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WATER SUPPLY AND SANITATION SECTOR STRATEGY REVIEW

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SANITATION (IRC)

ASIAN DEVELOPMENT BANK

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ABBREVIATIONS

AfDF	African Development Bank Fund
ADF	Asian Development Bank Fund
CWS	Community water supply
DAC	Development Assistance Committee of the OECD
DMC	Developing member country
ECOSOC	UN Organization for Economic Cooperation and Development
ESA	External support agency
IDB	Inter-American Development Bank
IDWSSD	International Drinking Water Supply and Sanitation Decade, 1981-1990
IRD	Integrated rural development
World Bank/IDA	World Bank/International Development Agency
LDC	Least-developed country
MC	Marginal cost
NGO	Non-governmental organization
NRW	Non-revenue water
ODA	Official development assistance
O & M	Operation and maintenance
OECD	Organization for Economic Cooperation and Development
PC	Private connection
PCR	Project completion report
PFAR	Project performance audit report
ROR	Rate of return
SP	Standpipe
UNICEF	United Nations Children's Fund
UNDP	United Nations Development Programme
WHO	World Health Organization
WS	Water supply
WSS	Water supply and sanitation

TECHNICAL TERMS

cu m	-	cubic meter
cu m/day	-	cubic meters per day
ha	-	hectare
hp	-	horsepower
hr	-	hour
km	-	kilometer
kW	-	kilowatt
lpcd	-	liters per capita per day
l/sec	-	liters per second; 1 cu m/day = 0.0116 l/sec
mg/l	-	milligrams per liter
min	-	minute
ml	-	milliliter
mm	-	millimeter
sec	-	second
sq km	-	square kilometer
sq m	-	square meter

NOTES

- (i) In this Paper, "\$" refers to U.S. dollars.
- (ii) For the conversion of national currencies into US dollars, the exchange rates prevailing at the time of preparation of study were applied.

FOREWORD

Until recently, Bank assistance to the water supply and sanitation sector has mainly been to provide financing for projects to expand water supply and sanitation facilities in urban areas. Bank assistance to the sector is now shifting toward a greater emphasis on water supply systems in smaller provincial urban centers and rural areas. Total Bank lending for water supply and sanitation projects so far has amounted to more than \$1.39 billion (or 8 per cent of the Bank's total lending), covering 55 projects in 16 countries. These 55 projects are helping increase water supply capacity to more than 12.6 million cubic meter per day and sewerage capacity by 2.3 million cubic meters per day, benefiting more than 60 million people.

In 1984, the Infrastructure Department undertook a review of its overall program of activities with a view to identifying broad strategies for each of the sectors in which it is involved. Arising from this review, strategy studies covering various sectors, including water supply and sanitation, are being prepared; the purpose of these studies is to review the strategy framework for each sector. This work will be complemented by the development of country-by-country sector strategy reviews, as a part of the Bank's ongoing economic and sector work program.

This study on the water supply and sanitation sector is based on experience gained from ongoing and completed water supply and sanitation projects, on reviews of staff appraisal, supervision and project completion reports, and on audit reports covering water supply and sanitation projects. Various papers, technical material and documents circulated by other international agencies with responsibility for coordinating assistance under the United Nation's International Drinking Water Supply and Sanitation Decade (IDWSSD) have been considered in establishing the Bank's sector lending policies.

The starting point for this study was an assessment of the water and sanitation situation in the Bank's developing member countries (DMCs). This was followed by an assessment of the progress realized and the sector goals and objectives proposed for the coming five to ten years. Starting by establishing the background of problems that have been encountered, and then indicating the opportunities foreseen for the immediate future, this study highlights the characteristics of the water supply and sanitation sector. The study then proceeds to a discussion of some of the principal issues facing both DMCs and the Bank in the work envisaged for the remaining years of the IDWSSD. Each of the issues is examined, and a strategy for dealing with the issues is proposed.

Based on experience and current trends, the Bank's future activities seem likely to be characterized by (i) more balanced development assistance in both urban and rural areas; (ii) preparation of more country sector profiles; (iii) increased sector lending; and (iv) more involvement in environmental aspects.

In financing water supply and sewerage projects, the Bank pays special attention to the financial position of the responsible entity -- entities should be in a position to operate and maintain their systems efficiently and, where practicable, to finance a reasonable portion of future expansion out of internally generated funds. Revenues for these purposes are sought through appropriate tariff levels, but in determining these levels, consumers' ability to pay is a vital factor. Where some beneficiaries cannot afford rate levels, alternative means for achieving financial viability are sought, such as cross-subsidization among consumers.

Although this study draws on Bank experience, it does not necessarily reflect the views of the Bank. The overall conclusions and proposals shown are those of the staff involved in the preparation of the study.

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SUMMARY AND CONCLUSIONS

I. The Water Supply and Sanitation Sector Overview

In most of the Bank's DMCs, substantial progress has been made in recent years in providing water supply services to urban populations. However, some DMCs have not done much more than keep pace with their population increase. In urban sanitation -- provision of sewage and excreta disposal facilities -- services have deteriorated and many cities are facing very serious problems. Some progress has been made in rural water supply, but often such efforts are lagging behind national program goals. According to the World Health Organization, little improvement has been realized in the standard of rural sanitation -- it appears that rural sanitation is of a lower priority than rural water supply. As a part of the current United Nations Water and Sanitation Mid-Decade Review, most countries of the region are presently reviewing and revising their water and sanitation programs.

II. Role of the Bank

Over the twenty years it has been active, the Bank has concentrated most of its sector investment in the urban water and sanitation subsectors. The Bank is supporting projects in the rural subsector through loans to agricultural and rural development projects and through sector loans directed at rural towns and villages. As it has carried out few operations in solid waste management and no projects in air pollution control, it is recommended that the Bank be prepared to finance projects in both fields, though at first support may be more along the lines of technical assistance. It is not expected that air pollution control projects will rank high in national plans, though it is expected that there will be localized problems for which assistance may be requested. Solid waste disposal and air pollution control are areas in which the Bank has in-house competence; this would permit almost immediate responses if requests are received.

III. Principal Issues and Strategy for the Next Five to Ten Years

The common issues identified in project completion and performance audit reports relate to a number of areas: setting of project priorities; the design of technical assistance for institutional development and training; financial performance, pricing policies and financial covenants; water metering and non-revenue water; sector loans and rural projects; maintenance; and sewerage financing.

IV. Project Implementation and Design

The main problem in delay in implementation of projects has been lack of local counterpart funds. Also, there have been delays in assignment of consultants and in approval of tender documents by government offices. Therefore Project preparation should place greater emphasis on the analysis of executing agency institutional arrangements. In addition, operation and maintenance of existing systems should be reviewed and more resources should be devoted to problems that cause high levels of non-revenue water (NRW). Also, suitable detailed engineering design should, if appropriate, be completed prior to appraisal, to define engineering aspects to help ensure project success.

V. Project Strategies

It is proposed that in establishing new schemes, project priorities in general follow a pattern of moving from the largest cities downward, on the reasoning that success in efforts to generate revenue for future project financing will be greatest in the largest cities. From the health standpoint, transmission of communicable diseases and the threat of epidemics is greatest the higher the population density. There continues to be many people in urban areas without benefit of a supply of good water, with no other source than public systems. Maintenance of facilities provided under Bank loans for most sectors faces the same problems of poor performance experienced in the water and sanitation sector. Proposed activities with regard to water metering policies are directed at reducing costs and improving performance; most actions are to be taken by borrowers, but could affect appraisals and project supervision. More effective measures for reducing non-revenue water are discussed, including accurate determination of the amount of water produced; auditing of accounts of the metering and billing departments at periodic intervals; emphasis on the metering of large consumers; converting to a fixed-rate charge for service lines below 3/4 inch (20 mm); greater efforts to prevent vandalism and theft of meters; and the use of private contractors for a number of operations, including meter reading, repair, billing and service connections -- such functions are now performed under contract in a number of countries.

This study notes that the Bank is moving from urban water supply and sanitation project loans to sector loans involving small towns and villages. However, in the past, other agencies have experienced problems with semiurban or rural sector loans. Therefore, among actions proposed is the exploration of a banking facility within countries in which communities secure loans to finance water and sanitation facilities. Concessional arrangements could be reflected in lending terms, should the government so decide. The basic reasoning behind this proposal is that expeditors and project promoters often convince communities of the need for facilities for which consumers later lose interest, after water bills arrive. Initiatives by communities to seek help through some lending arrangement is thought to be one way to identify those communities not really interested.

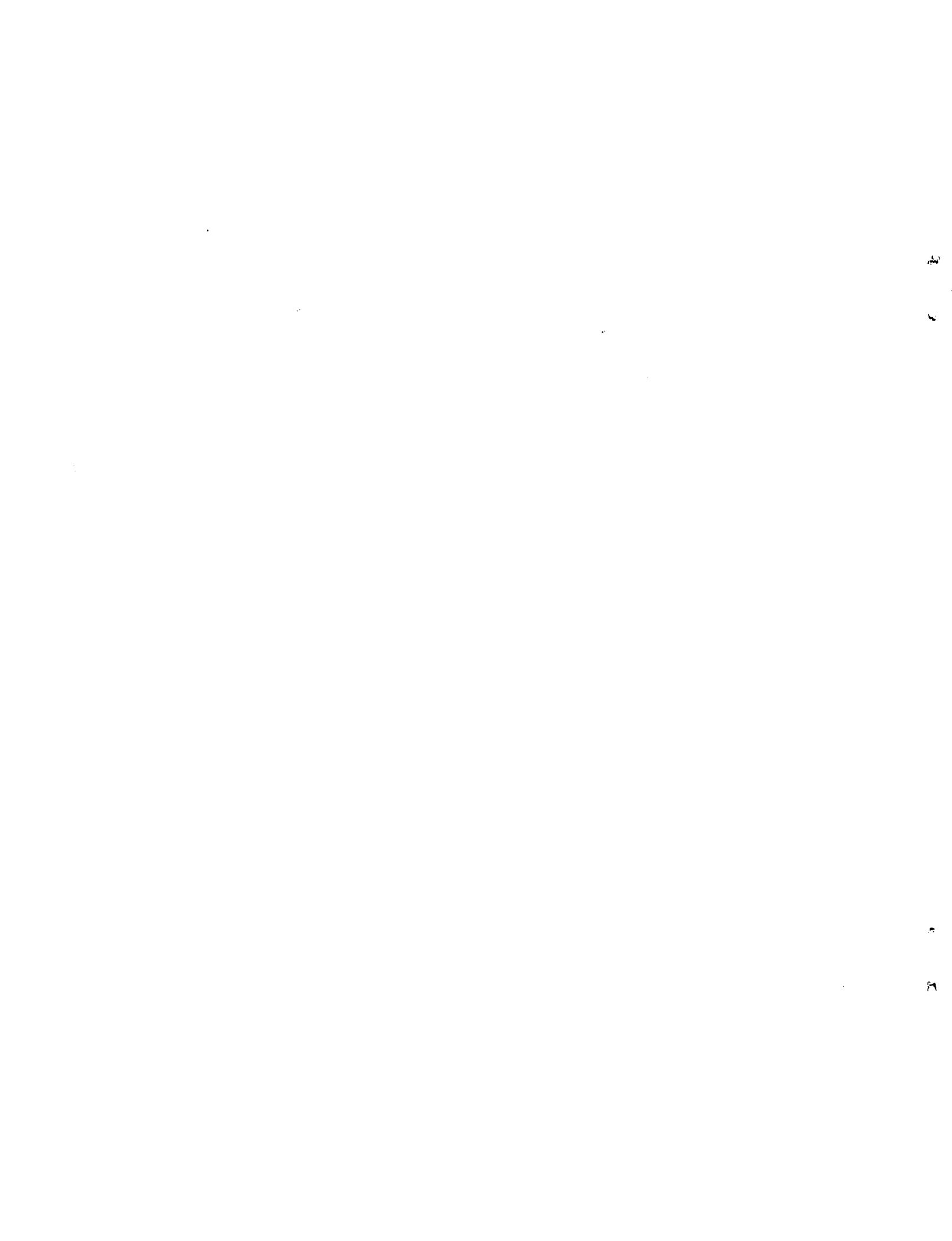
Other issues, such as sewerage financing, types of tariff covenants, country sector profile preparation, and privatization are also discussed; none of those involves any policy change or major shift in approach. The role of the Bank should continue largely as in the past, but with more emphasis on supporting efforts now underway to get donor countries, non-governmental organizations and others to pull in the same direction, following plans of governments rather than plans of their own. For the region, the study reasons that the Bank can be of further assistance, particularly to countries, in assisting them in reaching understanding on their programs and policies and making these known through country sector profile studies.

VI. Institutional Development Strategy

The appraisal of an institution and the approach best suited for upgrading its performance is usually based on recommendations by consultants. However, it is not uncommon that project administrator initiate consultant studies after a loan has been made, to permit payment out of loan funds. This approach should be avoided whenever possible; consultant studies should be completed before appraisal. This would permit the Bank to include covenants and agreements in the loan documents that would require action to be taken that might otherwise involve long delays. In particular, findings that involve legislation are well known at the time of appraisal. Consultant recommendations on staff training and institutional improvements should be studied during appraisal to insure that best approach among several, has been selected.

More attention should be given during project development to the sector organization and to the powers and duties conferred on the organization's management. When powers are limited or when Water Supply and Sewerage Boards become involved in day-to-day operation, changes should be requested by the Bank.

More attention should be given to managers' abilities to delegate and follow up on responsibility. Similarly, this function should be examined at lower levels within the institution.



I. INTRODUCTION

1. The end of 1985 was the midpoint of the United Nations Water Supply and Sanitation Decade, a period for which UN member countries mandated that the situation with regard to water supply and sanitation be reviewed. By March 1985, as a part of the Water Supply and Sanitation Decade, most countries in the Asian region had either established plans for water supply and sanitation, setting targets to be attained by 1990, or were in the process of revising existing plans. The Bank has been lending for the water supply and sanitation sector in this region since 1968 and has gained a broad knowledge of the sector on which to draw; the mid-point of the Water Supply and Sanitation decade is an opportunity to review the experience gained and the circumstances surrounding the more common problems encountered, and consider the direction lending operations in the water supply and sanitation should take over the second five years of the decade.

2. For urban water supply and sanitation, the situation in the next ten years will depend on current planning -- on average, at least ten years pass from the time a government identifies a need until the time when the first benefits of a specific project answering the need can be realized. Water supply and sanitation projects now being put into the pipeline in urban areas -- and to a fair extent in rural areas -- are unlikely to see completion until well into the next decade. This, however, is not necessarily a negative reflection on the Water Supply and Sanitation Decade; decade programs of any sort serve their purpose well even if they do no more than encourage governments to focus on specific problems. Governments' decisions on what should be achieved during a prescribed period can easily be taken and the implementation process can be put in motion. To a considerable degree, this has in fact been the major achievement of the Water Supply and Sanitation Decade.

II. THE WATER SUPPLY AND SANITATION SECTOR

A. Sector Characteristics

3. The term "water supply" has come to be considered simply the provision of a safe and adequate source of water. In the Bank's experience, sources of water supply have ranged from high-pressure piped water systems in urban areas, to covered handpumps in remote rural areas. The term "sanitation" has been adopted worldwide in recent years to cover the general subsector of human waste disposal, ranging from piped sewer systems, to simple latrines meeting basic health requirements. In its broader scope, sanitation means proper use of facilities, including basics such as hand washing and personal cleanliness.

4. The water supply and sanitation sector comprises a number of separate but related elements commonly broken down according to the areas served, such as urban or rural; to type of ownership, whether public or private; and to characteristics of the waste involved, for example, liquid or solid, or domestic or industrial. Storm sewers and urban drainage are normally included as part of urban sewerage and it is usual that solid waste disposal and water and air pollution control activities be included within the sanitation sector .

5. There are sufficient differences among subsector characteristics such that the application of uniform policies covering such important areas as cost recovery, organization and management, training, and technology is almost impossible. Differences between countries in the region as well as within the internal regions of most countries further underline the difficulties of generalizing with regard to solutions and applications.

6. The Bank's experience in the urban water supply and sanitation subsector is extensive, and greater experience in rural water supply and sanitation is being gained through involvement in sector loans and water supply and sanitation components attached to irrigation and rural development projects (for details see Appendix 1, Role of the Bank in the Sector). More experience in urban sanitation is being gained through implementation of drainage components included in some urban development projects. Other elements of the water supply and sanitation sector, including solid waste disposal and air and water pollution control, have been perceived by most government as being of a somewhat lower priority, though it is likely that as problems in certain parts of some countries arise, governments will seek assistance from the Bank.

7. Based on the experience gained by the Bank in the water supply and sanitation sector, as described in project completion reports and project performance audit reports, and considering recent reports of the UN Economic and Social Council (ECOSOC) and World Health Organization (WHO) (which note the experience of other agencies and development banks involved in the sector), a broad picture of the successes and failures, the problems and approaches, and the efforts exerted to date to assist countries in meeting water supply and sanitation needs emerges.

8. The purpose of this study is to examine information available and evaluate that which appears relevant to the Bank's operations, and to suggest an appropriate general course of action for lending in the sector. For the most part, attention is focused on urban and rural water supply and sewerage and excreta disposal, but remarks on approaches to certain other elements, such as solid waste disposal and air and water pollution control, are included.

B. Background

9. An examination of the progress made in the region in serving urban and rural populations with water and sanitation over the period from 1973-1983 shows a mixed picture, with limited to substantial progress noticeable in some countries, but slowly worsening conditions evident in others (for details see Appendix 2, Asia Regional Mobilization Profile). For rural water supply, some countries show substantial progress, but progress in most countries falls below the levels set in respective decade plans. For the sanitation subsector (sewage and excreta disposal), the situation, with few exceptions, continues to deteriorate, with the most critical situations existing in the fringes and the central slums of densely populated urban areas.

10. A number of reasons as to why so few countries are on schedule have been offered: the goals set by countries for providing their populations with adequate supplies of water and satisfactory levels of sanitation are often too high and in many cases were adopted without a full appreciation of the costs involved; a shortage of manpower has led to the inability of governments to take on new projects, even though financing may be available; shortages of local currency to complement external loans, along with contractual and other problems, have caused many delays that have led to cost overruns, with original estimates proving seriously low; the energy crisis occurred just as programs were getting under way, with the result that government budgets had to be adjusted to absorb the impact, the general effect of this being reductions in the amounts previously committed under the decade program to water supply and sanitation. Such is the broad situation as the countries approach the mid-decade review.

11. Appendix 3 presents data relating to both urban and rural populations and the numbers of persons served by water and sanitation facilities in the countries of the region. Also shown are projections of the populations and the number of persons expected to be served in 1990, in rural and urban areas, based on the most recent information relating to national goals set by the respective governments. Though the information in the appendix with regard to costs is obviously subject to significant error, these estimates reflect at least the magnitude of the funding required.

12. The major conclusion to be drawn from water supply and sanitation statistical data is that countries have undertaken -- and are still pursuing -- major efforts to keep pace with increasing populations; and that in a number of countries, substantial progress in both urban and rural water supply is being realized. However, the data also indicate that little or no headway is being made in satisfying rural and urban sanitation needs.

C. Past Performance

13. Reviews of Bank project performance audit reports (PPARs) covering water supply and sanitation loans for projects completed through 1983, and World Bank audit reports of similar types dating as far back as 1962, reflect nearly the same patterns of successes and problems. Principal problems relate to delays in completion, cost overruns, failures to meet financial covenants, procurement difficulties, management problems, and high levels of non-revenue water. Inadequate emphasis on institutional development and training has been a common shortcoming, as has been inaccurate population and water demand projections.

14. A review of Bank appraisal reports and project completion reports suggests that in a few instances, alternative technical solutions have not been explored as thoroughly as might have been warranted, and that in-depth studies of institutional problems and the training aspect of projects have received less attention than their importance would suggest. Most problems relating to these areas were referred to consultants undertaking studies financed under loans.

15. PPARs show that despite the problems noted in the water supply and sanitation sector over 14 years covered by the audits, in comparison with the performances in other sectors, the water supply and sanitation sector has done better. It should give the Bank some satisfaction that in a sector that so directly touches the lives and well-being of the people and that is so highly sensitive to political reaction, a better-than-average record of performance has been achieved. Rarely mentioned in reports but well documented in professional publications is the continuous pressure the Bank exerts with regard to financial performance and managerial improvement, in the administration of loan covenants as well as in the advice and encouragement given by staff during project supervision. Such pressure serves as a stimulating force that local authorities need and on which many higher government officials rely.

16. The Bank's broad approach to lending for the sector over the period covered by project completion reports and PPARs has, almost without exception, been conservative. The need to effect improvement in those areas that notably affect project performance as well as the departure from the conservative approach occasioned by a shift toward sector lending underlie the following examination of the specific issues that relate to the sector.

D. Sector Overview

17. It is unfortunate that the terms "urban" and "rural" must be used to define the areas in which water supply and sanitation activities are undertaken. Starting with the largest cities, population agglomerations decline in size, through outlying major cities, to provincial capitals, secondary centers, medium-sized and small cities, towns, villages, communities and districts, to dispersed and isolated family settlements. Somewhere within this continuum, each government establishes criteria defining what is urban and what is rural.

18. While the size of the overall agglomeration usually defines the broad design of facilities best suited to serve specific needs, those needs can never be fully satisfied, because within each group are subgroups of differing economic status, such as central slums, fringe-area populations, industrial areas, and hospitals, with each subgroup having its own problems and needs. In any discussion of issues and proposed solutions, departures from fixed definitions must be accepted. This can be seen clearly in the Bank's sector loans, which for most countries cover communities at the level of communities larger than settlements associated with the word "rural."

19. Another characteristic of the water supply and sanitation sector that complicates the activities of both government and external agencies is the number of government agencies involved in sector activities. Various water supply and sanitation responsibilities are assigned to agencies covering such diverse areas as agriculture, health, public works, interior, environment, tourism, water resources and finance. Further complications result from the several layers of government and consequent responsibilities that frequently overlap -- for example, national water and sewage agencies often have local operational responsibilities that conflict with the responsibilities of city councils and provincial and district governments. Moreover, rural water supply and sanitation programs are sometimes operated by health ministries, but in other situations can be assigned to agriculture or interior ministries, each following separate policies, though frequently serving adjacent or overlapping areas.

E. Project Implementation and Design

20. The main problems in delay in implementation of projects have been: (i) lack of local budget; (ii) delay in assignment of consultants; and (iii) delay in approval of tender documents by government offices. Therefore, for the design of water supply and sanitation projects, there is a need to provide further assistance to water supply organizations, especially in institutional development and in improving financial self-sufficiency, operational practices and staff training. Projects should be designed to have an appropriate mix of hardware and software components that will enable improvement of collection procedures, reduction of non-revenue water (NRW), reform of tariffs and implementation of overall cost recovery policies.

