistic and are likely to jeopardize the financial feasibility of the water utilities in many cases.
- Co-financing for this year's projects has been very low, only 6% of projects cost. Other external financing in FY's 89 and 90 reached about 25% of project costs. In FY91, the Argentina sector operation and the Bolivia major cities project have the only significant co-financing of US\$100 million (40% of total cost) and US\$8.0 million (15% of total cost) respectively. Future prospects seem to indicate this decline may be episodic; rather than a trend.
- Expected internal cash generation financing (ICG) continue to slump. ICG has declined since FY88 (34%)

through FY89 (22%) and FY90 (18%) to reach an alarmingly low 10% this year. Operations in Asia and Africa are void of supply institution contributions, while in LAC, ICG is expected at about 17% of projects cost. Local and central government nonreimbursable financing has consequently climbed to a five-year high of 26% of investments. An exception is the Valparaiso, Chile water supply and sewerage project with no government financing and a 67% ICG contribution.

- Capital cost recovery is not expected in the Pakistan and India rural water and sanitation projects, and only partially expected in China and Nepal. Operations in Argentina, Nigeria and Mexico have a high cost recovery risk. Despite Bank urging of full cost recovery in the sector "compliance with financial covenants, especially those concerning tariff increases are not taken to be important by many borrowers," as stated in the OED 1990 WSS Draft Annual Review. The Bank should not relax cost recovery policies in the sector to go case-by-case, as seems to be the trend. Rather a "comprehensive framework for analyzing financial issues beyond the current project-oriented approach" (FY90 Annual WSS Review recommendation) should be pursued, in conjunction with other needed institutional changes.

Institutional Strengthening.

- On the organizational management side, most projects emphasize the need for systems rehabilitation, a trend expected to continue in future projects. Poor operations management in the past will require "frequent rehabilitation to be undertaken to a higher standard" to improve distribution network sustainability, as indicated in OED's draft 1990 Annual Review. Operation and maintenance issues are generally being better addressed and proper operations management procedures are being set as sub-project selection criteria in all the urban sector-wide projects. To ensure sustainability in the two rural projects (Pakistan and India) community involvement in systems maintenance and operators training courses will be included. However, the action plans proposed to overcome serious operation and maintenance shortcomings identified in Nepal, Bolivia and Nigeria will need an intense Bank supervision to reach success. Unaccounted-for water is recognized as a serious problem and its reduction held to be an urgent activity in the seven urban projects. Unfortunately the proposed plans are sketchy and specific measures to reduce it will be designed and implemented only during project execution, rather than before. This strategy has proved to be unsuccessful.
- Training, an important component in improving organizational capability, is given particular importance and is

efficiently dealt with in the operations approved in FY91. From training needs assessment within sector-wide approaches to human resources improvement in rural areas, the projects approved seem to address properly the institutional quest for improved staff capabilities. In the sector project proposed for Mexico the preparation of staff to deliver in accordance to sector organization expectations has been institutionalized and the training programs organized in accordance with requirements. Similar comments could be made of the other urban and rural projects with the exception of Nigeria, where this component seems to be in an early preparation stage.

Technology Choice. Unfortunately selection of the most applicable technologies and imaginative low-cost designs is not a strong point in the projects approved in FY91. The discussion of technological issues is superficial in general and hasty in almost all projects. The technological aspects of water conservation, leading to better use of scarce and costly water, are practically ignored in all projects. The recommendation in last year's review to "reduce waste of water and promote conservation" has not yet been effectively translated into project designs.

Large sector operations, such as those financed in the past in Morocco, Tunisia or Brazil and presently in Argentina, Nigeria and Mexico, failed to provide specific guidelines to analyze technological options and select least cost (capital and operation) alternatives. Although in the majority of the cases an upper cost per-capita limit is used as cutoff criteria, the technologies selected might not be fit to the borrowers' operation capabilities or have a cost affordable to users. In the absence of local technical capability, consultants hired might choose technologies from alternatives that are not necessarily unsatisfactory but expensive, inappropriate and highly sophisticated. It is the role of Bank engineers to challenge these practices to the benefit of the borrower and the ultimate beneficiaries.

Selection of feasible technological options gets more complex in inverse proportion to the income level of beneficiaries, if service subsidization is to be minimized. Although willingness to pay for water and sanitation services of low income population may not be low (water from vendors and individual sanitation are expensive), capital and operating costs may not be affordable with conventional designs. Bank staff should be better prepared to discuss the use of satisfactory intermediate technologies as alternatives to conventional procedures. This will require additional training for Bank staff.

Even the selection of low-cost alternatives to serve the urban and rural poor might present serious difficulties.

In a willingness-to-pay analysis in a given area (such as several studies made in Africa by INU), different community groups may indicate preference for varied service levels which require also different technological approaches. In the case of water services some groups would prefer lower consumption levels or standposts, while others show a willingness to pay for yard tap connections. Some would prefer to pay for individual latrines against public options or intermediate sewers. The technological problem is to consolidate user demands into well conceived designs, taking into account their variable preferences.

Basic technology has not changed much in recent years. However, progress in electronics, biological and physico-chemical phenomena applied to water and sewage treatment is coupled to a continuous research to improve water quality and protect water resources demanded by more stringent world wide potable water standards. For example, scientists have recently developed faster and less costly alternatives to reverse osmosis in reducing dissolved solids content in water by using tangential microfiltration, precise low cost liquids macro-metering devices employ convenient new electronic devices, and upward anaerobic sludge blanket processes are available to reduce treated sewage eutrophication potential. It is imperative that Bank staff acquire knowledge about these advances to achieve purer and healthier water services and cleaner surrounding environment by promoting the use of "the best applicable technology."

In September 1988, the late Dr. Abel Wolman addressed the participants of the XXI Congress of the Interamerican Association of Sanitary Engineers and Environmental Sciences in Rio de Janeiro, Brazil. His paper, "A Revolution by Year 2000," gathered lessons from the past to send a message for the future that is illuminating:

If you need a symbol of what I am saying, it is available in the decisions immediately after World War II. The amount of money loaned by the World Bank was less than 500,000 U.S. dollars. Under pressure on the Bank by many of us, this figure has risen to billions of dollars, matched by local agencies by similar millions. The experience has much of which to be proud. Why then does one raise today concerns about our status and objectives in the next decade? For some years it has been clear that engineers have been losing caste as prime leaders to persons with disciplines in management and business administration. The arena for environmental activity has grown in astonishing depth, variety and importance. Water, wastes, toxics, land, forests, air, haz-

ardous dumps, greenhouse effects appear on the stage. They demand action at the same time we struggle with the unfinished demands of the Decade 1980 to 1990.”

This is a challenge that should be taken up by Bank engineers and others working in the sector.

Poverty Impact. Virtually all water supply and sanitation projects contribute to some degree to improve the life of the poor. Clean water and sanitary human waste disposal facilities, if properly used, can create positive

personal changes and support a healthier existence. Projects approved in FY91 have sought to benefit the poor under different and, in some cases, innovative approaches. Special attention is being given in several projects, particularly the rural projects, to enhancement of women’s roles in the sector; since women tend to be disproportionately affected by poor services and have been shown to make significant contributions to improvement when actively involved. Overall, in the seven of the nine FY91 projects which contain poverty impact analysis, it is estimated that the \$775 million investment will benefit about 19 million urban and rural poor.