21. In the water supply and sanitation sector, financial problems persist in part because governments have been reluctant to adjust tariffs; this had led to deterioration in the operation and maintenance of water supply and sanitation systems. Poor financial management along with staffing constraints, especially among technical and middle management staff, have further aggravated operational inefficiency and mismanagement of sectorial institutions.

22. Present water supply and sanitation projects are mainly designed to provide adequate and safe water supply and sanitation facilities in growing centers. These capital intensive components should be supplemented with NRW programs and tariff reforms, to assist water and sanitation utilities in becoming financially self-supporting. Additional technical assistance programs when appropriate, should assist in improving financial and water management and operation and maintenance, through the development of the sector institutional and policy framework and guided supportive training.

23. A total of 15 project performance audit reports (PPARs) covering 16 projects in the sector have been prepared. The early projects represent a base from which recommendations with regard to better implementation of new projects have been formulated. Follow-up actions on findings and recommendations of PPARs have been satisfactory.

24. The following general lessons were learned from earlier water supply and sanitation projects: (i) institutional aspects of projects must be planned just as carefully as physical developments; (ii) more emphasis should be placed on the operation and maintenance of existing systems, in particular, more resources should be devoted to problems that cause high levels of NRW, i.e., existing water supply systems should first be examined with a view to upgrading systems prior to any attempts are made to extend them; and (iii) more project preparation should be done prior to Board presentation -- specifically, advanced engineering designs should, if appropriate, be prepared before appraisal in order to define engineering aspects.

III. WATER SUPPLY AND SANITATION SECTOR ISSUES

25. Project appraisal reports, along with project completion reports (PCRs) and project performance audit reports (PPARs), present lists of recommendations and finding that serve as the basis for discussion of issues. Some of the approaches proposed for the handling of certain issues will likely affect Bank policy, while others will require only a change in emphasis or some additional effort; in view of the generally favorable results obtained from past project lending in the sector, however, changes are proposed only when real justification exists.

A. Institutional and Manpower Development Issues

26. Efforts to assist borrowers in introducing institutional arrangements that might lead to better management and financial performance have been disappointing, irrespective of whether such arrangements were initiated locally or whether they were a part of the assistance provided by multilateral or bilateral agencies or foreign or local consultants. A study of Bank PPARs shows that the Bank's experiences are similar to those of the World Bank and other organizations active in the sector.

27. The major issue that appears relates to what can and should be done to insure greater effectiveness in the Bank's approach to institutional development. At the same time, the Bank's manpower development efforts must be strengthened. How these two issues are to be approached creates a new problem, in that while institution building and manpower development are themselves separate, in practice the two areas are interrelated. The two areas must, therefore, be discussed as a single issue, although mechanisms for the implementation of action and technical assistance will differ.

28. Institutional issues relating to both urban and rural water supply and sanitation projects will differ greatly in every country, but in general, difficulties tend to multiply as project lending moves down the scale to smaller communities. The basic approach taken in assisting governments in their efforts to improve the management of urban water utility operations has included consultant studies, followed by special attention to upgrading those departments or operations identified in the consultant studies as weak on needing improvement. Training is often designed for the personnel involved, and is usually funded out of project loans. Departures from this formula are not proposed, even though results generally fall below expectations.

29. Some training experts in the water supply subsector believe that the establishment of a permanent training facility should be part of any training strategy. A substantial cost is attached to such a facility, and the questions that must be answered before taking a decision with regard to training are whether such a facility would be properly used and whether staff would receive an adequate return for their improving their capabilities.

30. One of the key elements of the development process is motivation. For large urban water supply systems, continued pressure from the public motivates the provision and improvement of services for which there are usually no alternatives. In rural areas, such public pressure is usually less, as alternative water supply sources are generally available, although experience shows that there is true need and demand for additional water supply during dry periods.

31. Improvement of institutional performance depends to a large degree on the staffing of a particular organization -- a poor organizational framework can be made to function if there are strong individuals in key positions, while the best organizational structures will fail if staffed with weak personnel. Much of the effort in improving performance must therefore focus on improving staff.

32. A problem encountered by many water supply and sanitation organizations is that salaries are tied to inadequate civil service scales or are otherwise limited to an extent that precludes both the recruitment and retention of good staff. There are many who oppose unbalancing local wage policies and undercutting civil service scales by raising salaries in a particular sector, arguing that if wages are permitted to increase for one sector in order to encourage better performance, every sector will demand the same concession. However valid this argument may be, for those public utility enterprises that produce revenues, maximization of revenues cannot be achieved unless appropriate, well-administered management systems are in place. This has been accomplished in urban systems by transforming governmental departments into semi-autonomous boards, though this approach is less suited to rural operations.

33. Training activities within any organization will be taken seriously by staff when promotions and salary increases are tied to professional development and improvement; training programs, both on-the-job and formal, are part of this process. Bank staff engaged in project development and supervision should place particular emphasis on this aspect of institution building.

34. In the rural subsector, institutional issues must be identified as relating to the national or upper-level unit responsible for certain services to local communities, or to the local community itself. Adequate performance at each of these levels is critical to successful sector progress, yet each level usually has inadequate manpower and physical resources, and staff have little understanding of how to proceed.

35. It appears from appraisal reports for sector projects that consultants are called upon to design, construct, train, and help operate community facilities in the first couple of years, after which time a surveillance system goes into place, to ensure that communities properly maintain the systems constructed. However, there does not appear to be sufficient reason to believe that this approach to water supply and sanitation projects for rural communities, which is also

contained in most current handbooks, will overcome the great difficulties of the kind encountered in past projects for which the community participation approach was employed. Another framework is required.

36. A proposal that deserves exploration is one requiring community access to a national rural bank, from which funds could be borrowed at whatever concessionary rates the government might set. Non-governmental organizations (NGOs) might be used as supplemental sources of technical assistance, and other mechanisms for delivering assistance should be identified. The advantage of this system is that the initiative for constructing facilities would come from the community, not from outside, and the fact that the programs would likely develop slowly would permit responsible central agencies to identify and adjust the details of training and other aspects. Whether donors, banks and countries would be willing to accept such a slowly progressing process is an issue that could arise subsequently.

37. Institutional and manpower issues stem from organizational structure, motivation, community attitudes and pressures, and the quality of staff and training. All must be considered when endeavoring to improve performance.

B. Urban and Rural Sector Issues

38. Among the issues the urban and rural water supply and sanitation sector is facing are those of financial policy and performance and project selection.

1. Financial Policy

39. Programs currently planned for the water supply and sanitation sector, both urban and rural and by country, covering the next five to ten years, will with few exceptions require substantial increases in local resources mobilization. It is likely that revenues generated from operations will not be sufficient to cover any significant part of the shortfall of resources.

40. As an objective for financial performance in its urban water supply and sanitation loans over the past 18 years, the Bank has maintained a policy that such projects should produce revenues sufficient to permit full cost recovery (operation and maintenance, including depreciation and debt service in excess of depreciation). Performance has usually been measured by applying rate-of-return covenants, although other methods are currently under review. For sector loans, the minimum financial objective has been to recover operation and maintenance (O&M) costs, with the long-range objective of increasing revenues until full cost recovery is possible.

41. Cost recovery is essential to all internal operations included in urban and rural water supply and sanitation systems. Among operations particularly sensitive to the lack of internally generated funds are maintenance of facilities and expansion of services. Each suffers when foreign or domestic resources provided by loans or national budgets is depended upon for financing -- in almost all cases in the region, funds generated from operations are insufficient to finance these activities. Almost without exception, rural water supply and sanitation projects are securing resources for both construction and operation from funding sources outside their operations; this pattern must be changed. Full cost recovery for rural systems probably cannot be achieved over a short period, but can be set as an immediate objective for systems in larger cities and as a medium-term goal for other types of system.

42. As a part of all past urban water supply and sanitation projects, the Bank has required adequate tariffs, commercial accounting systems, annual audits, sound organization and management, and competent staffing. The extent to which these requirements can be applied as communities served by projects get smaller will require testing in light of experience. There is obviously a point in the town-size scale below which it would be unreasonable to expect an accounting system of the type appropriate for a large city. However, systems that could be adopted for use by small communities should be developed. Where communities are small and financial resources very limited, setting up a water supply system that would involve fuel costs, motor maintenance, and the employment of a full-time trained technician would be undesirable. In such cases, handpump-equipped wells or gravity-supplied distribution systems or other simple designs are more appropriate. As means of testing of the affordability to pay, 3 to 5 percent of the annual household income is sometimes used for urban systems. However, this way of testing affordability is not always well-suited to rural areas, where a barter exchange economy may prevail and where quantification of the amount affordable for payment of water costs is difficult.

43. Matters concerning tariff and pricing policy for water supply and sanitation system are discussed in more detail in paras 65-73.

2. Project Priorities

44. Following a study of program priorities in the field of environmental health, the General Assembly of WHO in 1959 adopted a resolution calling for priority to be given to water supply, to urban water supply in particular. This resolution reflected a major shift, from a rural emphasis to an urban emphasis. In the same year, the Pan American Health Organization (PAHO), which acts as the WHO regional office for the Americas, endorsed a statement of its Directing Council noting that the greatest impact on the health of the people of the Latin American region would come through the provision of safe and adequate water supply. The statement also noted that the program most

likely to succeed would be a national water supply program starting at the top of the population agglomeration and working downward, i.e., from the largest cities, leaving the smallest until the last, not because of a desire to neglect the rural people, but because this would be the long-range strategy best suited to resolving national problems and reaching the greatest number of people in the shortest time. The main reason for this policy is that because institutional problems increase when the sizes of communities decrease, scope for reducing subsidies to the water supply subsector and helping it become self-sufficient is greatest if the start is made at the upper end. A secondary reason is a desire to alleviate the threat of epidemics, which is greatest where population density is greatest. It is incorrect to believe that cities have solved their problems and that it is now only rural areas that require more attention.

45. While the health benefits of a good water supply are well known and fully justify investment, in most countries, health considerations have not been the motivating factor in water supply installation -- the main motivation has been convenience, followed by considerations such as fire protection and rural industrial and commercial demand. The PAHO Council noted that more people are benefitted per unit of funds expended where population density is highest and that the cost for a particular level of service increases as population becomes more dispersed. The PAHO Council further noted that while health education is an activity that should be ongoing and encouraged, it is unnecessary to wait for the effects of health education programs to be absorbed into the thinking and actions of people for them to enjoy the health benefits of a good water supply; such benefits are enjoyed whether beneficiaries understand them or not.

46. The PAHO statement remains valid in terms of policy making. In the Asia region, substantial investment and effort has been directed toward the largest cities to help them meet their needs for physical facilities and adopt financial policies likely to lead to complete self-sufficiency, or at least to greatly reduce demands on national budgets. Much remains to be done on both these counts.

47. A next step in the development process of the sector has been reached in some countries; efforts can now be directed toward secondary centers and smaller cities, where the opportunities for achieving sound institutional and financial performance are still good. In many countries, however, the task with regard to the largest cities is still not yet finished and requires continued encouragement and support. In a few countries, the time may have come for a move downward in terms of the size of the centers served, but it is precisely at levels bordering on the rural that the problems of performance are multiplied many fold, requiring great resource inputs from the national level, both funding and personnel.

48. In most developing countries, rural water supply and sanitation is regarded as social sector activity for which those who benefit should pay only a token amount. With a few exceptions -- when rural communities are committed to paying the operation and maintenance

(O&M) costs -- maintenance of facilities constructed is extremely poor. The Inter-American Development Bank (IDB) recently confirmed that even though projects for which current O&M costs had been recovered from the users in the first three years after completion, subsequently such costs could no longer be recovered. At the same time, IDB, which has made more rural water supply and sanitation loans than any other development bank, after examining the question of maintenance concluded that poor maintenance of facilities is the primary problem in completed projects, and that as a consequence, many systems failed only a few years after completion.

49. One other note with regard to IDB operations is that, as a general policy, finance has been provided for connections to rural homes, on the reasoning that with home connections, consumers will be more willing to pay for water than if it is taken from public standpipes. IDB does not finance latrines, however, believing that households should install their own; consequently, and only a few rural piped sewage system projects have been approved by IDB.

50. Properly designed excreta disposal facilities should increase as population density rises. Given the universal reluctance of people to use public facilities, securing acceptance of latrine units in rural areas is a most difficult task. Success depends largely on the attitudes of women and the heads of families. Where livestock is quartered in part of the dwelling space, the stables usually serve as the family toilet, and there is little need, in the view of the household, to install a separate facility.

51. Institutions responsible for water supply and sanitation also have a responsibility to provide technical assistance to all who wish to install facilities. Establishment of central shops and yards for construction of latrine units, to be sold at cost, should be supported by the Bank as part of rural projects, but governments should not be encouraged to provide latrines free of charge or at highly subsidized prices.

52. As part of social policy or for other reasons, certain rural areas in some countries may be selected by the government for attention and government subsidies may be provided to the water supply and sanitation sector. There are a number of reasons why the Bank might wish to support a project that requires a subsidy -- for example, the area in which the project is located may have a high incidence of waterborne disease; moreover, the project may be justified through its contribution to another set of activities whose economic benefits outweigh the costs of the water supply and sanitation component. Where governments must borrow money, either locally or from external sources, for systems whose costs will not be repaid by those who benefit, fewer facilities will be built over a period of time than if financing came from internally generated investments through water or sewerage charges. The extent to which fewer systems can be built is directly related to the amount of funds required to pay interest on borrowed money.

C. Economic, Financial and Tariff Policy Issues

1. Economic Issues

53. In the economic analysis of a project, a cost-benefit analysis of the project is sometimes undertaken. Both macro as well as micro aspects and impacts are examined. Economic appraisal places a project in its sectoral setting, through examination of the strengths and weaknesses of sector institutions and key government policies.

54. The majority of project benefits in the water supply and sanitation sector, such as a decrease in morbidity, with consequent fewer days lost from work, and savings in the cost of medicines and medical services, can not be quantified accurately. In the majority of the water supply and sanitation projects it has been possible to assess alternative solutions that have the same benefits, making possible the identification of a least-cost solution. However, a qualitative assessment must still be undertaken with regard to project justification.

55. Whether qualitative or quantitative, economic analysis always aims at assessing the contribution of a project to the development objectives of the country; this remains the basic criterion for project selection and appraisal.

56. Inability to accurately quantify the benefits that result from the provision of either water or sanitation services has led development banks to use revenues as an indicator for economic benefits, though recognizing that revenues do not fully measure the value of the service to the economy.

57. While it is difficult to quantify the benefits of the provision of water supply, problems are even greater when attempting to measure benefits in the sanitation subsector, where the effects on health, property values, convenience, and comparisons of cost between a public sector and private facilities are further complicated by environmental benefits and water pollution control costs.

58. In rural and small-town water supply investment decisions, the approaches used for testing economic benefits -- using revenues as a proxy -- are applicable only if national or local government policies require full cost recovery from the sale of water. If the policy is to subsidize the capital or operation and maintenance costs of the water supply system in any way, the test for economic justification must be further examined to determine whether the investment costs are outweighed by the potential benefits to health and productivity.

59. For agricultural projects, it is common to include a component covering the costs of providing water supply and sanitation facilities and to use the economic justification for the entire agricultural project, calculated by including the cost of the water supply and sanitation component as the justification for the component, on the grounds that the facilities are necessary to the project.

2. Capital Recovery Issues

60. Capital recovery and O&M costs are dealt with under each project through the most appropriate means. The elements that enter into any consideration of tariffs and charges related to water and sanitation services include capital costs of facilities, O&M costs, depreciation and debt service. These elements are related and commonly overlap or are automatically included in one another. In the case of O&M costs, for example, it is usual to include depreciation as part of the costs, while a tariff directed at recovering all O&M costs would automatically cover depreciation. For loans to projects that fund construction of new facilities in a community in which no previous facilities existed, it will usually happen that if the tariff is set to include O&M, with maintenance to include depreciation, there may be a cash flow problem. Where the repayment period on the loan is 20 years and when the depreciation period for all facilities averages 35 years, the amount recovered from revenues will be less than the debt service payments. In this example, if costs are to be fully recovered by the end of the loan period, the tariff or charges will have to be determined by a cash-generation type of tariff covenant.

61. In the example above, if there are existing facilities, with the project providing additional facilities to extend and expand the existing system, the total value of fixed assets, frequently referred to as the rate base, will usually be of such a size that when depreciation is calculated against the rate base, there will be adequate cash to cover debt service. In this case, recovery of O&M will result in full cost recovery.

62. Special circumstances have occasionally led to the exclusion of depreciation costs from O&M; it is thus desirable when writing tariff and financial performance covenants to define clearly what is meant. Where O&M does not include depreciation, unless other means for debt service are provided, full cost recovery will not be realized. It would be prudent in such cases to specify what is meant by maintenance cost and how this is to be calculated in the project facilities. Where depreciation is a part of the O&M definition, no particular problem exists because there is a continuous generation of funds, some of which can be used to cover maintenance costs. This assumes that depreciation will be greater than debt service and that a positive rate of return will be generated.

63. Unless accurate means of predicting maintenance costs exist -- preferably based on maintenance records -- it is necessary to establish a maintenance figure. One method of doing this is to use a percentage of facility value as the cost -- for example, 3 per cent on an overall basis might be applied against asset value and used as the estimate of annual maintenance costs. In any system in which O&M is defined as excluding depreciation, the annual charge for water should cover the cost of power plus other operational costs and a fixed percentage of facilities value.

64. One problem with past rural water supply tariff structure policy has been the failure to define and insist on regular recovery of the agreed amounts to be applied to operation and maintenance.

3. Tariff Policy Issues

65. The experiences of most development banks with respect to the failure of borrowers to comply with tariff covenants have been about the same. For the most part, such experiences have helped make clear the need to generate a given rate of return on assets reasonably valued, though some exceptions do exist in World Bank-financed urban water supply and sewerage projects. Other measures, such as operating ratios, applications against future construction, and cash flow covenants, have been used, either because information on fixed asset value was not available or because cash problems existed even though a suitable rate of return was generated. In view of the problems occasionally encountered with financial internal rate of return (FIRR) ^{1/} covenants, review of alternative performance criteria is undertaken when appraisal of project is prepared.

66. Most utilities use average cost pricing as the basis for rate making. This is due in part to the fact that certain public utility boards that rule on rate increases do not wish to increase rates further than that is necessary to ensure a reasonable return to investors. Consequently, marginal cost and average incremental cost (AIC) pricing approaches proposed for water utilities have not been regarded with favor. A comparison of practices employed in developing and industrialized countries with regard to matters such as water rate policy is complicated and in some respects not very productive because water utilities in industrialized countries do not always need to accumulate reserves -- the utilities can usually, with little difficulty, issue tax free bonds to cover future construction needs, or draw against reserve funds into which they and others have paid. A developing country usually needs to generate its own reserves, for application during the next stage of construction.

67. Short-term marginal cost pricing of the type frequently employed by the power sector is not feasible for water supply and sanitation sector, since use of demand-type meters for water, unlike for power, is not possible, except perhaps for very large industries. Some economists over the past 15 years have concluded that long-range marginal cost (MC) or average incremental cost (AIC) pricing is a feasible means of establishing water tariffs and that their use will generate for the water utilities reserves that will finance next-stage expansion. However, in practical terms, this is difficult to implement among DMCs.

68. In the urban water subsector in DMCs, there are two problems with AIC and MC pricing. First is that few borrowers have much idea at

^{1/} FIRR -- the financial rate of return on an asset investment is the discount rate that equates the present value of future net revenue streams (over the economic life of the asset) to the cost of the investment.

the time a project is beginning as to what the cost of the next project will be; this precludes the calculation with any accuracy of a tariff. Second is that AIC and MC pricing will almost certainly lead to rates higher than those calculated by FIRR. With the current difficulties of collecting tariffs set by this means, the use of AIC or MC pricing would encounter even more difficulty.

69. However, the advantage of the AIC or MC pricing methods is that these methods allow governments and utility managements some indication of the levels at which tariffs should be set should it be decided that the funds needed to cover the estimated costs of the next stage expansion must be generated. Whether or not many Bank borrowers would, of their own accord, make the effort to calculate AIC or MC prices, the Bank should encourage them to do so, since this at least provides officials with some justification for the rates in effect. It does not appear that AIC or MC is a method to be considered for replacing of FIRR or similar types in loan covenants. A greater degree of flexibility in the use of alternatives, as is now proposed by the World Bank, seems a reasonable basis on which to approach the problem in the immediate future.

70. The covenants used when defining adequacy of water rates have usually included a FIRR test; the Bank has employed FIRR in its urban water projects. A FIRR that is adequate for one project may not be so for another; moreover cash flow problems can occur. A cash generation covenant can be used where the debt service requirement is one of the controlling factors; such covenants are particularly suited to cases in which high inflation exists, where changes in the size of investment are anticipated, and where increases in power costs may occur.

71. Covenants based on generation of reserves to be applied against next-stage expansion have also been employed in water projects. Such contributions toward next-stage construction costs are based on a percentage of estimated capital expenses and take into account the time when the funds will be needed.

72. Practical considerations usually govern the choice of the method used in the selection of a revenue covenant. As discussed in paras 66-69, average incremental cost (AIC) and marginal cost (MC) pricing techniques are difficult to employ in DMCs. Some of the considerations requiring attention when deciding which revenue covenant to employ include the extent and terms of debt, the value of assets, the views of government and borrower, the advantages and disadvantages of existing approaches, and legislation in effect related to tariff issues.

73. There is much to be said for a Bank policy that might strain a borrower slightly in achieving compliance. Relaxing pressure may cause assistance to become less effective in countries attempting to employ sound principles in the conduct of their operations. The Bank should not abandon its use of FIRR, except in cases with compelling circumstances.

D. Appropriate Technology, Maintenance,
Metering and Non-Revenue Water (NRW)

1. Appropriate Technology

74. Much has been written over the past ten years about "appropriate technology," and with only a few exceptions, every author has meant something different. A standard definition, which came out of the WHO/Donor Consultation Meeting in Bonn during late 1984, seems particularly good, and is recommended for general use: "Appropriate technology is that technology which, among several alternatives, satisfies the identified demand and/or need in a technical, socioeconomic, and culturally acceptable manner, and which is affordable to the user."

75. This definition is compatible with the Bank's appraisal objectives and is a useful working definition. The allocation of appropriate technology should not meet with resistance on the part of borrowers when designing projects, though design decisions may need to be challenged should differences arise as to what best satisfies, in a technically acceptable manner, an identified need.

76. The above definition (see para 74) is particularly pertinent when it refers to "several alternatives." Often, even experienced project appraisers become so engrossed in a design drafted by a consultant that they forget that one of their responsibilities is to determine what other "alternatives" exist, and forget to identify the reason for selecting the design submitted.

77. The use of the basic appropriate technology should not pose any problems so long as a definition of the type quoted is used by the Bank.

2. Maintenance

78. The elements of a good maintenance operation include accurate records, an appropriate program, proper manpower and training, and adequate equipment and materials. Most important is a manager who understands and places high priority on the execution of the program, including budget support. The Inter-American Development Bank has recognized that poor maintenance is one of the major causes of its loans becoming less productive than anticipated, and has revised some of its procedures to reflect this concern.

79. All project documents for water supply and sanitation loans made by the Bank call for the borrower to, at all times, operate and maintain its plants, equipment and other property in accordance with sound administrative, financial, engineering, public utility, and operation and maintenance practices. Most other development banks, including the World Bank, carry similar requirements in their project documents. It is therefore curious to note that in almost none of the appraisal or supervision reports of these institutions is any mention made of whether maintenance is adequate or inadequate, whether it is improving, or what needs to be done.

80. One reason for this lack of maintenance evaluation is that there is no set of specific criteria that can be used in evaluating maintenance during appraisal and supervision. This weakness should be remedied. In this regard, the Bank should provide a lead by asking staff to prepare criteria that could be used; such criteria should be tested in the field, and then be revised, corrected, and formalized before being made available to any interested party.

3. Metering and Non-Revenue Water

81. The most significant result of what water consumption metering is the conservation of water -- it is well documented that consumers reduce consumption when charges are levied on a metered basis. The main problems with metering are, first, that metering itself costs money, and second that metering can create new problems unless the metering program is administered efficiently, with both the utility and consumers exercising the discipline required to ensure that the system works. In a number of cities of the region, experience has shown that performance has been so poor that the approach should be examined on a case-by-case basis, to determine whether present policies should be continued.

82. It was found in one study ^{1/} that about 70 percent of all water from the water systems in major cities is used by 20 percent of the customers. This clearly shows that by accurately metering only the heaviest users, a major step forward in revenue generation will likely occur. This emphasizes the importance of starting with the heaviest users, and ensuring that their meters are accurately registering all water used; this would require properly sized meters and accuracy testing of the meters several times a year. Experience further suggests that the smallest consumers should be left until last -- a flat rate charge could then be used in the first years, with meter reading and meter repair being discontinued.

83. Whether or not this approach should be adopted should be decided on a case-by-case basis. Clearly, however, present metering policies in many systems supported by Bank loans are failing.

84. Water meters can accurately register the amount of water passing through a system only if the system is under pressure at all times. For example, when, for reasons common to water systems in DMC's, pressure drops to zero or becomes negative, air enters the system; when pressure is restored, air passes through the meters when customers open the tap, causing the meter to register as water the air passing through. Further, the velocity at which the air passes through can be so great that the air may cause the meter to register large volumes of apparent consumption in only a few minutes; this results in a need to adjust bills. The usual policy of most systems in which this program is

1/ Cepis, Lima, Peru on Brazilian water metering.

serious is to discontinue reading the meters and bill on a fixed monthly basis -- meters should not, therefore, be installed in any area where 24-hour pressure does not exist. Moreover, meters can become clogged by scale and sediment sluffed off the piping with pressure fluctuations, requiring that the meters be replaced once continuous pressure is restored.

85. Non-revenue water (NRW) continues to be the major cause worldwide of lost income for utilities. Although efforts to reduce NRW have been at the forefront of the action proposed by all the development banks and by governments themselves, little has done to reduce the problem; while appraisal reports for new projects suggest that NRW will gradually reduce over the years, this result generally has not been realized.

86. Part of the strategy for reducing NRW has been based on the assumptions that much is lost from leakage, and that leak detection programs will solve a large part of the problem. However, data from leak detection studies made in developing countries show leakage losses at 15 percent or less. This indicates that in reducing NRW, other solutions must be considered, the first of which might well be accurately establishing the amount of water produced. Data on the volume of water produced are usually based only an educated guesses, since few systems accurately measure the water actually entering the system.

87. A second matter requiring attention is the accuracy of meter reading record books and customer accounts; all houses with water service connections should be noted in record books, whether the connection is metered or not. Until accurate record systems for water utilities are established, there is little point in becoming too deeply involved in other corrective actions. It is also necessary that such accounts be audited.

88. The Bank should take a fresh look at the entire NRW problem and the approaches being undertaken to solve the problem.

IV. SUGGESTED APPROACHES FOR LENDING TO THE SECTOR

A. Institutional Development Strategy

89. The appraisal of an institution and the approach selected as best suited for upgrading the institution's performance is usually based on recommendations of consultants. It is not uncommon that consultant studies are postponed until after a loan has been approved, so that the consultant can be supported by loan funds; this approach should be avoided whenever possible -- studies should be completed before appraisal. In the case of the Bank, specific covenants and agreements should be included in loan documents to require that certain actions be taken; otherwise, long delays could result. In particular, matters that involve legislation are best defined at the time of appraisal. Consultant recommendations requiring staff training and institutional improvements must be studied during appraisal to ensure that the best approach identified is selected.

90. During project development, more attention should be given to the institutional organization of the executing agency involved and the powers and duties conferred on the organization's management. Where these are limited or where boards of directors become involved in day-to-day operations, changes should be requested.

91. More attention should be paid to individual project managers' abilities to delegate authority and to follow-up decisions taken. The two problems should similarly be examined at lower levels within the institution.

92. Training programs should also cover top management personnel. Observation tours have very limited effect in teaching managers how to manage, yet this seems the method most familiar to consultants; other training methods, such as management shortcourses of one or two weeks duration should be considered. The Bank could conduct courses for managers from countries speaking a common language and working for institutions with similar management objectives and problems. Such courses are usually best presented by business school faculties associated with universities possessing experience in such training, preferably using the case study as a teaching technique. Courses could also be held in a specific country for people in the same or related fields. Other approaches should also be explored.

93. Second and third loans to the same institution provide opportunities to effect changes and improvements difficult to complete in the period of one loan. This suggests that long-range plans are needed and that a series of loans should be encouraged.

94. Financial performance is so interlinked with organizational and management improvement that the two must be considered together at the time of project development and appraisal. Setting and increasing tariffs has proven to be a distinct problem for most public utilities; to ease this situation, the Bank should request that the water agency

concerned be authorized to raise water rates whenever a defined index exceeds a certain level. The indexes used most commonly are energy, labor, and cost of living. A number of water and power organizations worldwide have been given this authority. Opportunities to reduce costs through contracting for certain services should be identified before or during appraisal, and, if necessary, special studies or other actions to determine feasibility should be funded out of the loan (see remarks under privatization).

95. A clear approach regarding the best means for improving institutions and training in the rural water supply and sanitation subsector is difficult to identify. Since lessons will be learned from current sector loans during their implementation, it is important that the staff of the Bank's Water Supply Division be given the opportunity to learn what approaches have been tried so far, what their results have been, and what changes in approach should be made as better methods are identified.

96. Countries should be encouraged to establish financial facilities whereby rural communities can, on their own initiative, apply for loans to cover the costs of rural water supply and sanitation projects. Governments could arrange with local banks to provide such loans on a concessionary basis. With the initiative coming from the communities themselves, there would be considerable assurance that the loans would be taken seriously and that repayment would be likely.

97. Bank staff should be encouraged to take additional training, both within and outside the Bank, on subjects relating to organization and management.

B. Training Strategy

98. Placing greater emphasis on training without indicating particular areas of need and possible mechanisms for action would fall short of what is required. During project development, both technical and managerial operations should be studied; specific training needs and the best means of fulfilling this should be identified. As an objective that should be achieved as soon as possible, every country should have an established and ongoing means of training new and current staff. Duplication of vocational training facilities available at trade schools and other agencies should be avoided; existing facilities should be used. Only the facilities that are lacking should be provided by the water supply and sanitation institution itself.

99. Every organization requires a person specifically responsible for training; the person filling this position should be directly connected with the office of the organization's manager. The training director's post should be at a level equivalent to that of a personnel manager.

100. Areas needing particular attention with regard to training in almost all water supply and waste disposal operations include maintenance and service connection work.

101. In training, greater use should be made of foremen and tradesman from other well-run institution of a similar sizes from within the region. Seconded personnel, in teams of two or three, should speak the local language. These resource persons should demonstrate and train foremen and technicians; trainees should also be given instruction on how to train others in order to pass on the knowledge gained from the outside team.

102. On-the-job training and field training for personnel at the foreman and lower levels engaged in operations should be emphasized. Classroom instruction should be kept to a minimum. The same observation applies to the training of white collar workers.

103. For general improvement in physical operations and maintenance, concentration with regard to training should be placed on the foreman and their assistants. Increased pay should be given following periods after training and after trainees have demonstrated that the lessons have been learned. The training officer should have a key role in certifying such pay incentives.

C. Strategy on Project Priorities and Project Elements

104. Top priority should be given to urban projects, with project coverage extending from the largest cities downward.

105. Greater effort must be made when upgrading financial performance to facilitate generation of funds that can be applied to future expansions and extensions.

106. As an alternative to new treatment plant construction, possibilities for increasing plant output by changing plant operation should be examined. In this regard, additional staff training by means of a two- or three-day short courses is recommended.

D. Appropriate Technology and Maintenance Strategy

107. The Bank should endorse the use of appropriate technology, on the basis of the definition given in para 74.

108. To ensure that all technical alternatives have been explored at the time of appraisal or even earlier, it would be useful to include a paragraph in all appraisal reports indicating what other options were considered and why they were rejected. Although some appraisal reports have done this, the practice most often is not employed. In order to promote education, and as a self-disciplinary measure, it would

be most useful if consultants and host country nationals working on sector loans would include a statement in the subproject descriptions they prepare on the alternatives considered. This could then be used by Bank staff as one of the key monitoring devices for the project concerned.

E. Maintenance Strategy

109. Since currently there are no established criteria for evaluating maintenance, the Bank should initiate staff action to prepare a preliminary list that can be tested, added to, and changed as experience indicates. This list should, after refinement, be given broad circulation, particularly to other development banks and to the donor countries concerned with the water supply and sanitation sector.

110. Supervision missions should be asked to review the progress of borrowers in upgrading maintenance, as measured by the criteria proposed.

F. Metering and NRW Strategies

111. Appraisal reports should carry a special section with regard to metering, in which the following information would be provided:

- (1) The means used to establish the amount of water produced and the limits of accuracy attributed to the figures provided;
- (2) The number of times a day, week or month that given areas or an entire system are without water pressure;
- (3) The number of customers;
- (4) The number of meters of two inches (50 mm) or larger installed in the system, the frequency and nature of testing, the number of smaller meters and the frequency of testing, the number of unmetered customers, and the number of customers receiving estimated bills for the past three billings or longer;
- (5) The volume of NRW by month for the previous year; and
- (6) Such other data as the appraiser requires.

112. In the appraisal of projects, it is sound practice in the absence of evidence to the contrary to assume that 15 per cent of all water produced is lost through leakage.

113. Prior to appraisal, a competent private firm should undertake an audit of customer account records, as well as the services in place and billed for, in all systems.

114. Based on an analysis of metering data, a recommendation should be made as to whether to expand metering, to delay implementing metering in the entire or in parts of the system until pressure is constant, or, in the longer term, to meter only certain customers.

115. Appraisal staff should make proposals for meter accuracy tests and frequencies, emphasizing the need to start with the largest customers and largest meters, working downward.

116. Where NRW losses exceed 35 percent and where repeated efforts over time have substantially failed to remedy the situation, the focus of studies should be on the question of whether to bill all connection below, say, 3/4 inch (20 mm), on a flat rate, and to discontinue installing and reading meters on all smaller connection sizes. The study might also look into the question of installing, reading, and maintaining meters by private contract.

117. Depending on the conclusions reached on the foregoing items, the Bank should reach agreement with governments and their water agencies on what future policy on metering will be and how the NRW problem will be dealt with. For all water systems, when intermittent pressure is causing problems for the billing department and the customer complaints section, the Bank should either defer financing of new meters or postpone procurement until the system is under constant pressure.

118. For water systems that are so small as to have no staff for meter installation, reading, billing, record keeping, collecting and testing, metering should not be undertaken. Use of the smallest available diameter pipe for service lines or the installation of flow restricting devices (orifices) on each line should be considered for all less-important small systems. Office buildings often employ the installation of roof tanks; such systems should be avoided if possible and should not be encouraged for any larger systems. In the absence of meters, water charges are best effected by billing based on size of service line.

G. General Operation and Appraisal Strategies

119. At the time of appraisal of small towns and village water supply and sanitation projects, as well as at the time of project completion, consideration should be given to requesting WHO to provide an engineer to test the project, using health appraisal methodology ^{1/} recently developed for water supply and sanitation projects, and later test project impact of by further application of appraisal methodology. WHO is apparently open to any requests that might be made along these lines.

^{1/} Maximizing Benefits to Health, an Appraisal Methodology for Water Supply and Sanitation Project, WHO ETS/83.7

120. Latrines, septic tank systems and other facilities for the sanitary disposal of human waste at private homes are, with few exceptions, considered to be a matter for private financing and should not be covered out of project funds. It is appropriate to finance facilities for central shops in the project area where units can be fabricated for sale to the population. In special circumstances, financing of communal facilities may be considered, though this should be avoided whenever possible.

121. The objective of the rural sanitation units is well described by the appropriate technology definition (see para 74), which states that the technology should satisfy the need in a socioeconomic and culturally acceptable manner and be affordable to the user. WHO publication on latrines, though perhaps in need of some updating, could be followed by the Bank as a sound reference.

H. Sewerage Lending Strategies

122. Experience from sewerage projects financed by external agencies in many developing countries over the past 20 years have, with few exceptions, encountered one major problem: failure to connect large numbers of users quickly. The result is that in the years immediately following project completion, so few connections have been made and sewage flows are so limited that the sewers become clogged and in some cases are abandoned. This failure to realize the benefits to health and environment constitute a general problem.

123. Experience shows that city council regulations requiring all properties adjacent to sewers to be connected are seldom enforced; once the sewer main in the street has been covered up, the added cost of making connections has further discouraged new connections. Owners of the properties served by private systems that work or cause trouble only periodically, usually only requiring that the sewers be cleared, see no reason for abandoning such facilities, and installing connections to the new sewage system, particularly if connections is expensive. While there are no completely satisfactory solutions to these problems, the following measures have been tried and found more effective than most:

- (1) City Councils should adopt regulations that require immediate connection to the public sewers by all properties abutting streets where sewers have been installed;
- (2) At the time sewer mains are laid in a street, all abutting properties should be connected as part of the contractor's or subcontractor's work. A special reduced price reflecting the savings achieved should be charged to property owners;

- (3) The Bank should include as part of any sewer loan, funds for connecting all properties adjacent to the sewers;
- (4) Properties with septic tanks should preferably be bypassed by house sewer service lines. If for any reason the householder does not wish to pay the extra amount for the bypass, however, connection to the septic tank outlet should be permitted on the understanding that if at any time in the future the tank becomes clogged, it must be abandoned and the bypass installed at the owner's expense;
- (5) Where payment for the property sewer connection cannot be made at the time of completing work, owners can be given the option of regular monthly payments until the entire cost has been recovered. Failure to make payments should be reflected as a lien against the property, to be paid, with interest, at the time the property is sold, if not sooner;
- (6) On streets where sewers are laid and where the number of properties to be connected will be limited until new houses are constructed, connection fees should be established and paid at the time the newly constructed facility is connected; and
- (7) On sewers in streets where sewage flow will in the early years be limited for various reasons, flushing devices should be installed to protect against sewer blockage.

124. Precautions must be taken to avoid locating flushing devices within sewer manholes. This can cause water lines to be submerged in sewage when manholes flood.

125. A general property tax for sewerage in cities having annual collection of assessed levies is perhaps the most feasible method of paying for the capital investment involved in such systems. The advantage of this approach is that it spreads the financial burden over the city, obligating the owners of the more valuable properties to pay the greater part of the cost. This is equitable for two reasons: first, because an entire city benefits environmentally even though only a portion may be served by the sewer system; second, because higher-priced properties will usually benefit more than most others by the environmental improvements resulting from proper collection and disposal of the community's liquid waste.

126. Use of a general tax to cover the capital costs of sewers does not preclude a charge for O&M of the system, imposed on the basis of usage as reflected in the volume of water discharged into the system. The metered water volume used in a prescribed period has been used as a

means to establish the sewer charge. It has also been found expedient that this tax be collected as a surcharge on the water bill. If the sewer agency is separate from the water agency, an agreed payment can be made to the water department for collection of the sewer charge.

127. Although nothing prevents the covering of the full cost of sewerage through a surcharge on the water bill, experience shows that when capital costs are added to O&M costs, the total may equal or exceed the monthly payment for water. With the problems now encountered in collecting for water only, it appears unlikely that adding sewerage charges would change the amounts visualized; it would be prudent for the Bank to support this approach in most of its DMCs.

128. Charges for treatment of industrial wastes discharged to urban sewers are commonly based on the volume and strength of the waste. For developing countries, this method has not proved practical because it requires frequent checks of both volume and strength. The method must be modified to avoid extensive laboratory work, and an average figure that can be adjusted periodically should be considered.

I. Solid Waste Projects

129. The Bank should be prepared to lend for solid waste management projects. For the long run, the Bank should engage appropriate staff. For the short run, the use of consultants to complement the experience of current staff should permit adequate coverage of this subsector.

130. Every effort should be made to provide technical assistance to governments that have solid waste disposal problems. Assistance should be directed toward selecting proper methods and avoiding processes that require sophisticated operation and large capital inputs. Sanitary land fill should be the method of choice for most DMCs.

131. Studies should include exploration of the logistics of collection and the means of reducing trucking distances to disposal sites.

132. Land reclamation must be considered one benefit attached to the land fill approach.

J. Air Pollution Control

133. Certain countries of the region are now experiencing signs of serious air pollution and may require assistance in the near future -- assistance should be extended if requested. As in the case of solid waste projects, the Bank should insist on thorough and pertinent studies that not only establish the nature and depth of the problem but that also suggest a solution. By defining the problem and subjecting proposed solutions to critical review, the Bank can serve as a source of sound advice. Action to control air pollution should be handled by

staff, supported by consultants. It is probable that this activity will never be of such high priority in country programs that the Bank will need to employ a full-time staff member to cover requests; nevertheless, the Bank should be prepared to respond to such requests for technical assistance.

K. Sector Loans

134. A review of loans made by the Bank to date for small communities involved in water supply and sanitation sector projects indicates that the communities served are small- and medium-sized towns, ranging from a low of about 4,000 to a high of about 21,000 people, the median being about 10,000.

135. Under the usual procedure for implementing sector loans, borrowers or executing agencies are responsible for the appraisal and processing of subprojects in a manner not unlike that followed by the Bank in its appraisal and lending operations. As a result, sector loans are normally provided to well-established and experienced institutions that re-lend borrowed funds to the local government for project construction.

136. In exceptional cases, loans may be made to less capable institutions, but there will invariably be a need for substantial technical assistance to ensure that the borrower can cope with a large scale construction program while at the same time strengthening and improving its own organization. In order to provide both the government and the Bank with an understanding of the sector and its institutions and the problems to be overcome, an in-depth study of the type referred to as a country sector profile may provide a useful guide in preparing projects that follow the sector loan format.

137. Sector projects that package a number of projects for a group of larger cities and towns where systems are owned or managed by a water department of the local government will benefit if transfer of certain functions in project implementation can be made to local government level. Institution building arrangements that will enable local government organizations to assist in management improvement, including financial performance, must also be included.

138. To the extent possible, responsibility for project execution should be transferred to local organizations. Financial commitment, proof of performance, and other such matters should be required of each subborrower. Because of the complexity of this type of operation, the time required of Bank staff in project administration will undoubtedly be much greater than for normal projects.

139. Since the Bank's experience is currently limited to sector project performance, until several specific projects are completed and become operational for a few years, a complete picture of how best to reduce problems and achieve good performance will not be fully available. It can be predicted, however, that the most critical point

will come two years beyond the time when consultants terminate their services -- when the systems are under local operation and maintenance, with back-up support from the responsible central agency. The Bank should give particular attention to sector projects during this period to ensure that poor maintenance and inadequate community support do not result in breakdown and failure of the system, as has occurred in rural projects financed by other agencies.

140. For sector projects with sanitation components, irrespective of the type of facilities to be built, the most critical time will be when latrine vaults and septic tanks become full and when action is required to restore their usefulness. Back-up resources must be available, first, to educate in advance all families with facilities on what to do, and, second, to identify or provide services to assist in cleaning and maintaining. The Bank should continually encourage appraisers of sector projects to provide resources for these types of assistance.

L. Sector Profiles

141. The Bank should continue to prepare country sector profiles. The first profile should be prepared in depth and then updated in depth, perhaps every five years. At two to three-year intervals, an update should be made to supplement the basic document in those matters that have operational significance. The Bank should be prepared to make available to donor countries and multilaterals interested in the region and in the water supply and sanitation sector copies of the basic reports and updates.

M. Privatization

142. The term privatization as used here means the management, operation and financial control of certain facilities or services, either by ownership or under contracts that confer such responsibilities. In the water supply and sanitation sector, privatization is not a newly developed notion in United States; private ownership of utilities was the means by which most utilities came into being during the 19th and early part of the 20th century. As urban areas expanded and metropolitan facilities became more complex, and as the need for land, rights-of-way and water shed preservation and acquisition has grown, opportunities for private companies to own and operate water system have faced increasing obstacles. The pattern emerging in some cities of the United States is municipal ownership, but with management, operation, maintenance, normal extensions and planning under private contract. Where this is done, the benefits normally associated with municipal ownership are coupled with the efficiency that goes with private management.

143. For developing countries, the closest example to the American pattern mentioned above exists in some West African countries -- Cameroon, for example, where government contracts for the management, operation and expansion of certain large water systems are undertaken by French firms.

144. Experience with operational performance has been good in both North America and West Africa. However, prices for water have commonly been higher than average, and the claim is made that in the African cities, the poor are not served or are served badly because they cannot afford to pay -- that only the rich enjoy the benefits. There undoubtedly is truth in this claim because the contractor is paid in part on the basis of revenue generated and is usually not reimbursed for water used by the poor. Approaches and solutions to this problem exist, but they have not been pressed with great enthusiasm by either the government or the contractors.

145. Privately owned and operated water systems in some areas of Latin America -- Guatemala City and Cartagena, for example -- have functioned well in the past but at present are experiencing difficulty in remaining viable.

146. Meter repair is being done by contract in numerous cities; Seoul goes as far as to undertake part of its meter reading by private contract. Experience with private contractors has been outstanding in cases in which proper supervision of the contracted commitments has been maintained. In Manila, when meter repair arrangements were reviewed in 1965, it was found that a private contractor could repair 22 meters per day, against three per day by the authority's personnel. In Tokyo, the number was about 18 per day by the contractor against six by the Tokyo water authority.

147. Opportunities for privatization exist, particularly in meter reading, meter testing, service connection auditing, billing, collecting, leak repair and the making of service connections.

148. It can be anticipated that resistance to change will come from labor unions and others whose jobs will be affected. Also, abuses in operation may be encountered whether work is done under contract or by utility personnel; vigilance and tight control of contractors is always necessary.

149. One of the big advantages in the private contract approach is that financial incentives can be offered to improve performance. This is why meters are repaired more quickly under private contract; after repairing a basic quota of meters a bonus may be paid for each additional meter repaired. Such an approach may also hold out some promise for the detection and correction of illegal connections, improving meter reading, meter installation and replacement, and for reducing non-revenue water. Few governments can pay bonuses on a regular basis for work done under regular salary however.

150. Urban sewerage operations could be privatized, but the problems to be overcome are much greater than for water.

151. Most rural systems will probably not sustain private management contracts unless they are well established and serving communities of considerable wealth. Nevertheless, there appear to be opportunities to engage mechanics and technical people under the contract for the repair and operation of systems. Problems have resulted in the past from the inability of communities to make payments.

152. Privatization should be encouraged as an alternative to utility-managed services that are failing to meet reasonable performance standards. The turnover of entire municipal systems for management and operation under private contract will, however, encounter much resistance and generate many problems; the Bank should therefore, as a matter of policy, avoid adopting a position of open support. On the other hand, the Bank should not oppose privatization if any of its borrowers should wish to attempt it.

V. INTERNATIONAL AGENCIES AND THE BANK

153. During 1985, WHO scheduled a series of meetings for each of the regions of the world. Donor countries, non-governmental organizations, multilateral agencies and development banks were invited to attend. The subject of the meetings was water supply and sanitation and the actions necessary to achieve the goals for provision of services for the rest of this decade, as set in national plans. The Asia meeting was held in October 1985 (see Appendix 4 for Summary of Conclusions of Asia Donor Meeting).

154. At a meeting in Bonn in the latter part of 1984, a majority of the donors providing funds to countries for support of their decade programs reaffirmed their intention of continuing to support water supply and sanitation sector programs. Of particular significance was the recognition of the need that all external aid directed at the sector follow the plans and policies set by the recipient governments. It was accepted that previous efforts at assistance often were counter-productive and at cross purposes with both national policies and the policies of other donors. There was also agreement that donor countries should be guided by recipient countries' plans and approaches rather than by the plans and approaches of the donors. The extent to which this affirmation will be followed remains to be seen.

155. In view of the the position adopted at the Bonn meeting, it appears that the Bank should, to the greatest extent possible, lend its support to the approach proposed and help ensure its success. There are, however, a few problems to be overcome by all agencies involved in the sector. The most important, perhaps, is whether in each country plans and policies exist that are sound and worthy of support without reservation. While some countries have such a base to start from, many do not and it will be a problem, at least at the beginning, for donors -- including the Bank -- to know what type of support to extend.

156. The Bank has sector information relating to most of the countries in this region and has prepared country sector profiles for several. For these countries, certain policies, approaches and patterns that have been defined could serve as a broad guide for future operations. Whether the donor countries and World Bank would accept the general policies laid down by the Bank for its operations in each country would probably not be known until the relevant reviews and judgements have been made. It seems probable that when agreement among a particular country, the Bank and the World Bank is reached, other agencies active in the country will cooperate, at least in the urban water supply and sanitation subsector. For the rural subsector, many differences among donor countries exist with regard to the policies to be followed, particularly with regard to finance. With few countries having any clearly defined rural water supply and sanitation policy, it seems likely that it will be in this area that efforts at agreement will be most difficult. It is particularly important that recipient countries take the lead in determining the basic policy and strategy to be followed; once determined, that policy and strategy should be closely adhered to by all donors. This makes it desirable from the

outset of policy formulation that each country know the position of the Bank, the World Bank, and the majority of donor countries. Otherwise, outside support will probably be delayed.

157. WHO seems to have taken the lead by convening the regional meeting with donors in the second half of 1985; it is desirable that the decisions of the meeting be supported fully and that Bank assistance, compatible with country interests be extended. If sector information is not available or is out of date, the Bank might offer to prepare either a country sector profile or a profile update.

158. The Bank should be prepared to take part in special country meetings called for the purpose of helping prepare a policy guide or reviewing policy with other external agencies to determine whether such assistance would serve as a basis for future project development acceptable to all.

159. Bank strategy for donor meetings and for proposals to be presented should be supportive and flexible. The approaches are likely to be completely compatible with those of the Bank; this should be of great benefit to the Bank's member countries.

160. Until about 1977, country sector studies for water supply and sanitation, financed through the cooperative program with the World Bank, were being undertaken by WHO. With the initiation of activities associated with the water decade, WHO and the World Bank agreed to discontinue the sector studies and replace them with a "rapid assessment" program that involves visits of about two weeks each by WHO teams to most of the UN countries, and the preparation of a short report on the status of water supply and sanitation in the country. With the termination of the WHO/World Bank Cooperative Program, however, this rapid assessment activity also came to an end. Information on progress being made in the sector toward the 1990 goals is now gathered by WHO through country engineers; moreover, special regional coordinators are gathering information for the decade program. However, the broad sector information contained in the original sector study reports is no longer being provided. The World Bank, for its own purposes, places the responsibility for collecting and updating sector information for each of its countries on its water supply divisions. The information is usually not assembled as separate country reports nor is it available for use outside the World Bank.

161. From the end of 1982, the Bank began in a limited way to collect and report on water supply and sanitation sector data from selected countries in the region. These reports were labelled "country sector profiles", and to date, studies have been prepared for Nepal, Indonesia, Korea and Malaysia. Based on the experience gained in completing these reports, it is estimated that approximately five man-months would be required to prepare a report.

162. In view of what is stated in the section of this report with regard to describing Bank support to countries and donor nation in the water supply and sanitation sector, a strong argument exists for the Bank's continuing and even expanding its activity in preparing country sector profiles. Information on country institutions, organization of the sector in a particular country, the nature and scope of services available, and policies and needs, is badly needed by external financing agencies as they prepare programs providing assistance. Donor countries in particular find it difficult and time-consuming to collect the information required. In the formation of policies and revision of plans, national agencies frequently find it difficult to obtain information on the sector in their own country. Therefore, there is a definite need for information of the type presented in the Bank's country sector profiles.

163. Country sector profile updates could perhaps be prepared every two to three years, so that current data and major changes that have occurred in the sector can be presented. Preparation of a basic sector profile should be considered for countries from which there is an expressed need.

APPENDIXES

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THE ROLE OF THE BANK IN THE
WATER SUPPLY AND SANITATION SECTOR

I: INTRODUCTION

1. The Bank is an international development finance institution owned by its 31 regional and 14 non-regional member governments. The Bank was established in 1966 mainly for the purpose of lending funds and providing technical assistance to developing member countries (DMCs).

2. The Bank's lending activities are divided into two major categories -- "conventional" loans from Ordinary Capital Resources (OCR), and "concessional" loans from the Asian Development Fund (ADF). Both types of loans are intended principally to cover the foreign exchange requirements of specific projects. A DMC's access to ADF is determined on the basis of the country's economic situation. Along with per capita GNP, a country's debt repayment capacity is also taken into account in determining its eligibility for concessional loans.

3. The Bank has, so far, approved a total of \$17 billion for 760 loans. Of these, 419 loans were conventional and 341 were concessional. The loans were made to finance 689 projects in 27 DMCs. In addition, the Bank has financed 889 technical assistance projects, amounting to \$197.1 million, assisting 26 DMCs.

4. The Bank's operations provide principally for the financing of specific projects in such fields as agriculture and agro-industry; energy, industry and non-fuel minerals; development banks; transport and communications; water supply and sanitation; urban development; education; and health.

5. The improvement of water supply and sanitation facilities is of critical importance to the health and socioeconomic progress of Asia. It has been estimated that in developing countries, 80 per cent of all illness is related to contaminated drinking water and the lack of sanitation. Even in the most-advanced of the Bank's DMCs, it is rare for more than one half of rural populations and three quarters of urban populations to have a piped water supply system. In the least-developed DMCs, only about 10 per cent of rural populations and one-half of urban population have such systems.

II. THE SECTOR

6. The Bank's financing in this sector in the past has been in expanding water supply and sanitation facilities, mainly in the urban areas. These projects have principally served domestic consumers, but institutional, commercial and industrial users have also benefitted significantly. However, Bank financing in the sector is shifting from major urban projects toward smaller provincial urban areas and rural areas. Bank-financed irrigation and rural development projects also include the provision of drinking water in project areas, but this usually is only a small component of any Project. Total Bank lending for water supply and

sanitation projects has, so far, amounted to more than \$1.39 billion (or 8 per cent of the Bank's total lending program), covering 55 projects in 16 countries. These 55 projects are helping increase water supply capacity by more than 12.6 million cubic meters per day and sewage treatment capacity by 2.3 million cubic meters per day. More than 60 million people have been benefitted.

7. The Bank's decision in 1980 to provide sector loans ^{1/} is of considerable importance for water supply and sanitation programs in rural areas. This type of lending has made it feasible to finance large numbers of small systems characteristic of rural water supply and sanitation development. In such loans, the sectoral needs are identified in terms of (i) capital investment required; (ii) strengthening of technical and managerial capabilities; and (iii) improving supporting financial and sectoral policies. Accordingly, when a loan is made to a DMC, the primary responsibility for the proper utilization of the loan proceeds for sub-projects in the sector is delegated to the Borrower or the Executing Agency.

8. In financing water supply and sewerage projects, the Bank pays special attention to the financial position and capability of the responsible entity/authority. Such entities should be in a position to operate and maintain their systems efficiently and, where practicable, to finance a reasonable portion of future expansion out of internally generated funds. Revenues for these purposes are sought through appropriate tariff levels, but, in determining these levels, consumers' ability to pay is a vital factor. Where some beneficiaries/consumers cannot afford rate levels consistent with the broad financial objectives mentioned above, alternative means for achieving financial viability are sought, such as cross-subsidization among consumers, government subsidies, and adjustment of Project scope.

9. Based on experience and current trends, the Bank's future activities seem likely to be characterized by the following: (i) preparation of sector profiles; (ii) further assistance in rural areas; (iii) increased sector lending; and (iv) greater involvement in environmental aspects.

10. The assistance for development of water supply and sanitation facilities in rural areas is likely to be increased and relatively fewer loans provided for expansion of water supply and sanitation systems in urban areas because of:

- greater emphasis in many DMCs on financing projects in rural areas, where the proportion of people having access to potable water is relatively low; and

^{1/} The scope and components of a sector loan depend on the characteristics and needs of the sector concerned. The Bank may finance the capital investments needs of a sector in a specified geographical area (area slice) or may support them over a specified period of time (time slice), or both.

- the capability of some urban entities to finance expansions through internally generated funds.

11. Preparation of country sector profiles in selected DMCs will be required in order to identify the need, scope and timing of the Bank's assistance. These profiles, which will be prepared on the basis of in-depth reviews of the sector, will examine such aspects as the adequacy of and constraints present in government programs, institutional and manpower capability, and existing or new training programs. Some of the major constraints are likely to be:

- institutional, particularly in rural areas, where at present few institutions with financial and technical capability in the water supply/sanitation sector exist;
- shortage of manpower, particularly engineers, accountants and technicians, who are needed for project planning and implementation and, perhaps more important, operation and maintenance of such systems; and
- shortage of local currency because of the large amounts involved.

12. In order to provide increased assistance for development of water supply in rural areas, sector lending will be used more extensively. Advisory and operational technical assistance will be needed to strengthen institutional capability, particularly with respect to operation and maintenance and management of more-efficient accounting systems, with such assistance incorporated within the sector loans.

13. For those DMCs whose economies continue to grow rapidly, particularly in the industrial sector, there will be a need for the Bank to consider greater involvement in environmental improvement, through safe solid waste disposal and air and water pollution control.

III. THE PROJECT CYCLE

A. General

14. Bank loans, whether project or sector, and whether provided from OCR or ADF, follow a sequence of activities making up a project cycle or the project management cycle (see Figure 1, page 39).

15. The key and essential steps in Bank's project management cycle are as follows: (i) identification; (ii) preparation; (iii) appraisal; (iv) loan negotiation and approval; (v) implementation and supervision; and (vi) post-evaluation.

B. Project Identification

16. Priority of the project must be established not only in the sector but also in the overall development strategy of the country. An economic analysis of the sector will provide an understanding of the development potential and provide a framework for evaluating national and sectoral policies and problems.

PROJECT MANAGEMENT CYCLE

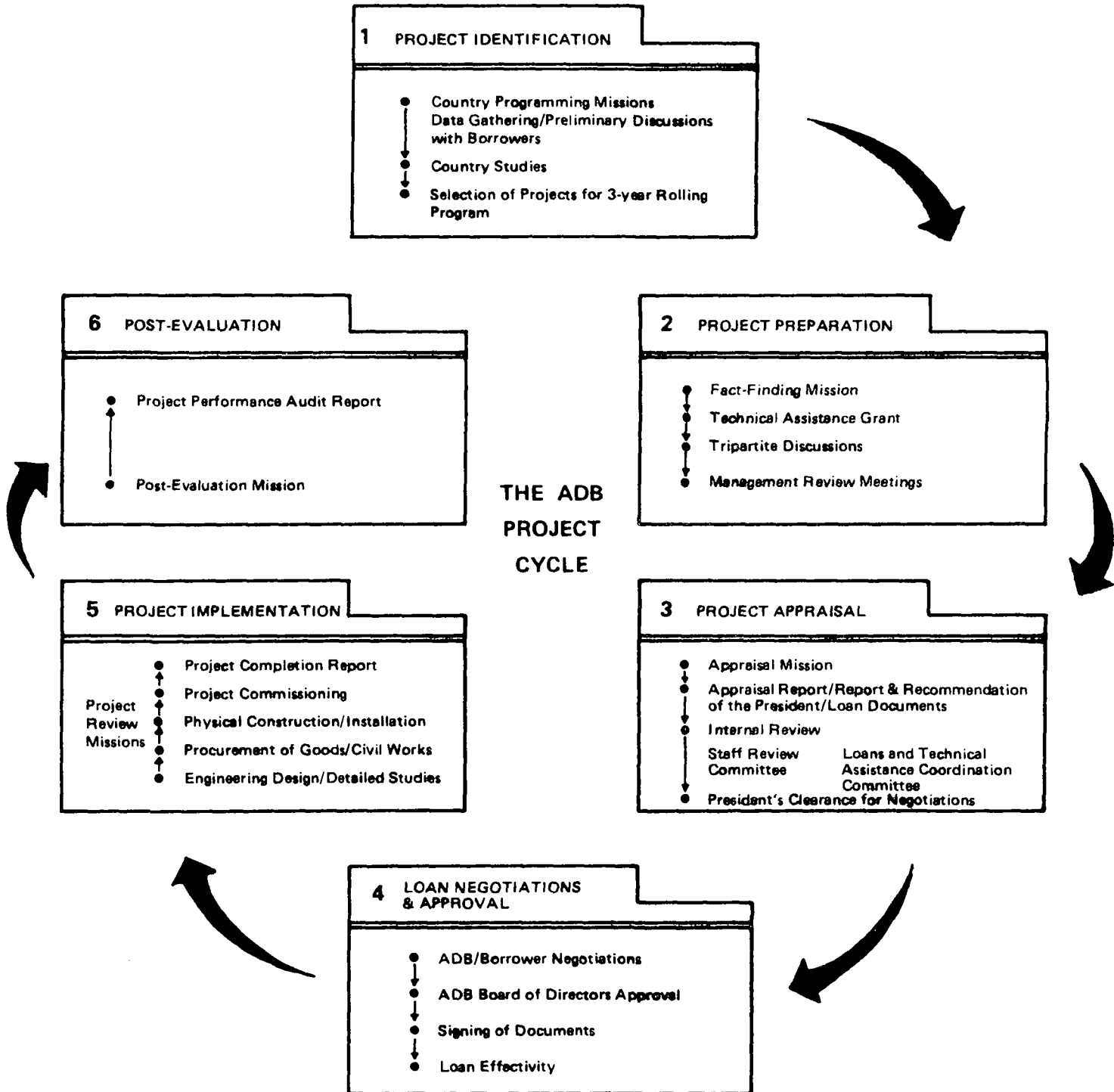


Figure 1

17. An important activity in project identification is programming missions, which are carried out annually by the Bank. These Bank missions identify suitable projects on a three-year rolling cycle for the Bank's consideration.

C. Project Preparation

18. Project formulation and preparation is primarily the responsibility of the executing agency. A reconnaissance mission from the Bank discusses the status of project preparation and the institutional and financial aspects. A project profile thereby emerges, indicating the project objectives, principal issues and a timetable for its further processing.

19. Most water supply and sanitation projects are financed on the basis of feasibility studies, normally carried out by consultants but sometimes by the public entity's own staff. If necessary, the Bank provides the responsible executing agency with technical assistance for Project preparation. Such a study examines the technical, institutional, economic and financial aspects of a proposed project.

D. Project Appraisal

20. Following the Bank's reconnaissance mission (see para 18) and when additional studies and data gathering are completed and a project prepared, a fact-finding mission is mounted. An issue paper is prepared thereafter, to form the basis for seeking advice and direction from senior management of the Bank on the position with respect to the issues and the approach to be adopted to resolve same. If further work is required to complete project preparation and resolve issues before proceeding to the next stage, such work is then commissioned and a pre-appraisal mission mounted. Otherwise an appraisal mission is mounted. The four major aspects examined and appraised are technical, institutional, economic, and financial.

1. Technical

21. The technical appraisal is concerned with evaluation of alternative questions of the recommended scheme, its physical scale, layout, and location of physical facilities. It also examines the technology to be used, types of equipment or processes, technical standards to be adopted, procurement arrangements, and the implementation schedule and arrangements.

22. In a water supply and sanitation project, technical appraisal will be concerned with existing set up, the projected demand, level of service, arrangements for proper operation and maintenance, and whether all alternatives have been considered. A critical part of this technical appraisal is a review of the engineering data and the alternatives considered to determine that the most cost effective solution has been selected. In finalizing project costs, adequate allowances for physical contingencies and expected price increases during implementation are considered. Proposed procurement arrangements are reviewed to make sure that the Bank's requirements are met. In addition, technical appraisal is concerned with reviewing the costs and cost recovery arrangements for

operating and maintaining project facilities. The impact of the project on the environment during implementation and thereafter is also examined, to ensure that adequate measures are taken to eliminate or mitigate any adverse effects.

2. Institutional

23. The institutional appraisal involves an examination of the borrowing entity itself, its organization, management, staffing, policies and procedures. It further includes an appraisal of government policies that condition the environment in which the institution operates.

24. Institutional appraisal should address many questions, e.g., whether the entity is properly organized and its management adequate, whether local capabilities are being used effectively, and whether policy or institutional changes are required. It is difficult enough to develop institutions that will economically implement, operate and maintain urban water supply and sanitation facilities. In rural areas, the approach formulated must take into account social attitudes and patterns of behavior if any success is to be achieved. Programs must be introduced to educate the potential rural consumers as to the benefits and cost of the services and the cost of wastage/misuse. If payment is not made for the service, in kind or in cash, it has been found that the service will soon cease to function. The Bank recognizes the need for a continuing re-examination of institutional arrangements and will adopt a long-term approach.

3. Economic Analysis

25. In the economic analysis of the project, a cost-benefit analysis of the project is undertaken. Both macro as well as micro aspects and impacts are examined. The economic appraisal studies the project in its sectoral and country setting, the investment program for the sector, and key government policies are all examined.

26. In the majority of water supply and sanitation projects, it is possible to assess alternative solutions having the same benefits and select the least-cost solution. Whether qualitative or quantitative, the economic analysis always aims at assessing the contribution of the project to the development of the country.

4. Financial

27. Financial analysis is done primarily to ensure that there are sufficient funds to cover the cost of implementation of the project. The Bank typically finances the foreign exchange cost and expects the Borrower or the government to meet some or all of the local costs. An important aspect of the appraisal is to ensure that there is a financing plan that will make funds available to implement the project.

28. Financial appraisal is also concerned with project financial viability. The Bank examines closely whether the water supply and sewerage entity will be able to meet all its financial obligations, including debt

service payments, and whether it will be able to generate sufficient funds from operation to provide adequate working capital, to earn a reasonable return on its fixed assets, and to make a satisfactory contribution to its future capital requirements.

29. The finances of the entity are closely reviewed through projections of the balance sheet, income statement, and cash flow statements. Where financial accounts are inadequate, 1/ a new accounting system must usually be established, often with technical assistance financed out of the loan.

30. Financial appraisal is also concerned with whether or not the project can recover investment and operating costs from project beneficiaries. Subject to affordability, the Bank normally expects that the beneficiaries will pay all the operating and maintenance costs, and, over the life of the project, the capital cost via the inclusion of depreciation of capital investments in operating costs.

31. In cases in which beneficiaries can not afford the project, the Bank would require that alternatives such as reducing the level of service, cross-subsidization by other consumers, or government subsidies be examined before agreeing to proceed with the proposed project. In each case, actual cost recovery takes account of the income position of the beneficiaries. The policies of the Bank try to strike a balance among the need to use scarce resources efficiently, considerations of equity, and the need to generate additional funds to expand the project.

32. The financial review often highlights the need to adjust the level and structure of tariffs charged. Some governments wish to subsidize services as a matter of policy and therefore may be reluctant to approve tariff increases necessary to ensure the viability of the entity. The establishment of tariffs to reflect the true economic cost of the service provided, subject to checks on affordability to each of the various consumer groups, is one of the major objectives of lending by the Bank. Especially in rural water supply and sanitation projects, the Bank often has to set its sight on a long-term goal, recognizing that it will take time to bring about what may be far-reaching changes in financial policy.

E. Loan Negotiation and Approval

33. On return from the field, Bank staff prepare an appraisal report that sets forth findings and makes recommendations to Management with regard to the appropriate terms and condition of the loan.

1/ A change from a cash system of accounting to a commercial system of accounting using accrual method is required in order to record revenues and expenditures on the day the services are provided or received, thereby reflecting true operating results rather than the cash flow in the profit and loss statement.

34. The appraisal report is reviewed at a number of levels before it is finally cleared for Management 1/ consideration by the Staff Review Committee (SRC). 2/ Once the project is cleared by Management, discussions and negotiations are held with the Borrower based on the loan/ project documents, which tie up the objectives and scope of the project and the commitments/responsibilities of the Borrower and the Bank for project implementation, operation and maintenance. These agreements are known as the loan documents/agreements. The project is then presented to the Board of the Bank for approval. After approval, the loan agreement is signed. The project can then move on to the implementation stage.

F. Implementation and Supervision

35. The borrower is responsible for the implementation of the project. Project funds are disbursed by the Bank on application from the borrower, for financing procurement and the services of consultants required to assist in the implementation of the project.

36. All projects face implementation problems, some of which cannot be identified in advance. Therefore, the Bank stresses that supervision should be the first priority in the assignment of project staff. With the increase in the number of water supply and sanitation projects covering a large number of rural communities, there is a need to increase the resources of the Bank devoted to supervision of this type of project due to the inherent complexity, often incorporating institutional changes, as well as training, and health education programs.

37. Recruitment of consultants under a loan for a project is the responsibility of the Borrower. As in the case of procurement of goods and services, the Bank has guidelines for recruitment also incorporated into the loan agreement. The Bank supervises the implementation, through progress reports from the Borrower and periodic field visits by Bank staff to review progress.

E. Post Evaluation

38. This last stage of the project cycle follows the final disbursement of the Bank funds for the project. An independent department of the Bank, the Post Evaluation Office, reviews the project completion report of the Bank's project staff and prepares its own audit of the project, often by reviewing materials at the headquarters, and through field visits where necessary.

39. Each audit and project completion report for water supply and sanitation projects reviews projections made at the time of appraisal and actual results with regard to number of beneficiaries, water demand, physical completion and cost estimates. The financial internal rate of

1/ The President and Vice-Presidents.

2/ Chaired by the director of the relevant project department and attended by all other departments.

return 1/ is re-estimated on the basis of actual implementation cost and updated information on expected costs and revenues. The evaluation system provides valuable feed back, and is taken into account in subsequent project identification, preparation and appraisal work.

IV. CONCLUSION

40. The objective of this appendix was to give a general overview of the Bank's lending operations, some of its basic policies, and the programs and techniques it uses in its efforts to contribute to the water supply and sanitation development in the DMCs of Asia and the South Pacific.

41. The improvement of water supply and sanitation facilities is of critical importance to the health and socioeconomic progress of Asia. It has been estimated that at any given time there are about 150 million Asians suffering from gastroenteritis, and that if all persons had access to safe drinking water and sanitation, infant mortality would be reduced by 50 per cent. In the past, the Bank has made a contribution to the improvement and expansion of water supplies in major urban centres and to reducing the problems caused by inadequate and overloaded sewerage systems, which particularly affect the urban poor. In recent years, the Bank's role has been enlarged with financing being directed increasingly to projects in provincial and rural areas. This trend will continue and future Bank activities will show a balanced spread between major urban water and sewerage systems and relatively simple village water and sanitation systems. The Bank has also recently become involved in comprehensive studies of air, water and solid waste pollution in order to determine the most cost-effective approach to environmental protection.

1/ FIRR - the financial rate of return on an asset investment is the discount rate that equates the present value of future net revenue streams (over the economic life of the asset) to the cost of the investment.

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ASIA

REGIONAL RESOURCE MOBILIZATION PROFILE
WATER SUPPLY AND SANITATION SECTOR

Foreword

- (i) The purpose of this appendix is to provide an overall view of the water supply and sanitation (WSS) sector situation in the Asia Region, including present levels of service, past funding patterns, resource requirements and, particularly, the role that External Support Agencies (ESA) may play in the future development of the sector.
- (ii) Information concerning the sector, and referred to in this document, is mostly based on statistics inputs ESAs. As the data is not reported in a uniform format and is not always complete, the figures quoted in this appendix often consist of extrapolations from available data, estimates based on Bank's experience.

I. THE ASIA REGION

1.1 Definition of the Asia Region

For the purpose of this appendix, the Asia Region comprises all the Developing Member Countries (DMC) of the Bank noted in Annex 1 (Appendix 2, page 70). It consists of 28 countries covering a total land area of about 10.3 million sq. km. 1/

1.2 Population

In the Asia Region the current average annual population growth rate exceeds the world average. The mid-1984 population of the Asia Region is estimated at 1.43 billion. The average annual growth rate in the 1979-1984 period was between 2 per cent and 2.5 per cent. The average annual growth rate between 1980 and 2000 is projected at 2.4 per cent, and from 1990 to the year 2000, at 1.8 per cent. This would lead to populations in 1990 and 2000 of 1.65 billion and 2.0 billion, respectively.

Total urban population 2/ in 1984 was estimated at about 25 per cent. The average urban growth rate from 1970-1982 was about 3.8 per cent. If the same growth rate is assumed to continue through the year 2000, the urban populations in 1990 will amount to about 27 per cent, and in 2000 to more than one-third of the Region's population.

Table 1 (Appendix 2, page 63) depicts the population development from 1984 through 2000, of the nine major countries accounting for more than 90 per cent of the Asia Region's population.

The rural exodus is particularly noticeable in Bangladesh, the Republic of Korea, and Indonesia, where the urban populations in 1982 amounted to about 12 per cent, 61 per cent and 22 per cent, respectively. If the high urban growth rate in these three countries cannot be drastically reduced, in the year 2000 urban populations might average 20 per cent, 90 per cent and 35 per cent. This would require sizeable investments for infrastructure, and constitute an extremely difficult task for urban planners. In addition, fast urban growth would perpetuate the trend for urban rather than rural WSS sector investments, and would continue to demonstrate that despite the steady flow of funds to the sector, the service coverage rate would not keep up with population expansion.

Demographic development of a country or a region generally affects its economic performance. Sustained economic relapse in industrialized countries dates back about 20 years. While there are a number of interrelated causes for poor economic performance in the late 1960s and throughout the 1970s, the "crisis period" also coincides with the remarkable surge in worldwide population growth which began in the second half of the Twentieth Century.

1/ The People's Republic of China with a land area of about 9.56 million sq km and more than one billion people, is not an ADB member.

2/ Because estimates are based on different national definitions of what is "urban"; cross-country comparisons should be interpreted with caution.

1.3 Socioeconomic Situation

1.3.1 The Economy - Worldwide Trends

During the past ten years, the world has had two major recessions; a brief, severe one in 1974-1975, and a more drawn out one in 1980-1983. During the first recession, developing countries were less affected than industrial countries. Their GDP growth dropped only slightly, from 7.4 per cent in 1973 to 4 per cent in 1975, compared with 6.1 per cent in 1973 to only 0.4 per cent in 1975 for industrial countries.

The second slowdown hit developing countries harder. GDP growth of only 2.5 per cent in 1980 fell to 2.4 per cent in 1981, to 1.9 per cent in 1982, and an estimated 1 per cent in 1983. Many least developed countries (LDC) are still suffering in 1985 from a stagnating economy.

While the cause of the first recession (1974-1975) can be mostly attributed to the sharp oil price increase, the second one has two probable causes: the oil price increase from supply disruptions in Iran, and drastic anti-inflation measures undertaken by industrial countries after 1980 (high interest rates, trade barriers). In an interdependent world economy, the wellbeing of developing countries depends largely on that of industrial countries, especially considering that about 65 per cent of the output from developing countries is consumed by the developed world.

Two fundamental consequences have emerged from the new world economic situation that began to develop in the early 1970s and that resulted in a changing development environment. First, recession and high energy prices have led developing countries to increase their borrowings throughout the 1970s, which has doubled or even tripled the debt service ratio (interest and loan amortization as a percentage of earnings from export of goods and services) for most of the countries. The debt burden has, however, impacted more strongly on middle income developing countries than on LDCs, as the former had to borrow mostly on commercial terms, while the latter received soft loans and grants ^{1/}. This means that a larger share of foreign exchange earnings -- part of which otherwise could be spent on development financing -- flows back to industrialized countries in the form of debt service.

Second, in the recessionary environment of the 1970s and early 1980s, Official Development Assistance (ODA) from industrialized countries increased only slightly in real terms. The combination of an increased outflow of foreign exchange and a stagnatory inflow of ODA has the

^{1/} Reported external public debt of low-income (1983 GNP/capita more than US\$400) market economies in 1982 was US\$57.1 billion, with an average debt service ratio of 5 per cent to 8 per cent. These figures were, respectively:

- for middle income (1983 GNP/capita more than US\$400) economies: US\$138.2 billion and 20% to 30%.
- for upper-middle income (1983 GNP/capita more than US\$400) economies: US\$221.0 billion and 15% to 25% (including Brazil: US\$47.6 billion = 42.1%).

inevitable effect of widening the gap between industrialized and developing countries, and within the latter, between low and high income groups (see Table 2 (Appendix 2, page 64) - Income Distribution in Nine Countries in the Asia Region).

This general trend analysis applies similarly to developing countries throughout the world, except for a variation in sub-Saharan Africa, where climatic conditions have compounded the crisis.

1.3.2 Asia Region Development Experience 1970 to 1980

For the purpose of this analysis, the DMCs have been divided into three groups, taking account of the diversity within the Region. Grouping of the countries refer to low-, middle- and high-income countries and reflect Bank's lending arrangements.

Group A 1/ contains the low-income DMCs, with per capita GNP in 1980 below US\$300. These are essentially agriculture-based economies, with low productivity and high population pressure on land. Slow growth marked their economic performance throughout the 1970s. In addition, they suffered high current account deficits, high inflation, a sharply increasing debt service burden, and slackening demand for their exports due to continuing recessions in industrial countries. Their average annual GDP growth was about 3.2 per cent (about 4 per cent for the 5 selected countries in Group A see Table 3). Rapid population growth, averaging 2-3 per cent per year, largely offsets output increases, widening the gap in per capita income between Group A countries and other DMCs. Current account deficits, resulting mainly from higher prices for oil and capital goods, were mostly financed by official development assistance.

Group B 2/ consists of lower-middle-income DMCs, characterized primarily by commodity-producing economics. These economies were highly vulnerable to depressed world demand and prices for primary products as well as non-traditional exports during the 1970s and early 1980s. Nevertheless, these countries achieved average GDP growth rates of 6 per cent to 8 per cent per year in the 1970s, which allowed a reasonable increase of per capita income. After the second oil shock, and with the objective of reducing current account deficits, some of the Group B countries, for example the Philippines and Thailand, attempted to modify their policies to structural adjustments, i.e., redirecting resources towards production of more efficient export promotion and import substitution activities. Indonesia, as an exception, has hardly been affected by the economic slump of the 1970s due to increased receipts from oil and non-oil exports. However, since 1981, Indonesia's economy had to be readjusted as a result of continuous global recession and slackening demand for oil.

1/ Group A includes: Afghanistan, Bangladesh, Bhutan, Burma, Cambodia, India, Lao People's Democratic Republic, Maldives, Nepal, Pakistan, Sri Lanka, Viet Nam, Cook Islands, Kiribati, Solomon Islands, Tonga, Vanuatu, West Samoa.

2/ Group B includes: Indonesia, Papua New Guinea, Philippines, Thailand.

Group C 1/ DMCs are upper-middle and high-income developing countries. They are characterized by fast industrialization, such as in the Republic of Korea, Singapore, and Hong Kong. These economies have fared well throughout the 1970s with a sustained growth of 8 per cent to 10 per cent per year. The adjustment process of these countries was further assisted by substantial capital flows from external private sources. However, toward the end of the 1970s and the early 1980s, these resources declined, mainly as a result of over-indebtedness of developing countries in general. Exports and GDP growth have already been adversely affected.

1.3.3 Development Prospects of the 1980s

The international economic environment facing developing countries worldwide has worsened considerably since the beginning of the 1980s. The continuing slow economic growth of industrialized countries will exacerbate this tendency in the years to come. Nevertheless, the Bank projects an overall real growth of developing countries' economies in the 1985-1995 period of 4.7 per cent to 5.5 per cent. (See Table 3 (Appendix 2, page 65) -- GDP Growth Pattern and External Public Debt.)

In the case of DMCs, export-dependant countries like the Republic of Korea and the Philippines, will grow slower than in the past, partly because their markets in industrialized countries are stagnating, and partly because their already high debt service ratio will put constraints on additional borrowing. This adverse impact is further compounded by an expected reduction in concessionary funds. On the other hand, low income DMCs in the 1970s have received a significant proportion of their investment capital (14 per cent) and foreign exchange for imports (20 per cent) from ODA. The World Bank projects a decline in the rate of increase of ODA in the 1980s with 18.1 per cent in nominal terms (average 1970s), to below 10 per cent, or at best, 11.7 per cent, a clear decline in real terms (see Table 4, (Appendix 2, page 66) - Net Flow of Financial Resources from all Sources to DMCs by Type of Funds: 1970-1980).

A reduction in ODA and concessionary lending will also signify less funds for social sectors in developing countries, which would directly affect WSS activities. In the light of Chapter II, depicting an abstract of resource requirements to meet Decade 2/ targets, one can but realize that both objectives and approaches to solve the constraints of under-served populations need to be re-examined and adjusted for realism.

1.3.4 Other Social Indicators

Health statistics provide one of the best indications as to the status of the hygienic environment of a country. It is often found that people are unaware of the correlation between their sanitary environment and their state of health. In most developing countries, 60 per cent to 80 per cent of all endemic diseases can be attributed to poor water supply and sanitation. This deficiency strikes small children, in particular. In

1/ Group C includes: Republic of China, Fiji, Hong Kong, Republic of Korea, Malaysia, Singapore.

2/ International Drinking Water Supply and Sanitation Decade, 1981-1990.

Asia, infant mortality (death rate per 1,000 live births of children below 1 year of age) is particularly high in Afghanistan (205), Bangladesh (133), and Pakistan (121) -- 1/ these were countrywide averages in 1982. In some rural areas, the infant mortality rate might at times be above 300.

Education, the basis for an improved standard of living, in (least-developed countries (LDCs), lags far behind that of industrialized countries. In turn, general wellbeing is a prime motivator for economic activity. In many developing countries, the social environment requires children to contribute to the family economy, through engaging in farm work, trading, and other remunerated chores. These activities prevent them from attending school, which perpetuates the ignorance that is frequently the origin of their families' dismal fate. In fact, there appears to be a direct relation between per capita GNP and the proportion of primary school enrollment. For example, primary school enrollment in Bangladesh (US\$140 GNP per capita) in 1981 was reported as 62 per cent of children in this age group, as compared to Thailand (US\$790 GNP per capita), reporting a 96 per cent enrollment of the related age group. Table 5 (Appendix 2, page 67) shows some health and education indicators for the nine selected countries of the Asia Region.

11. THE WATER SUPPLY AND SANITATION SECTOR

2.1 Present Situation

In the DMCs of the Asia Region, water supply and sanitation service coverage at the beginning of 1985 was high, relative to other regions -- for drinking water supply, it averaged 66 per cent, and for sanitation or safe excreta disposal, 38 per cent. To what extent these levels will further improve in the second half of the Decade, will largely depend on government development priorities (i.e., support to underserved rural and urban populations), and the extent to which external and local funds will consider these priorities. If the flow of funds is unlikely to increase significantly in the present worldwide economic climate, perhaps the most important factor for sustained development of the sector will be the approaches (i.e., socially relevant systems that people can afford) chosen by governments and the support they obtain from funding agencies, and the further reduction of population growth.

2.2 Sector Objectives

The overall Decade objective for DMCs of the Asia Region is to reach service levels of 86 per cent in drinking-water supply, and 43 per cent in sanitation or safe excreta disposal systems. This, however, seems to be a political rather than a realistic target. Achieving this objective would require, from 1985-1990, more than ten times the investment amount of that estimated for the 14 preceding years (see Section 2.3.2). Table 6 (Appendix 2, page 68) provides a summary of service coverage (present and 1990 targets), as well as financial requirements for DMCs.

1/ Infant mortality in Sweden, Finland and Japan was 7, in Switzerland 8, in the USA 11.

It appears obvious that governments and funding agencies will have to adjust their traditional sector investments methods to strategies which are more apt to address under-served populations, which are affordable for the people concerned, and which invoke self-reliance and community participation.

2.3 Resources

2.3.1 Past Investments

Most of the financial input into the WSS sector of DMCs in the 1970-1984 period has come from four multilateral 1/ and a number of bilateral external support agencies (ESA).

The largest single financiers have been the Bank and the World Bank, with estimated funding from 1970 to 1984 of about US\$1.35 billion 2/ and US\$1.6 billion, respectively. Total estimated WSS sector investments from ESA's for DMCs are about US\$3.2 billion (in current prices 3/) in this period, or an annual average of about US\$213 million. The yearly investments of the last five years are probably about double that of the preceding ten years. This corresponds to about 23 per cent of worldwide sector investments by these agencies in the same period. For details, see Annex 2, (Appendix 2, page 71 -- Water Supply and Sanitation Sector Investment, An Estimate).

The proportion of government contributions toward construction projects in the WSS sector is not known, but estimates fluctuate between 25 per cent and 50 per cent. No figures on operation and maintenance (O & M) costs are available, either. They may reach 10 per cent to 15 per cent per year, of investment costs in urban areas, and 1 per cent to 5 per cent in rural areas.

Subsector investment breakdowns are not readily available from all agencies. However, on the average, it is estimated that about 70 per cent of all investments were allocated to urban water supply, 20 per cent to 25 per cent to urban sanitation, and only about 5 per cent to 10 per cent to rural water supply. Rural sanitation has been largely neglected.

Available data is insufficient to compute accurately the proportion of WSS investments of the total assistance funds channelled to the Region by these agencies. However, it can be estimated that roughly 3 per cent to 5.5 per cent of all funds were allocated to the WSS sector. This corresponds approximately to the proportion allocated to the WSS sector from overall government budgets.

1/ Multilateral: The Bank, World Bank, European Development Fund, OPEC Fund.

2/ The Asian Development Bank from 1967 to 1985 invested US\$1.35 billion in the WSS sector, or 8 per cent of the Bank's total lending, covering 53 projects in 15 countries.

3/ Does not include activities from NGOs, as no comprehensive statistics are available.

2.3.2 Future Investment Requirements

It is estimated that to meet 1990 Decade targets of its DMCs, investments of about US\$35.2 billion (at 1985 prices) would be required in the 1985-1990 period. On an annual basis, investments would have to be more than 30 times higher than the average yearly investments from 1970 to 1984.

This amount is based on average per capita investment costs of US\$126 for urban water supply, US\$35 for rural water supply, US\$223 for urban sanitation, and US\$29 for rural sanitation. Table 7(a) and 7(b), (Appendix 2, page 69) indicates water supply and sanitation per capita investment costs in 19 DMCs.

Of the investments required between 1985 and 1990, about 65 per cent would need to be provided from external resources: i.e., the governments concerned could only be expected to contribute about US\$12.2 billion towards these WSS sector investments.

No estimates are available on recurrent costs necessary to operate and maintain these new investments. Considering, however, that on the average it might be as high as 10 per cent per year of the capital investment and that at present the funding and carrying out of O & M activities is one of the major constraints of the sector institutions, it would be a near impossible undertaking for these institutions to raise the sharply increased recurrent resources required to run the new systems.

If per capita cost assumptions are correct, Decade service coverage targets for 1990 have to be reduced considerably to meet current, or even slightly improved, institutional capacity standards. Alternatively, capital costs and service needs should be re-examined for their adequacy and appropriateness in view of adjusting technology standards to reduce investment and maintenance costs.

This latter point seems to be the key conclusion. Even if a sensitivity analysis would put a 100 per cent deviation on the assumption base, i.e., if past annual investments were about US\$426 million (instead of US\$213 million), and future annual requirements US\$3.5 billion (instead of US\$7.0 billion), the message is still clear: unless different sector development approaches are chosen, the gap cannot be bridged.

Official Development Assistance might stagnate in the foreseeable future, or, in the worst case, even decline in real terms. In a depressed economy, which the world likely continues to be faced with during the next few years, investment priorities are usually attributed to directly productive sectors (manufacturing and agriculture), rather than to social sectors. Funding for the WSS sector can, therefore, not be expected to increase significantly in the remainder of the Decade. Yet the need for higher service coverage rates and improved service levels continues, thus requiring alternative low-cost solutions (rehabilitation, improved operation and maintenance including beneficiaries' participation, design of socially relevant systems) acceptable by governments and funding agencies alike.

2.3.3 Funding Conditions

As a social sector with a limited cost recovery potential, particularly in rural areas, the WSS should ideally be funded by grants or concessionary loans. The criteria for the choice of project financing should be based on the affordability of the new installations. Normally, the cost to the beneficiaries of a WSS system should not exceed 3 per cent of the lowest income. Projects in Group A DMCs and in some cases for Group B DMCs, if they have a high social content, are mostly eligible for soft-term financing ^{1/} by the Asian Development Fund (ADF). Funding of projects in Group C DMCs and in most cases in Group B DMCs is at ADB's regular lending rate. ^{2/}

Furthermore, the Bank's loans are usually designed to cover only the foreign exchange component of a project (on the average 60 per cent of total project cost), whereas ADF financing may pay up to 80 per cent of total project cost, including a local cost component. In addition, the Bank will, in general, only finance 80 per cent of the total project cost in Group A DMCs, and 60 per cent and 40 per cent in Group B and Group C DMCs, respectively. Lending rates and conditions of other ESA's may differ, but, if at least partial cost recovery remains an objective, they should aim at lowering the cost to the WSS institutions and, ultimately, to the consumer.

2.3.4 Other Support Activities

In addition to financial aid for investment purposes the WSS sector is in dire need of Advisory and Operational Technical Assistance (AOTA), a term that covers a wide range of activities linked to the transfer of technical, financial and administrative know-how. Traditional AOTA projects or project components are often supported by ESA's in the form of the broad concept of "institution building" which normally aims at improving the institutions technical and financial efficiency. Other less conventional AOTA approaches could also be of invaluable benefit to the WSS sector of developing countries: Other less conventional AOTA approaches could also be of invaluable benefit to the WSS sector of developing countries:

- The promotion of appropriate technology (Socially relevant and affordable systems) and community participation (active involvement of the beneficiaries) would help to reduce the cost of WSS installations and ease their much neglected maintenance. This would be a significant contribution to the WSS sector, particularly in the rural areas, in an environment of limited cash resources.
- Building a project preparation capacity within WSS sector institutions would help DMCs to prepare a pipeline of technically

^{1/} One per cent annual service charge, 40 years repayment period, including ten years of grace.

^{2/} September 1985, 9.65 per cent interest, normally 10 to 25 years of repayment, including two to five years grace periods.

and financially sound projects which could ultimately be submitted to potential donors or funding agencies.

- An active campaign to coordinate WSS with other ongoing or planned health activities would allow to associate the water and sanitation related environmental hygiene with other Primary Health Care (PHC) services.
- Project lending through local development banks may in many cases, specially rural areas, facilitate project implementation. Local development banks can often act faster than large institutions, and their staff might be closer to the grassroots of a daily situation.

2.3.5 National Resources

National development funds are normally used to finance government investments; as counterpart contribution to externally financed projects; and to operate and maintain ongoing and new projects. Mobilizing these resources for the WSS sector presents a notorious constraint in developing countries that may have a particularly negative impact in the latter two cases: lacking counterpart funds may delay execution of externally funded projects and, in many cases, result in cost increases; and the shortage of funds to cover recurrent expenditures, i.e. to pay for operation and maintenance, may often lead to a faster than normal deterioration of installations and thus, a reduction in both the financial and socioeconomic returns from the investment.

External Support Agencies may help to alleviate these deficiencies by:

- (i) ascertaining adequate provisions for counterpart funds and recurrent costs in national budgets, when negotiating the financing of projects; and
- (ii) when designing projects, incorporating mechanisms that would facilitate the flow of national funds to the sector, for example the establishment of revolving funds or lines of credit with local development banks.

In addition ESA's can, in collaboration with WSS sector and associated government authorities, explore ways of mobilizing non-monetary resources, i.e. the participation in project execution and subsequent O & M by beneficiaries through labor or the supply of local materials. This input in kind would not only constitute a cash-saving project component, but it would also generate an active involvement of communities, leading to a long-term social benefit.

2.4 Absorptive Capacity

While full cost-recovery, mainly in urban areas, may remain an objective for the future, most sector institutions still depend largely -- and will do so for many years to come -- on government subsidies and external funding. This financial dependency, as well as an often undefined legal status, sets the stage for an institution's absorptive capacity. In addition, there are limits with regard to human resources (qualified personnel, training) and technical know-how to carry out regular rehabilitation and maintenance programs, as well as the construction of new WSS systems. Many ESA's identify specific TC projects, designed to strengthen the institution, so as to assure the execution of investment projects. Others include TC components in their construction projects with the same purpose.

Despite this effort, the overall institutions' management and project execution capacity will probably not increase much more than 10 per cent per year. Therefore, the calculation of capital cost requirements remains to a great extent a theoretical exercise. Even if the funds were available, their viable absorption would remain a function of the institutions' management, construction and maintenance capacity.

2.5 Sector Coordination

In general, coordination between agencies within the WSS sector and with institutions of other sectors, is weak. Often, several organizations are involved in the same sub-sector. Individual roles are not clearly defined, leading to overlapping activities, and thus a squandering of scarce resources.

Insufficient cooperation and collaboration is particularly prevalent between ministries or agencies in charge of water supply and the health sector. Therefore, efforts to coordinate water supply and sanitation with general health services, or, more specifically, with PHC programs, have so far remained a pioneering task, with positive results still to show. This integration is of primary importance in rural areas, where village health centres have often been designed without water points and sanitary facilities. One of the main constraints for integration might be the relatively high per capita cost for WSS (about US\$40 to US\$80 in rural areas), compared with only US\$2 to US\$5 for other PHC components. Nevertheless, governments have recognized that WSS is a vital element in the pursuit of basic health. ESAs are thus urged to take due account of this fact in the future design of WSS projects.

2.6 Non-Governmental Organizations

At present, little information is available on the activities of NGO's in the Asia Region. They often act as autonomous agencies and have seldom contact with larger ESA's. Nevertheless, their input in the WSS sector can be significant, particularly in terms of filling a gap in those areas where multi- and bilateral funding agencies lack the flexibility to quickly adapt to changing situations.

- NGO's could play the role of project execution entities for development banks and bilateral agencies, thereby reducing lengthy administrative procedures (example: CARE frequently carries out USAID funded projects).
- The grassroots approach of many NGO's can provide technical know-how and experience in low-cost rural WSS projects and the necessary consideration of social aspects for project implementation.
- NGO's flexibility to act quickly in the absence of formal administration constraints may often be helpful.
- Hygiene education, a field requiring close contact with the populations concerned, might be more aptly carried out by NGO's than by other ESA's.

2.7 Key Sector Constraints

The main sector constraints are linked to fund raising and are similar in the most developing countries. In addition, it is, however, worthwhile to single out

- the lack of operation and maintenance (O & M) can be largely linked to the shortage of national resources but also to the absence of hygiene "awareness" of the populations concerned;
- the insufficiency of national counterpart funds for externally financed projects often delays project execution, thus disrupting the pace of project implementation and raising its overall cost;
- the local construction industry needs to be strengthened so that it can effectively support the WSS sector and help reduce the foreign exchange component of projects;
- WSS sector institutions have generally a limited absorptive capacity (shortage of manpower, equipment, ill-defined legal status, financial resources and work experience) and, therefore are constrained in the execution of projects as well as O & M activities; and
- in most countries WSS sector inputs have widely neglected the urban poor and rural populations.

A continuous dialogue among ESA's, particularly their local representatives, might help to achieve a balanced development approach.

III. CONCLUSIONS

3.1 Past Shortcomings

WSS sector investment patterns of the past 15 years indicate that about 90 per cent of all development funds from ESAs were channeled into largely capital intensive urban water supply (about 70 per cent) and urban sanitation (20 per cent to 24 per cent) projects. Rural areas have been widely neglected.

Considering that the majority of DMCs populations live in rural areas (on average 60 per cent to 80 per cent) these funds have not yielded maximum benefits.

Close to 80 per cent of external resources that were channeled into the WSS sector since 1970 came from the two major development institutions active in the Asia Region, the Bank and the World Bank. This indicates that these agencies are trend-setters for sector investment policies of ESA's. It further shows that ESA's investment policies have yet to shift to give emphasis to under-served rural and urban populations.

While it might not be obvious during economic recessions that development funds - from external as well as local resources - are directed towards social sectors, ESAs and DMCs should recognize, however, that economic development depends largely on the political will, the social environment and wellbeing of population.

3.2 The Role of External Support Agencies

The international donor/financing community, including NGO/s, constitutes a significant link between government policies and project implementation. In the process of funding specific projects, ESAs become involved in policies of developing countries, the selection of priorities, and the appraisal and execution of projects. Furthermore, their individual engagement in a particular sector, i.e. water supply and sanitation, exposes them to similar activities of other ESAs in the same sector. In that sense, an ESA plays a triple role in relation to government authorities in developing countries, of adviser, of participant to the coordination process, and of financier.

New emphasis was put on this triple role aspect during the European Donor Consultation that took place in October 1984 in Konigswinter, near Bonn, West Germany. The Consultation was co-sponsored by WHO and the German Federal Ministry for Economic Cooperation (BMZ), and was attended by representatives of 12 bilateral and 7 multilateral organizations. ^{1/} The Consultation stressed the need for, (i) improved coordination in the WSS sector among ESAs, (ii) a reorientation in the development approaches for the WSS sector, and (iii) efforts to increase the flow of funds to the sector. It concluded on the usefulness to continue the dialogue and exchange of views and experiences among ESAs in similar international fora. As a result, the OECD-DAC Meeting followed in May 1985 in Paris, where the subject of a "common denominator" for Decade work was among the key topics.

The present Regional External Support Consultation, co-sponsored by the Asian Development Bank, WHO, and the BMZ, is a further action towards joint Decade promotion. Similar consultations are planned for November 1985 with the African Development Bank in Abidjan, Ivory Coast, and in February 1986 with the Inter-American Development Bank in Washington, D.C., USA.

^{1/} The report by the Secretariat (February 1985) of the WHO/BMZ European Donor Consultation, is available from WHO and the German Federal Ministry for Economic Cooperation.

3.1.1 The Adviser

External Funding Agencies can play an important advisory role in collaborating with governments and WSS sector authorities by cooperating in

- the design of sector policies;
- the elaboration and updating of sector development plans;
- the removal of institutional deficiencies;
- the identification of sector priorities;
- the preparation of technically and socioeconomically sound projects;
- the mobilization of national resources through central or local government and communities; and
- in the continuous effort to coordinate water supply and sanitation with basic health services.

This advisory activity might lead to a better understanding on how the WSS sector constitutes a concise component in the overall development of a country.

3.2.2 The Participant in the Coordinating Process

Although sector coordination is a major responsibility of government authorities, ESAs may be instrumental in helping to streamline sector activities so as to avoid duplications and omissions. In some developing countries, a form of coordination is the organization of ad hoc meetings of the donor community, during which program and project plans of individual agencies are discussed. In other cases, the local UNDP Office takes the lead in calling meetings with resident donor representatives, the so-called Technical Support Committee for the Decade.

Often such coordination meetings are, however, of a sporadic nature, and lose momentum after a while.

Coordination among ESAs should take place on a regular basis

- in each developing country, harmonize their support on sector policies and approaches of recipient governments to achieve Decade goals;
- at a regional level, such as the present Manila Consultation; and
- in a global context, like the Konigswinter Consultation of October 1984 or the DAC Meeting in Paris of May 1985.

This structured coordination might, in the long-run, lead to more frequent co-financing of projects, where the chief purpose is the pursuit of a common objective.

3.2.3 The Financier

Finally, as financiers of projects and programs, ESAs may also act as catalysts of resource mobilization for the WSS sector, particularly for jointly identified priorities. This activity is not confined to external resources, but also includes raising of funds from central or local government, communities, and the motivation of beneficiaries to participate in project implementation through labor or the supply of local materials.

As ODA is unlikely to increase significantly in the coming years, it is all the more essential that ESAs continue to put emphasis on the WSS sector as a primary element of social wellbeing in the macro-economic development process through more efficient sector approaches.

3.3 The Need for a Data Bank of "Common Denominators"

A comprehensive data base on the flow of external funds to the WSS sector, would facilitate the analysis of Decade progress in developing countries. In that sense, WHO has issued the Catalogue for External Support. In addition to a listing of major multilateral and bilateral agencies, as well as NGOs, which are active worldwide in water supply and sanitation, the Catalogue also shows figures of individual agencies' investments and technical cooperation in the sector. Since every agency uses its own statistical data, so far, few common input denominators have been used that would allow to read an unequivocal pattern of past funding, and to project future needs in the sector.

For a better understanding and interpretation of sector activities, it would be helpful if each External Support Agency would regularly (once a year) report its past sector inputs in a uniform format, and respond to a few questions which address ESAs sector policies and experience.

The Catalogue for external support might, thus, become a reference book for Decade progress. Annex 3 (Appendix 2, pages 72-73 shows the desirable reporting format.

3.4 The New Thrust

Looking at past WSS sector experience, future sector requirements and the present world economic situation, one may conclude that a new direction in sector development is called for.

- (1) Institutional Development: The WSS sector institutions are limited in the amount of activities they can handle, due to constraints in their organizational structure and availability of own resources, funds and manpower. New and existing installations need to be maintained regularly. The generation of national funds through cost recovery, at least partially, is a vital step in ensuring O & M and the sector's viability. Therefore, if sector investments are to reach the objective of improved service coverage, ESAs ought to keep in mind that the institutions' capacity needs to be developed in advance of construction projects, through intense technical cooperation.

- (ii) Coordination of Assistance to the Water Supply and Sanitation Sector: In the present economic world environment, the flow of external funds to the WSS sector may not increase substantially in the foreseeable future. Nevertheless, ESAs can help in optimizing the impact of limited funds, by coordinating among themselves and with government authorities their approach to the sector's development, thus streamlining their activities through coordinated support of recipient governments' sector policies.
- (iii) Decade approaches: The focus of WSS sector investments has hardly shifted from the traditional project approval to more cost-conscious, socially adapted programmes since the beginning of the Decade look at their support activities, particularly in view of emphasizing the so-called Decade approaches, i.e.,
- complementarity in developing water supply and sanitation;
 - strategies giving precedence to under-served rural and urban population;
 - programs promoting self-reliant, self-sustaining action;
 - socially relevant systems that people can afford;
 - community involvement at all stages of project implementation;
 - association of water supply and sanitation with relevant programs in other sectors, particularly with primary health care, concentrating e.g. on health education, human resources development, and the strengthening of institutional performance.

Table 1

POPULATION GROWTH PATTERN
(Population figures in million)

Countries	Pop. mid-1984	1980-2000 growth %	Proj. pop. 1990	Proj. pop. 2000	Urban pop. 1982 %	Average annual growth urban pop. 1970-1982	Est. urban pop. 1984	Projected ^{1/}	
								Urban pop. 1990	Urban pop. 2000
Bangladesh	96	2.9	119	157	12	6	11.5	16.3	30.9
Burma	37	2.4	43	53	28	3.9	10.4	12.6	19.1
India	730	1.9	844	994	24	3.9	175.2	212.0	322.4
Indonesia	162	1.9	179	212	22	4.5	35.6	46.3	75.1
Korea, Republic of	41	1.4	45	51	61	5.0	25.0	33.5	47.3
Pakistan	93	2.7	107	140	29	4.3	27.0	34.8	55.4
Philippines	53	2.1	61	73	38	3.8	20.1	25.1	38.0
Thailand	51	1.9	57	68	17	4.3	8.7	11.2	17.8
Viet Nam	58	2.5	70	88	19	3.2	11.0	13.3	18.8
Total	1 321		1 525	1 836			324.5	405.1	624.8
% of total							24.6%	26.6%	34.6%
Average growth		2.4%		1.8%				3.8%	

^{1/} Assuming that urban growth rate would remain stable in the 1985-2000 period.

Sources: Mid-1984 population: Asian Development Bank.

Project growth rate, population and rural/urban distribution: World Bank (World Development Report 1984).

INCOME DISTRIBUTION ASIA REGIONTable 2

Countries	Reporting Period	Percentage share of total household income, by percentile groups of households			
		Lowest 20%	Middle 60%	Highest 20%	Highest 10%
<u>Group A^{1/}</u>					
Bangladesh	1973-1974	6.9	50.9	42.2	27.4
Burma	N.A.	-	-	-	-
India	1975-1976	7.0	43.6	49.4	33.6
Pakistan	N.A.	-	-	-	-
Viet Nam	N.A.	-	-	-	-
<u>Group B^{1/}</u>					
Indonesia	1976	6.6	44.0	49.4	34.0
Philippines	1970-1971	5.2	40.8	54.0	38.5
Thailand	1975-1976	5.6	44.6	49.8	34.1
<u>Group C^{1/}</u>					
Korea, Republic of	1976	5.7	49.0	45.3	27.5

N.A.: Not available

^{1/} The grouping of countries refers to low, middle and high income countries and reflects ADB's lending conditions.

Source: World Bank, World Development Report 1984.

GDP GROWTH PATTERN AND EXTERNAL PUBLIC DEBT

Countries ^{1/} Regions	GNP per capita 1982 US\$	GDP annual average growth rate in %		Regional growth pattern in %		Regional growth projections 1980-1990 in %		External Public Debt US\$ millions 1982	Debt Service 1982 in % of	
		1960-1970	1970-1980	1960-1970	1970-1980	low	high		GNP	Exports
I. Countries (DMC's Asia Region)										
<u>Group A Countries:</u>										
Bangladesh	140	3.6	6.5	-	-	-	-	4 353	1.0	8.3
Burma	190	2.6	3.9	-	-	-	-	1 960	2.1	22.0 ^{2/}
India	260	3.4	3.2	-	-	-	-	19 487	0.7	7.1 ^{2/}
Pakistan	380	6.7	4.5	-	-	-	-	9 178	1.8	9.2
Viet Nam	330	N.A.	N.A.	-	-	-	-	N.A.	N.A.	N.A.
<u>Group B Countries:</u>										
Indonesia	580	3.9	7.5	-	-	-	-	18 421	2.6	8.3
Philippines	820	5.1	6.1	-	-	-	-	8 836	2.6	12.8
Thailand	790	8.2	7.0	-	-	-	-	6 206	2.2	8.4
<u>Group C Countries:</u>										
Korea, Republic of	1 910	8.6	8.7	-	-	-	-	20 061	5.2	13.1
Total								<u>88 502^{3/}</u>		
II. Regions:										
Oil importers	N.A.	-	-	5.7	5.1	5.4	4.1	-	-	-
Low income oil importers	250 ^{4/}	-	-	4.2	3.0	4.1	3.0	-	-	-
Sub-Saharan Africa	250 ^{4/}	-	-	4.0	2.4	3.0	1.9	-	-	-
Asia	250 ^{4/}	-	-	4.3	3.2	4.4	3.2	-	-	-
Middle income oil importers	1 500 ^{4/}	-	-	6.2	5.6	5.6	4.3	-	-	-
Sub-Saharan Africa	N.A.	-	-	4.1	3.5	3.1	2.8	-	-	-
East Asia and Pacific	1 100 ^{4/}	-	-	7.9	8.2	8.1	6.4	-	-	-
Latin America, Caribbean	1 840 ^{4/}	-	-	5.3	6.0	5.6	4.6	-	-	-
Middle East/North Africa	800 ^{4/}	-	-	4.1	4.9	4.1	3.2	-	-	-
Oil exporters	N.A.	-	-	6.5	5.2	6.5	5.4	-	-	-
All developing countries	650 ^{4/}	-	-	5.9	5.1	5.7	4.5	-	-	-

N.A.: Not Available.

^{1/} The nine countries represent more than 90 of the Asia Region's population, not including the People's Republic of China.

^{2/} Figures are for 1981, not 1982.

^{3/} Reported external public debt from developing countries, worldwide, in 1982 was US\$ 416.3 billion, i.e. external public debt of the eight reporting Asian countries represents about 21% of the total worldwide.

^{4/} Figures refer to GDP per capita 1980, not GNP 1982.

Sources: Asian Development Bank, "Study of Operational Priorities and Plans of the Asian Development Bank for the 1980s".
World Bank, "World Development Report", 1984.

NET FLOWS OF FINANCIAL RESOURCES FROM ALL SOURCES TO DMCs BY TYPE OF FUNDS^{1/}: 1970-1980
(US Dollars Million Current Prices)

Type of Funds	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980
Bilateral flows, net	4 117.0	4 379.2	4 930.2	6 159.6	6 866.0	8 513.9	9 720.9	6 160.6	8 173.2	9 742.8	10 754.7
Official flows	3 137.8	3 400.8	3 904.7	4 283.4	5 527.2	5 805.9	5 880.1	4 414.7	5 581.9	6 160.9	6 951.0
DAC ^{2/}	3 137.8	3 400.8	3 254.7	3 463.4	4 000.2	4 289.8	3 599.0	3 261.5	4 428.6	5 124.8	5 424.0
OPEC ^{3/}	-	-	-	-	697.0	846.1	1 536.1	511.2	483.5	144.1	635.0
CMEA ^{4/}	-	-	650.0	820.0	830.0	670.0	745.0	642.0	669.8	892.0	892.0
Private flows from DAC	979.2	978.4	1 025.5	1 876.2	1 338.8	2 708.0	3 840.8	1 745.9	2 591.3	3 581.9	3 803.7
Multilateral flows, net	351.9	529.0	565.3	966.5	1 389.5	2 187.4	2 186.4	2 181.5	2 859.2	3 252.9	4 541.1
IBRD	133.4	128.5	147.7	129.5	170.1	433.7	636.4	586.4	861.9	1 004.0	949.7
IDA	75.3	197.6	182.9	455.9	700.9	749.3	878.0	657.5	567.0	795.8	980.7
ADB	17.0	48.2	56.8	137.6	174.8	338.6	292.1	309.1	383.8	388.0	473.3
OPEC	-	-	-	-	-	-	-	68.9	48.5	-	-
Others ^{5/}	125.2	154.7	177.9	243.5	343.7	665.8	376.9	559.7	998.0	1 065.1	2 137.4
Total net flows to DMCs (1)	4 468.9	4 908.2	5 495.5	7 126.1	8 255.5	10 701.3	11 907.3	8 342.1 ^{6/}	11 032.4 ^{6/}	12 995.7 ^{6/}	15 295.8 ^{6/}
Total net flows to developing countries (2)	18 970.0	21 090.0	23 170.0	31 370.0	35 040.0	53 670.0	57 590.0	63 350.0	79 830.0	83 860.0 ^{7/}	88 950.0 ^{7/}
As % of total net flows to DMCs											
IBRD	3.0	2.6	2.7	1.8	2.1	4.1	5.3	7.0	7.8	7.7	6.2
IDA	1.7	4.0	3.3	6.4	8.5	7.0	7.4	7.9	5.1	6.1	6.4
ADB	0.4	1.0	1.0	1.9	2.1	3.2	2.5	3.7	3.5	3.0	3.1
As % of multilateral flows											
IBRD	37.9	24.3	26.1	13.4	12.2	19.8	29.1	26.9	30.1	30.5	20.9
IDA	21.4	37.4	32.4	47.2	50.4	34.3	40.2	30.1	19.8	24.5	21.6
ADB	4.8	9.1	10.0	14.2	12.6	15.5	13.4	14.2	13.5	11.9	10.4
Ratio of total DMCs/All developing countries (1) (2) %	23.6	23.3	23.7	22.7	23.6	19.9	20.7	13.2	13.8	15.5	17.2

1/ On net disbursement basis. i.e. gross disbursement minus repayment on earlier loans.

2/ DAC (Development Assistance Committee) members comprise seventeen countries of OECD: Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Italy, Japan, Netherlands, New Zealand, Norway, Sweden, Switzerland, United Kingdom, United States of America, and the Commission of the European Economic Communities.

3/ OPEC (Organization of Petroleum Exporting Countries) aid-giving countries include Algeria, Iran, Iraq, Kuwait, Libya, Nigeria, Qatar, Saudi Arabia, United Arab Emirates, and Venezuela.

4/ CMEA (Council for Mutual Economic Assistance) comprises Bulgaria, People's Republic of China, Czechoslovakia, German Democratic Republic, Hungary, Romania, Poland, and the USSR.

5/ Including IFC, EEC, and UN Agencies.

6/ Includes flows to South Pacific DMCs which are not available in the breakdown by type of funds.

7/ Excludes OPEC multilateral flows.

Source: OECD, Development Cooperation 1980 and 1982, and Geographical Distribution of Financial Flows to Developing Countries, 1976-1979 and 1977-1980.

SOCIAL INDICATORS FOR HEALTH AND EDUCATION

Countries	GNP per capita in US\$ 1982	Life expectancy at birth (years) 1982	Infant mortality rate (aged under 1) 1982	Child death rate (aged 1-4) 1982	Daily calory supply per capita, as % of requirements 1981	Primary School enrolment as % of age groups 1981	Secondary School enrolment as % of age groups 1981	Enrolment in higher education as % of population aged 20-24 1981
<u>Group A</u>								
Bangladesh	140	48	133	19	84	62	15	3
Burma	190	55	96	12	113	84	20	4
India	260	55	94	11	86	79	30	8
Pakistan	380	50	121	17	106	56	17	2
Viet Nam	330	64	53	4	90	113 <u>1/</u>	48 <u>1/</u>	3
<u>Group B</u>								
Indonesia	580	53	102	13	110	100	30	3
Philippines	820	64	51	4	116	110 <u>1/</u>	63 <u>1/</u>	26
Thailand	790	63	51	4	105	96	29	20
<u>Group C</u>								
Korea, Republic of	1 910	67	32	2	126	107 <u>1/</u>	85	18

1/ Figures include pupils below or above official primary or secondary school age.

Source: World Bank, World Development Report, 1984.

Table 6

SUMMARY OF SERVICE COVERAGE AND FINANCIAL REQUIREMENTS FOR DMCs 1/ (in 1985 prices)

Items	Safe Drinking Water Supply			Sanitation/Safe Excreta Disposal		
	Urban	Rural	Total	Urban	Rural	Total
Total population 1985 (Mn.)	405	1 029	1 434	405	1 029	1 434
Total population 1985 (%)	28	72	100	28	72	100
Population served 1985 (Mn.)	303	638	941	291	255	546
Population served 1985 (%)	75	62	66	72	25	38
Total population 1990 (Mn.)	467	1 097	1 564	467	1 097	1 564
Total population 1990 (%)	30	70	100	30	70	100
Population to be covered according to 1990 targets (%)	88	85	86	70	31	43
Target number of population served 1990 (Mn.)	413	933	1 346	329	344	673
Additional population to be served by new systems (Mn.)	110	295	405	38	89	127
Per capita cost	50-350	5-140	5-350	20-300	5-100	5-300
Average per capita investment cost	126	35	60	223	29	87
Total required investment 1985-1990 (Mn.) 2/	13 811	10 309	24 120	8 489	2 562	11 051
Local anticipated investment 1985-1990 (Mn.) 3/	3 764	3 892	7 656	3 527	987	4 514
Foreign possible investment 1985-1990 (Mn.) 4/	10 047	6 417	16 464	4 962	1 575	6 537

1/ Not including Cambodia and Republic of China, for which information is not available.

2/ Total required sector investment US\$ 35.17 billion.

3/ Total anticipated local sector investment US\$ 12.17 billion.

4/ Total possible foreign sector investment US\$ 23 billion.

Table 7(a)

WATER SUPPLY PROJECTS
INVESTMENT COST PER CAPITA (US\$/PERSON)
(in 1985 prices)

Type of System DMC's	Dug Well with Hand Pump	Shallow Drilled Well with Hand Pump	Deep Borehole Well with Distribution System and Untreated Water	Deep Borehole Well with Distribution System and Treated Water	Surface Water with Gravity Feed Distribution and Treated Water	Surface Water with Pumped Distribution System and Treated Water
Bangladesh	10 - 30	20 - 40	40 - 90	90 - 110	100 - 120	100 - 200
Bhutan	20 - 50	40 - 80	50 - 150	80 - 150	80 - 150	100 - 200
Burma	5 - 20	15 - 40	30 - 60	60 - 100	80 - 120	100 - 150
Hong Kong	40 - 80	60 - 110	90 - 150	100 - 160	100 - 200	150 - 550
India	10 - 25	15 - 35	40 - 80	40 - 80	50 - 130	60 - 150
Indonesia	5 - 15	15 - 30	30 - 60	60 - 100	70 - 120	120 - 300
Korea	15 - 30	20 - 50	40 - 80	70 - 100	90 - 200	100 - 350
Laos	10 - 30	15 - 30	30 - 60	60 - 100	80 - 120	100 - 200
Malaysia	20 - 40	30 - 80	50 - 100	70 - 120	80 - 200	80 - 350
Maldives	5 - 20	20 - 40	30 - 60	60 - 100	60 - 120	60 - 150
Nepal	20 - 50	40 - 70	60 - 100	70 - 120	80 - 150	100 - 200
Pakistan	10 - 30	20 - 60	50 - 100	80 - 110	100 - 140	100 - 200
Papua New Guinea	20 - 50	40 - 70	60 - 100	80 - 120	100 - 180	150 - 400
Philippines	30 - 60	40 - 80	60 - 110	90 - 130	110 - 200	120 - 450
Singapore	30 - 80	50 - 100	80 - 150	100 - 150	100 - 200	150 - 400
Solomon Islands	15 - 30	20 - 50	40 - 100	60 - 100	80 - 120	110 - 250
Sri Lanka	10 - 20	20 - 80	50 - 150	50 - 150	80 - 200	100 - 250
Thailand	10 - 20	20 - 40	40 - 60	50 - 100	70 - 120	90 - 250
Viet Nam	20 - 50	30 - 50	30 - 90	60 - 130	70 - 110	100 - 200
Average Range	20 - 40	30 - 60	50 - 100	70 - 120	80 - 150	110 - 260

Table 7(b)

SANITATION PROJECTS
INVESTMENT COST PER CAPITA (US\$/PERSON)
(in 1985 prices)

Type of System DMCs	Pit Latrine	Water Seal Latrine	Septic Tank	Sewerage
Bangladesh	5 - 15	15 - 25	25 - 150	150 - 300
Bhutan	25 - 40	40 - 75	75 - 200	200 - 400
Burma	20 - 30	30 - 50	50 - 100	100 - 400
Hong Kong	30 - 50	50 - 150	150 - 250	250 - 600
India	10 - 30	25 - 45	30 - 50	50 - 150
Indonesia	5 - 10	10 - 50	50 - 200	200 - 400
Korea	30 - 50	50 - 100	100 - 300	300 - 500
Laos	10 - 20	20 - 50	50 - 150	150 - 350
Malaysia	15 - 30	30 - 65	65 - 250	250 - 500
Maldives	5 - 25	25 - 55	55 - 100	100 - 200
Nepal	20 - 40	40 - 100	100 - 300	300 - 400
Pakistan	15 - 30	30 - 70	70 - 400	400 - 600
Papua New Guinea	10 - 50	50 - 200	200 - 350	350 - 650
Philippines	5 - 30	30 - 150	150 - 400	400 - 700
Singapore	25 - 50	50 - 175	175 - 300	300 - 800
Solomon Islands	5 - 20	20 - 100	100 - 200	200 - 450
Sri Lanka	10 - 20	20 - 60	60 - 200	200 - 400
Thailand	10 - 20	20 - 160	160 - 300	300 - 500
Viet Nam	5 - 20	20 - 100	100 - 250	250 - 400
Average Range	15 - 30	30 - 95	95 - 235	235 - 460

Annex 1

Developing Member Countries

The Asia Region includes the following Developing Member Countries (DMCs) of the Bank:

Afghanistan
Bangladesh
Bhutan
Burma
Democratic Kaumpuchea
China, Republic of
Cook Islands
Fiji
Hong Kong
India
Indonesia
Kiribati
Korea, Republic of
Lao People's Democratic Republic
Malaysia
Maldives
Nepal
Pakistan
Papua New Guinea
Philippines
Singapore
Solomon Islands
Sri Lanka
Thailand
Tonga
Vanuatu
Viet Nam
Samoa

WATER SUPPLY AND SANITATION SECTOR INVESTMENTS - AN ESTIMATE

Annex 2

MAJOR MULTILATERAL AND BILATERAL FUNDING AGENCIES^{2/}
(all figures are indicated in US Dollars
million / in current prices)

Funding Agency	Reporting Period	Amount during reporting period	Annual average amount during reporting period	Estimated total 1970-1984 4/	Estimated % per sub-sector 5/	Estimated % of total lending to Region in reporting period	Comments
I. Multilaterals							
1. Asian Development Bank							
Reporting Period: 1970 - August 1983							
Urban water supply (WS)	1 356.0	88.9	1 185.0	83	8.0	These figures do not include WS components in rural multi-purpose projects	
Rural WS				2			
Urban sanitation				13			
Rural sanitation				-			
2. World Bank/IDA							
1978 - 1982 6/							
Urban WS	835.0	167.0	1 600.0	60	6.5	Estimated percentage of WS to total lending refers to period 1978-1981 and is based on worldwide lending.	
Rural WS				10			
Urban sanitation				30			
Rural sanitation				-			
3. European Dev. Fund (EDF)							
1961-1983							
	N.A.	-	-	-	-	-	No reliable data available for Asia.
4. Kuwait Fund							
1970-1982							
	14.7	1.1	17.0	N.A.	N.A.		
5. OPEC Fund^{7/}							
1976-1983							
	5.7	0.7	7.0	N.A.	4.1		Estimated percentage of total lending refers to worldwide lending.
II. Bilaterals							
1. Fed. Rep. of Germany							
1971-1981							
Urban WS	47.4	5.6	85.0	64	N.A.		
Rural WS				21			
Urban Sanitation				13			
Rural Sanitation				-			
2. USAID							
1960-1983							
Urban WS	56.0	12.0	50.8	55	N.A.	Percentages of sector breakdown are based on estimates.	
Rural WS				48			
Urban Sanitation				3			
Rural Sanitation				-			
3. France							
1979-1982							
	-	-	-	-	-	-	Total French assistance to the Asia Region in the 1977-1981 period amounted to US\$ 257.9 million, but does not include WS projects.
4. United Kingdom							
1971-1981							
Urban WS	7.1	0.6	12.0	25	N.A.	The reporting period is estimated, as no precise indication is available.	
Rural WS				39			
Urban Sanitation				16			
Rural Sanitation				-			
5. SIDA (Sweden)							
1970-1982							
Rural WS	20.5	1.6	25.0	75	N.A.	The sub-sector proportion of 75% for Rural WS is an estimate only.	
6. DANIDA (Denmark)							
1970-1982							
Urban WS	23.5	1.5	22.0	29	N.A.	Figures are based on disbursements; for 1983 estimate only.	
Rural WS				68			
Urban Sanitation				-			
Rural Sanitation				13			
7. NORAD (Norway)							
1971-1980							
	N.A.	-	-	-	-	-	No figures available for the Asia Region. World-wide sector investments for the reporting period are US\$ 60.0 million, most of which was allocated to Africa.
8. Netherlands							
1970-1981							
Urban WS	141.2	12.0	155.0	42	N.A.	Figures refer to commitments during the reporting period.	
Rural WS				50			
Urban Sanitation				-			
Rural Sanitation				-			
9. CIDA (Canada)							
1971							
	5.0	5.0	10.0	N.A.	N.A.	- Up to 1982 about US\$ 306.0 million have been disbursed worldwide for "water related" projects, of which about 30% were allocated to Africa. - In the reporting period 1979-1981, total ODA to Asia Region amounted to US\$ 570.0.	
10. Australia							
1981							
	0.8	0.8	60.0	N.A.	N.A.	In 1982, total Australian assistance to Asia amounted to US\$ 269.0, of which about 30% for Papua New Guinea.	
TOTAL			305.4	3 228.0	-	-	

Footnotes:

N.A.: not available.

1/ The Asia Region includes all developing Member Countries (DMC) of the Asian Development Bank.

2/ All of the Agencies included have reported their statistics to WHO for the compilation of the Catalogue of External Support, 1984 edition.

3/ For the conversion of donor currencies into US\$, the UN official exchange rate of 3 May 1983 was applied.

4/ These figures are rough estimates that have been extrapolated on the basis of available data and experience. They do not claim to be exact.

5/ Sector breakdowns are mostly not available. The percentage figures - where possible - have been estimated, based on available data and experience. They do not claim to be exact.

6/ Actual reporting period for the Region is only 1981. Reporting period worldwide is 1978-1982 (5 years), US\$ 3 325 million, from which it was estimated that about 25% is attributable to Asia, 30% to Africa, 40% to Latin America, and 5% to others.

7/ The OPEC Fund reports for the 1976-1983 period US\$ 56.0 million for the WS sector. It is estimated that about 10% were allocated to Asia, 60% to Africa, and 30% to Latin America. No sectoral breakdown is available.

Name of External
Support Agency (ESA) _____

I. WATER SUPPLY AND SANITATION (WSS) INVESTMENTS PER SUB-SECTOR^{1/}
(in US\$ million equivalents or the currency of the ESA - in current prices^{2/})

Country^{3/} _____

Sub-Sector	Period						Decade				
	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	Total
1. Urban Water Supply											
2. Rural Water Supply											
3. Urban Sanitation											
4. Rural Sanitation											
5. Sector ^{4/} Support											
<u>TOTAL</u>											
Estimated ^{5/} Recurrent Cost											
% Estimate of grants/donations ^{6/}											

1/ Indicate figures for calendar year period.

2/ Bilateral agencies may indicate investments in their national currency units. If US Dollars are reported, the exchange rate and date of conversion should be indicated.

3/ Indicate developing country concerned.

4/ Indicate type of sector support (technical cooperation covering the WSS sector at large), i.e. institutional strengthening, manpower development, master plans, hydrological studies, etc.

5/ Indicate your estimate of recurrent costs emanating from your projects/inputs, with a note as to how and by whom they are covered.

6/ Refers to non-reimbursable support only.

Questions:

1. What is your agency's estimate of the present countrywide service coverage by sub-sector (in %)? - How does that compare with the coverage rate at the beginning of the Decade? - Decline or progress?
2. What will be the trend of your future investments/sector support in the country per sub-sector? - Will it increase, stagnate, or decrease in absolute terms and as a proportion of your overall regional development funding?
3. What is your estimate of the average government contribution in the developing country concerned (in %) to WSS sector projects? - How is this proportion likely to change in the future?
4. What are your average lending conditions to the sector in the developing country concerned in terms of interest and repayment period? - Will there be a change in trend in the future? (This question refers to agencies that operate loans.)
5. What do you consider the major regional sector development constraints? - How do you intend to address these issues in the future? (Please define the regional concept you are referring to, when answering this question.)

II. WATER SECTOR AT LARGE

To obtain an estimate of your agency's involvement in the drinking water supply and sanitation sector, as compared to total involvement in water development activities, please fill in your estimates in the table below.

CATEGORIES OF MAJOR WATER-RELATED ASSISTANCE	millions US\$ year %
Total net disbursements to Water Sector at Large (bilateral assistance plus funds channeled through Multi-bi agreements ^{1/} and NGOs)	100
<hr/>	
Of total:	
1. Hydropower	
2. Irrigation	
3. Ecology (soil conservation, ecological programmes & studies, forest conservation)	
4. Planning for water sector at large (regional water master plans, meteor- ological studies, hydrological programmes)	
5. Drinking water supply & sanitation (hydrological studies for drinking water supplies, training programmes, evaluation and research etc.)	

^{1/} Multi-bilateral projects and programmes include funds-in-trust, co-financing arrangements and other types of contributions specifically to the sector which were implemented through a multilateral organization.

INVESTMENT COSTS, UNIT COSTS, ESTIMATED COVERAGE
AND DOMESTIC CONSUMPTION

Tables

Water Supply Projects per DMCs

1. Investment Cost per Capita (\$/person)
2. Investment Cost per Cubic Meter per Day (\$/cumd)
3. Production Cost per Cubic Meter and Average Tariff (¢/cum)

Sanitation Projects per DMCs

4. Investment Cost per Capita (\$/person)

Water Supply Systems

5. Construction Unit Costs (\$)
6. Construction Cost per Cubic Meter per Day (\$/cumd)
7. Annual Operation and Maintenance Cost (\$/year)

Present and Targetted Coverage - Financial Requirements

8. Summary of Coverage and Financial Requirements for DMCs
9. Afghanistan
10. Bangladesh
11. Bhutan
12. Burma
13. Cook Islands
14. Fiji
15. Hong Kong
16. India
17. Indonesia
18. Kiribati
19. Korea, Republic of
20. Lao, People's Democratic Republic
21. Malaysia
22. Maldives
23. Nepal
24. Pakistan
25. Papua New Guinea
26. Philippines
27. Singapore
28. Solomon Islands
29. Sri Lanka
30. Thailand
31. Tonga
32. Vanuatu
33. Vietnam
34. Western Samoa

Domestic Water Consumption

35. Schedule of Approved Loans and Projected Average Domestic Water Consumption in 1990

(Reference in text: page 3, para 11)

Table 1

Water Supply Projects
Investment Cost Per Capita (\$/Person)
(in 1985 prices)

DMCs	Type of System Dug Well with Hand Pump	Shallow Drilled Well with Hand Pump	Deep Borehole Well with Distribution System and Untreated Water	Deep Borehole Well with Distribution System and Treated Water	Surface Water with Gravity Feed Distribution and Treated Water	Surface Water with Pumped Distribution System and Treated Water
Bangladesh	10 - 30	20 - 40	40 - 90	90 - 110	100 - 120	100 - 200
Bhutan	20 - 50	40 - 80	50 - 150	80 - 150	80 - 150	100 - 200
Burma	5 - 20	15 - 40	30 - 60	60 - 100	80 - 120	100 - 150
Hong Kong	40 - 80	60 - 110	90 - 150	100 - 160	100 - 200	150 - 550
India	10 - 25	15 - 35	40 - 80	40 - 80	50 - 130	60 - 150
Indonesia	5 - 15	15 - 30	30 - 60	60 - 100	70 - 120	120 - 300
Korea	15 - 30	20 - 50	40 - 80	70 - 100	90 - 200	100 - 350
Laos	10 - 30	15 - 30	30 - 60	60 - 100	80 - 120	100 - 200
Malaysia	20 - 40	30 - 80	50 - 100	70 - 120	80 - 200	80 - 350
Maldives	5 - 20	20 - 40	30 - 60	60 - 100	60 - 120	60 - 150
Nepal	20 - 50	40 - 70	60 - 100	70 - 120	80 - 150	100 - 200
Pakistan	10 - 30	20 - 60	50 - 100	80 - 110	100 - 140	100 - 200
Papua New Guinea	20 - 50	40 - 70	60 - 100	80 - 120	100 - 180	150 - 400
Philippines	30 - 60	40 - 80	60 - 110	90 - 130	110 - 200	120 - 450
Singapore	30 - 80	50 - 100	80 - 150	100 - 150	100 - 200	150 - 400
Solomon Islands	15 - 30	20 - 50	40 - 100	60 - 100	80 - 120	110 - 250
Sri Lanka	10 - 20	20 - 80	50 - 150	50 - 150	80 - 200	100 - 250
Thailand	10 - 20	20 - 40	40 - 60	50 - 100	70 - 120	90 - 250
Vietnam	20 - 50	30 - 50	30 - 90	60 - 130	70 - 110	100 - 200
Average Range	20 - 40	30 - 60	50 - 100	70 - 120	80 - 150	110 - 260

Table 2

Water Supply Projects
Investment Cost Per Cubic Meter Per Day (\$/cumd)
 (in 1985 prices)

DMCs	Type of System	Dug Well with Hand Pump	Shallow Drilled Well with Hand Pump	Deep Borehole Well with Distribution System and Untreated Water	Deep Borehole Well with Distribution System and Treated Water	Surface Water with Gravity Feed Distribution and Treated Water	Surface Water with Pumped Distribution System and Treated Water
Bangladesh		4 - 20	15 - 50	40 - 200	150 - 250	200 - 450	300 - 700
Bhutan		5 - 30	20 - 85	35 - 250	200 - 300	250 - 500	350 - 750
Burma		2 - 10	10 - 40	30 - 300	150 - 400	350 - 600	300 - 800
Hong Kong		10 - 50	40 - 150	100 - 400	250 - 500	400 - 1000	600 - 2000
India		2 - 10	5 - 40	30 - 220	80 - 320	200 - 400	200 - 600
Indonesia		3 - 15	10 - 60	60 - 300	300 - 500	450 - 800	300 - 1400
Korea		4 - 20	20 - 80	80 - 400	400 - 500	500 - 1000	500 - 1200
Laos		2 - 15	10 - 40	40 - 350	300 - 450	350 - 500	400 - 700
Malaysia		2 - 10	10 - 50	50 - 200	200 - 400	300 - 800	500 - 1000
Maldives		2 - 10	10 - 40	30 - 170	170 - 350	250 - 650	250 - 500
Nepal		5 - 25	20 - 75	65 - 160	150 - 300	200 - 500	350 - 600
Pakistan		4 - 10	10 - 70	40 - 150	100 - 400	300 - 700	400 - 800
Papua New Guinea		3 - 12	10 - 50	50 - 180	150 - 500	450 - 800	500 - 1800
Philippines		5 - 15	10 - 60	60 - 200	180 - 550	530 - 1000	600 - 1500
Singapore		5 - 20	15 - 80	50 - 250	200 - 600	500 - 1000	800 - 1400
Solomon Islands		4 - 15	10 - 60	30 - 200	150 - 380	350 - 600	500 - 900
Sri Lanka		3 - 10	5 - 30	30 - 200	100 - 300	300 - 800	400 - 1000
Thailand		4 - 10	10 - 40	40 - 150	130 - 450	400 - 1000	600 - 1100
Vietnam		5 - 30	20 - 50	30 - 200	150 - 400	300 - 400	300 - 600
Average Range		4 - 20	10 - 60	40 - 240	180 - 410	350 - 710	430 - 1000

Table 3

Water Supply Projects
Production Cost Per Cubic Meter (¢/cum)
(in 1985 prices)

DMCs	Type of System Dug Well with Hand Pump	Shallow Drilled Well with Hand Pump	Deep Borehole Well with Distribution System and Untreated Water	Deep Borehole Well with Distribution System and Treated Water	Surface Water with Gravity Feed Distribution and Treated Water	Surface Water with Pumped Distribution System and Treated Water
Bangladesh	1 - 3	2 - 3	3 - 6	4 - 8	6 - 11	11 - 13
Bhutan	1 - 2	1 - 5	2 - 8	6 - 10	6 - 10	10 - 15
Burma	1 - 2	1 - 2	2 - 5	3 - 6	5 - 8	4 - 10
Hong Kong	2 - 3	2 - 4	3 - 11	7 - 10	7 - 10	7 - 12
India	1 - 2	1 - 2	1 - 5	2 - 5	2 - 6	5 - 8
Indonesia	1 - 2	1 - 2	2 - 6	3 - 12	10 - 15	6 - 16
Korea	1 - 3	2 - 4	2 - 10	5 - 15	10 - 20	5 - 25
Laos	1 - 4	1 - 4	4 - 7	4 - 10	4 - 10	10 - 15
Malaysia	1 - 2	1 - 5	3 - 10	5 - 15	5 - 15	5 - 18
Maldives	2 - 3	2 - 3	3 - 5	4 - 15	6 - 15	8 - 17
Nepal	1 - 2	1 - 2	1 - 6	5 - 12	5 - 12	11 - 19
Pakistan	1 - 3	1 - 3	3 - 8	8 - 10	8 - 15	12 - 18
Papua New Guinea	1 - 2	2 - 5	2 - 10	6 - 20	10 - 25	10 - 30
Philippines	2 - 3	2 - 3	3 - 9	9 - 15	9 - 18	12 - 20
Singapore	1 - 2	2 - 6	3 - 11	10 - 12	10 - 15	15 - 18
Solomon Islands	2 - 3	2 - 3	2 - 4	4 - 10	6 - 13	13 - 15
Sri Lanka	1 - 2	1 - 4	2 - 6	3 - 10	4 - 15	11 - 23
Thailand	1 - 2	2 - 3	3 - 10	10 - 20	10 - 20	10 - 25
Vietnam	1 - 3	2 - 3	3 - 11	5 - 15	5 - 15	9 - 21
Average Range	1 - 3	2 - 3	2 - 8	6 - 12	7 - 14	9 - 18

Table 4

Sanitation Project
Investment Cost per Capita (\$/Person)
(in 1985 prices)

Type of System DMCs	Pit Latrine	Water Seal Latrine	Septic Tank	Sewerage
Bangladesh	5 - 15	15 - 25	25 - 150	150 - 300
Bhutan	25 - 40	40 - 75	75 - 200	200 - 400
Burma	20 - 30	30 - 50	50 - 100	100 - 400
Hong Kong	30 - 50	50 - 150	150 - 250	250 - 600
India	10 - 30	25 - 45	30 - 50	50 - 150
Indonesia	5 - 10	10 - 50	50 - 200	200 - 400
Korea	30 - 50	50 - 100	100 - 300	300 - 500
Laos	10 - 20	20 - 50	50 - 150	150 - 350
Malaysia	15 - 30	30 - 65	65 - 250	250 - 500
Maldives	5 - 25	25 - 55	55 - 100	100 - 200
Nepal	20 - 40	40 - 100	100 - 300	300 - 400
Pakistan	15 - 30	30 - 70	70 - 400	400 - 600
Papua New Guinea	10 - 50	50 - 200	200 - 350	350 - 650
Philippines	5 - 30	30 - 150	150 - 400	400 - 700
Singapore	25 - 50	50 - 175	175 - 300	300 - 800
Solomon Islands	5 - 20	20 - 100	100 - 200	200 - 450
Sri Lanka	10 - 20	20 - 60	60 - 200	200 - 400
Thailand	10 - 20	20 - 160	160 - 300	300 - 500
Viet Nam	5 - 20	20 - 100	100 - 250	250 - 400
Average Range	15 - 30	30 - 95	95 - 235	235 - 460

Table 5 Water Supply Systems - Construction Unit Costs
(in 1985 prices)

<u>Water Supply Facilities</u>	<u>Descriptions</u>	<u>Unit Costs (\$ 000)</u>
1. <u>Well</u>	Q - 1000 cumd	680
2. <u>Surface Water:</u>		
<u>Intake</u>	Q ----- cumd	
<u>Pumps</u>	<u>KW</u> <u>H in m.</u>	
	114 42	160
	94 37	132
	70 35	170
	60 42	80
	45 15	15
3. <u>Transmission:</u>		
<u>Raw water mains</u>	Per km. DCIP ϕ in m.	
	900	386
	800	359
	700	293
	600	265
	500	220
	400	160
	300	75
	200	68
4. <u>Treatment Plant</u>		
<u>Pumps</u>	Q ----- cumd	
	<u>KW</u> <u>H in m.</u>	
	76 35	253
	70 35	246
5. <u>Booster Pumps</u>		
	<u>KW</u> <u>H in m.</u>	
	96 39	281
	52 39	116
	25 50	58
	23 50	50
	7.5 39	40
6. <u>Distribution Systems:</u>		
<u>Service Reservoir</u>	v = 520 cum	75
	v = 1520 cum	330
	v = 1860 cum	405
<u>Distribution Pumps</u>	see Items 2 & 4	
<u>Lifting Pumps</u>	per unit	
<u>Elevated Tanks</u>	v = 50 cum	1.0
	v = 60 cum	6.5
	v = 100 cum	10.2
	v = 200 cum	17.4
<u>Distribution Pipelines</u>	Per km DCIP ϕ in mm.	
	100 - 150	48
	100 - 250	56
	100 - 400	60

Table 6

Water Supply^{1/} - Construction Cost
(in 1985 prices)

<u>Ground Water</u> (No. of deep bore hole wells)	<u>Water Demand</u> (cumd)	<u>Construction Cost</u> (\$'000)	<u>Unit Cost</u> (\$/cumd)
2	1,500	1,020	680
3	3,000	1,031	344
4	4,500	2,003	445
6	6,000	3,330	555
8	7,500	3,500	467
10	10,000	3,650	365

<u>Surface</u> <u>Water</u>	<u>Water Demand</u> (cumd)	<u>Construction Cost</u> (\$'000)	<u>Unit Cost</u> (\$/cumd)
	2,000	1,300	650
	5,000	3,200	460
	10,000	9,250	925
	15,000	11,250	750
	40,000	19,500	488
	60,000	27,000	450

1/ The construction cost estimates for water supply systems (including treatment and distribution) are based on costs of major imported items such as pumps, machinery, electrical equipment, pipes and civil works.

Table 7

Water Supply Systems -
Annual Operation and Maintenance Costs
(in 1985 prices)

1. Maintenance Expenses
0.03 x construction cost (including exhalation costs)
2. Personal Expenses
Annual salary x operators
3. General Management Expenses
0.15 x personnel expenses per year
4. Power Cost
Average water demand per year x power
consumption in KWH per cum x basic
power charge per KWH
5. Chemical Cost
Average water demand per x 0.0015 kg per
cum x sodium hypochloric unit cost per kg

Table 8 SUMMARY OF COVERAGE AND FINANCIAL REQUIREMENTS FOR DMCs^{a/}
(\$ in 1985 prices)

I T E M S	Safe Drinking Water Supply			Sanitation/Safe Excreta Disposal		
	Urban	Rural	Total	Urban	Rural	Total
Total population 1985 (Mn.)	405	1,029	1,434	405	1,029	1,434
Total Population 1985 (%)	28	72	100	28	72	100
Population served 1985 (Mn.)	303	638	941	291	255	546
Population served 1985 (%)	75	62	66	72	25	38
Total population 1990 (Mn.)	467	1,097	1,564	467	1,097	1,564
Total population 1990 (%)	30	70	100	30	70	100
Population to be covered according to 1990 targets (%)	88	85	86	70	31	43
Target number of population served 1990 (Mn.)	413	933	1,346	329	344	673
Additional population to be served by new systems (Mn.)	110	295	405	38	89	127
Per capita cost	50-350	5-140	5-350	20-300	5-100	5-300
Average per capita investment cost	126	35	60	223	29	87
Total required investment 1985-1990 (Mn.) ^{b/}	13,811	10,309	24,120	8,489	2,562	11,051
Local anticipated investment 1985-1990 (Mn.) ^{c/}	3,764	3,892	7,656	3,527	987	4,514
Foreign possible investment 1985-1990 (Mn.) ^{d/}	10,047	6,417	16,464	4,962	1,575	6,537

^{a/} Not including Cambodia and Republic of China for which information is not available.

^{b/} Total required sector investment \$35.17 billion.

^{c/} Total anticipated local sector investment \$12.17 billion.

^{d/} Total possible foreign sector investment \$23 billion.

Table 9

COUNTRY: AFGHANISTAN

ESTIMATED PRESENT AND TARGETTED COVERAGE FINANCIAL REQUIREMENTS
(\$ in 1985 prices)

I T E M S	Safe Drinking Water Supply			Sanitation/Safe Excreta Disposal		
	Urban	Rural	Total	Urban	Rural	Total
Total population 1985 (Mn.)	3.6	14.6	18.2	3.6	14.6	18.2
Total Population 1985 (%)	20	80	100	20	80	100
Population served 1985 (Mn.)	1.1	1.5	2.6	2.6	2.9	5.4
Population served 1985 (%)	30	10	14	70	20	30
Total population 1990 (Mn.)	5.0	15.1	20.1	5.0	15.1	20.1
Total population 1990 (%)	25	75	100	25	75	100
Population to be covered according to 1990 targets (%)	50	30	35	80	30	42
Target number of population served 1990 (Mn.)	2.5	4.5	7.0	4.0	4.5	8.5
Additional population to be served by new systems (Mn.)	1.4	3.0	3.4	1.5	1.6	3.1
Per capita cost	60-100	30-50	30-100	50-70	20-40	20-70
Average per capita investment cost	80	40	68	60	30	45
Total required investment 1985-1990 (Mn.)	112	120	232	90	48	138
Local anticipated investment 1985-1990 (Mn.)	56	60	116	45	24	69
Foreign possible investment 1985-1990 (Mn.)	56	60	116	45	24	69

Table 10

COUNTRY: BANGLADESH

ESTIMATED PRESENT AND TARGETTED COVERAGE FINANCIAL REQUIREMENTS
(\$ in 1985 prices)

I T E M S	Safe Drinking Water Supply			Sanitation/Safe Excreta Disposal		
	Urban	Rural	Total	Urban	Rural	Total
Total population 1985 (Mn.)	24.7	74.0	98.7	24.7	74.0	98.7
Total Population 1985 (%)	25	75	100	25	75	100
Population served 1985 (Mn.)	7.4	29.6	37.0	6.7	3.0	9.7
Population served 1985 (%)	30	40	34	27	4	10
Total population 1990 (Mn.)	30.4	78.2	108.6	30.4	78.2	108.6
Total population 1990 (%)	28	72	100	28	72	100
Population to be covered according to 1990 targets (%)	58	77	72	50	13	24
Target number of population served 1990 (Mn.)	17.6	60.2	77.8	15.4	10.2	25.6
Additional population to be served by new systems (Mn.)	10.2	30.6	40.8	8.7	7.2	15.9
Per capita cost	50-70	5-15	5-70	30-50	5-15	5-50
Average per capita investment cost	60	10	23	40	10	26
Total required investment 1985-1990 (Mn.)	612	306	918	348	72	420
Local anticipated investment 1985-1990 (Mn.)	214	107	321	122	25	147
Foreign possible investment 1985-1990 (Mn.)	398	199	597	226	47	273

Table 11

COUNTRY: BHUTAN

ESTIMATED PRESENT AND TARGETTED COVERAGE FINANCIAL REQUIREMENTS
(\$ in 1985 prices)

I T E M S	Safe Drinking Water Supply			Sanitation/Safe Excreta Disposal		
	Urban	Rural	Total	Urban	Rural	Total
Total population 1985 (Mn.)	0.10	1.20	1.30	0.10	1.20	1.30
Total Population 1985 (%)	8	92	100	8	92	100
Population served 1985 (Mn.)	0.05	0.12	0.20	0.01	0.12	0.13
Population served 1985 (%)	50	10	15	10	10	10
Total population 1990 (Mn.)	0.14	1.26	1.40	0.14	1.26	1.40
Total population 1990 (%)	10	90	100	10	90	100
Population to be covered according to 1990 targets (%)	100	60	64	60	60	60
Target number of population served 1990 (Mn.)	0.14	0.76	0.90	0.08	0.76	0.84
Additional population to be served by new systems (Mn.)	0.09	0.64	0.73	0.07	0.64	0.71
Per capita cost	60-100	40-60	40-100	20-60	10-50	10-60
Average per capita investment cost	80	50	53.70	40	30	31.00
Total required investment 1985-1990 (Mn.)	7.20	32.00	39.20	2.80	19.20	22.00
Local anticipated investment 1985-1990 (Mn.)	5.70	6.10	11.80	1.00	4.00	5.00
Foreign possible investment 1985-1990 (Mn.)	1.50	25.90	27.40	1.80	15.20	17.00

Table 12

COUNTRY: BURMA

ESTIMATED PRESENT AND TARGETTED COVERAGE FINANCIAL REQUIREMENTS
 (\$ in 1985 prices)

I T E M S	Safe Drinking Water Supply			Sanitation/Safe Excreta Disposal		
	Urban	Rural	Total	Urban	Rural	Total
Total population 1985 (Mn.)	9.5	28.5	38.0	9.5	28.5	38.0
Total Population 1985 (%)	25	75	100	25	75	100
Population served 1985 (Mn.)	3.8	5.7	9.5	3.8	5.7	9.5
Population served 1985 (%)	40	20	25	40	20	25
Total population 1990 (Mn.)	12.5	29.1	41.6	12.5	29.1	41.6
Total population 1990 (%)	30	70	100	30	70	100
Population to be covered according to 1990 targets (%)	50	50	50	67	50	55
Target number of population served 1990 (Mn.)	6.25	14.55	20.8	3.38	14.55	2.93
Additional population to be served by new systems (Mn.)	2.45	8.85	11.30	4.58	8.85	13.43
Per capita cost	70-100	10-30	10-110	20-60	15-25	5-60
Average per capita investment cost	90	20	35.2	40	15	23.5
Total required investment 1985-1990 (Mn.)	220.5	177.0	397.5	183.2	132.75	315.95
Local anticipated investment 1985-1990 (Mn.)	22.0	26.5	48.6	18.9	13.75	32.65
Foreign possible investment 1985-1990 (Mn.)	198.5	150.5	348.9	164.3	119.0	283.3

Table 13

COUNTRY: COOK ISLANDS

ESTIMATED PRESENT AND TARGETTED COVERAGE FINANCIAL REQUIREMENTS
(\$ in 1985 prices)

I T E M S	Safe Drinking Water Supply			Sanitation/Safe Excreta Disposal		
	Urban	Rural	Total	Urban	Rural	Total
Total population 1985 (Mn.)	0.002	0.018	0.020	0.002	0.018	0.020
Total Population 1985 (%)	10	90	100	10	90	100
Population served 1985 (Mn.)	0.002	0.016	0.018	0.002	0.014	0.016
Population served 1985 (%)	100	90	90	100	80	80
Total population 1990 (Mn.)	0.003	0.018	0.021	0.003	0.018	0.021
Total population 1990 (%)	10	90	100	10	90	100
Population to be covered according to 1990 targets (%)	100	100	100	100	85	86
Target number of population served 1990 (Mn.)	0.003	0.018	0.020	0.003	0.015	0.018
Additional population to be served by new systems (Mn.)	0.001	0.002	0.003	0.001	0.001	0.002
Per capita cost	130-190	40-80	40-190	140-220	20-60	20-220
Average per capita investment cost	160	60	93	180	40	110
Total required investment 1985-1990 (Mn.)	0.16	0.12	0.28	0.18	0.04	0.22
Local anticipated investment 1985-1990 (Mn.)	0.08	0.06	0.14	0.09	0.02	0.11
Foreign possible investment 1985-1990 (Mn.)	0.08	0.06	0.14	0.09	0.02	0.11

Table 14

COUNTRY: FIJI

ESTIMATED PRESENT AND TARGETTED COVERAGE FINANCIAL REQUIREMENTS
(\$ in 1985 prices)

I T E M S	Safe Drinking Water Supply			Sanitation/Safe Excreta Disposal		
	Urban	Rural	Total	Urban	Rural	Total
Total population 1985 (Mn.)	0.28	0.42	0.7	0.28	0.42	0.7
Total Population 1985 (%)	40	60	100	40	60	100
Population served 1985 (Mn.)	0.28	0.25	0.53	0.21	0.31	0.52
Population served 1985 (%)	100	50	76	75	74	74
Total population 1990 (Mn.)	0.33	0.47	0.8	0.33	0.47	0.8
Total population 1990 (%)	41	59	100	41	59	100
Population to be covered according to 1990 targets (%)	100	84	91	85	86	85
Target number of population served 1990 (Mn.)	0.33	0.4	0.73	0.28	0.40	0.68
Additional population to be served by new systems (Mn.)	0.05	0.15	0.20	0.07	0.09	0.16
Per capita cost	250-350	60-100	60-350	220-280	40-80	40-280
Average per capita investment cost	300	80	135	250	60	143
Total required investment 1985-1990 (Mn.)	15	12	27	17.5	5.4	22.9
Local anticipated investment 1985-1990 (Mn.)	7.5	6	13.5	8.75	2.7	14.45
Foreign possible investment 1985-1990 (Mn.)	7.5	6	13.5	8.75	2.7	14.45

Table 15

COUNTRY: HONG KONG

ESTIMATED PRESENT AND TARGETTED COVERAGE FINANCIAL REQUIREMENTS
(\$ in 1985 prices)

I T E M S	Safe Drinking Water Supply			Sanitation/Safe Excreta Disposal		
	Urban	Rural	Total	Urban	Rural	Total
Total population 1985 (Mn.)	5.1	0.4	5.5	5.1	0.4	5.5
Total Population 1985 (%)	93	7	100	93	7	100
Population served 1985 (Mn.)	5.1	0.38	5.48	4.1	0.3	4.4
Population served 1985 (%)	100	95	99	80	70	80
Total population 1990 (Mn.)	5.5	0.4	5.9	5.5	0.4	5.0
Total population 1990 (%)	94	6	100	94	6	100
Population to be covered according to 1990 targets (%)	100	100	100	100	100	100
Target number of population served 1990 (Mn.)	5.5	0.4	5.9	5.5	0.4	5.9
Additional population to be served by new systems (Mn.)	0.4	0.02	0.42	1.4	0.1	1.5
Per capita cost	200-240	100-140	100-240	260-300	60-100	60-300
Average per capita investment cost	220	120	215	280	80	267
Total required investment 1985-1990 (Mn.)	88	2.4	90.4	392	8	400
Local anticipated investment 1985-1990 (Mn.)	70	1.9	72.3	196	4	200
Foreign possible investment 1985-1990 (Mn.)	18	0.5	18.1	196	4	200

Table 16

COUNTRY: INDIA

ESTIMATED PRESENT AND TARGETTED COVERAGE FINANCIAL REQUIREMENTS
(\$ in 1985 prices)

I T E M S	Safe Drinking Water Supply			Sanitation/Safe Excreta Disposal		
	Urban	Rural	Total	Urban	Rural	Total
Total population 1985 (Mn.)	171.2	573.1	744.3	171.2	573.1	744.3
Total Population 1985 (%)	23	67	100	23	67	100
Population served 1985 (Mn.)	154.1	384.0	538.1	68.5	28.7	97.2
Population served 1985 (%)	90	50	72	40	5	13
Total population 1990 (Mn.)	193.3	612.3	805.6	193.3	612.3	805.6
Total population 1990 (%)	24	66	100	24	66	100
Population to be covered according to 1990 targets (%)	100	100	100	80	20	38
Target number of population served 1990 (Mn.)	193.3	612.3	805.6	154.6	153.1	307.7
Additional population to be served by new systems (Mn.)	39.2	228.3	267.5	86.1	124.4	210.5
Per capita cost	60-100	20-40	20-100	40-60	5-15	6-60
Average per capita investment cost	80	30	37	50	10	26
Total required investment 1985-1990 (Mn.)	3,136	6,849	9,985	4,305	1,244	5,549
Local anticipated investment 1985-1990 (Mn.)	1,098	2,397	3,495	1,507	435	1,942
Foreign possible investment 1985-1990 (Mn.)	2,508	4,452	6,490	2,798	809	3,609

Table 17

COUNTRY: INDONESIA

ESTIMATED PRESENT AND TARGETTED COVERAGE FINANCIAL REQUIREMENTS
(\$ in 1985 prices)

I T E M S	Safe Drinking Water Supply			Sanitation/Safe Excreta Disposal		
	Urban ^{1/}	Rural	Total	Urban ^{1/}	Rural	Total
Total population 1985 (Mn.)	66	99	165	66	99	165
Total Population 1985 (%)	40	60	100	40	60	100
Population served 1985 (Mn.)	40	32	72	30	31	61
Population served 1985 (%)	60	32	44	45	31	67
Total population 1990 (Mn.)	76	104	180	76	104	180
Total population 1990 (%)	42	58	100	42	58	100
Population to be covered according to 1990 targets (%)	75	60	77	60	40	49
Target number of population served 1990 (Mn.)	57	62	139	46	42	88
Additional population to be served by new systems (Mn.)	17	30	47	16	11	27
Per capita cost	50-100	5-15	5-100	10-30	5-15	5-30
Average per capita investment cost	75	10	34	20	10	16
Total required investment 1985-1990 (Mn.)	1,275	300	1,575	320	110	430
Local anticipated investment 1985-1990 (Mn.)	510	120	630	128	44	172
Foreign possible investment 1985-1990 (Mn.)	765	280	945	192	66	258

^{1/} Including semi-urban communities with population between 3,800 to 20,000.

Table 18

COUNTRY: KIRIBATI

ESTIMATED PRESENT AND TARGETTED COVERAGE FINANCIAL REQUIREMENTS
(\$ in 1985 prices)

I T E M S	Safe Drinking Water Supply			Sanitation/Safe Excreta Disposal		
	Urban	Rural	Total	Urban	Rural	Total
Total population 1985 (Mn.)	0.016	0.044	0.06	0.016	0.044	0.06
Total Population 1985 (%)	27	73	100	27	73	100
Population served 1985 (Mn.)	0.015	0.026	0.041	0.014	0.037	0.051
Population served 1985 (%)	95	60	69	90	85	86
Total population 1990 (Mn.)	0.018	0.052	0.07	0.018	0.052	0.07
Total population 1990 (%)	25	75	100	25	75	100
Population to be covered according to 1990 targets (%)	100	100	100	100	100	100
Target number of population served 1990 (Mn.)	0.018	0.052	0.07	0.018	0.052	0.07
Additional population to be served by new systems (Mn.)	0.003	0.026	0.029	0.004	0.015	0.021
Per capita cost	80-120	30-70	30-120	20-60	5-15	5-60
Average per capita investment cost	100	50	55	40	10	15
Total required investment 1985-1990 (Mn.)	0.3	1.3	1.6	0.16	0.15	0.31
Local anticipated investment 1985-1990 (Mn.)	0.11	0.46	0.57	0.06	0.05	0.11
Foreign possible investment 1985-1990 (Mn.)	0.19	0.84	1.03	0.10	0.10	0.20

Table 19

COUNTRY: KOREA, REPUBLIC OF

ESTIMATED PRESENT AND TARGETTED COVERAGE FINANCIAL REQUIREMENTS
(\$ in 1985 prices)

I T E M S	Safe Drinking Water Supply			Sanitation/Safe Excreta Disposal		
	Urban	Rural	Total	Urban	Rural	Total
Total population 1985 (Mn.)	29	12	41	29	12	41
Total Population 1985 (%)	70	30	100	70	30	100
Population served 1985 (Mn.)	25	2	29	26	8	34
Population served 1985 (%)	86	17	70	90	70	83
Total population 1990 (Mn.)	34	10	44	34	10	44
Total population 1990 (%)	77	23	100	77	23	100
Population to be covered according to 1990 targets (%)	93	70	86	100	100	100
Target number of population served 1990 (Mn.)	31	7	38	34	10	44
Additional population to be served by new systems (Mn.)	6	5	11	8	2	10
Per capita cost	120-200	40-100	40-200	40-80	10-30	10-70
Average per capita investment cost	160	70	120	60	20	64
Total required investment 1985-1990 (Mn.)	960	350	1,310	480	160	640
Local anticipated investment 1985-1990 (Mn.)	768	280	1,048	384	128	512
Foreign possible investment 1985-1990 (Mn.)	192	70	262	96	32	128

Table 20

COUNTRY: LAOS PDR

ESTIMATED PRESENT AND TARGETTED COVERAGE FINANCIAL REQUIREMENTS
(\$ in 1985 prices)

I T E M S	Safe Drinking Water Supply			Sanitation/Safe Excreta Disposal		
	Urban	Rural	Total	Urban	Rural	Total
Total population 1985 (Mn.)	0.75	3.65	4.4	0.75	3.65	4.4
Total Population 1985 (%)	17	83	100	17	83	100
Population served 1985 (Mn.)	0.13	0.91	1.04	0.15	0.37	0.52
Population served 1985 (%)	35	25	26	20	10	12
Total population 1990 (Mn.)	0.93	3.97	4.9	0.93	3.97	4.9
Total population 1990 (%)	19	81	100	19	81	100
Population to be covered according to 1990 targets (%)	50	40	42	30	20	22
Target number of population served 1990 (Mn.)	0.47	1.59	2.06	0.28	0.79	1.07
Additional population to be served by new systems (Mn.)	0.34	0.68	1.02	0.13	0.42	0.55
Per capita cost	80-120	50-70	50-120	100-200	10-30	30-200
Average per capita investment cost	100	60	73	150	20	51
Total required investment 1985-1990 (Mn.)	34	40.8	74.8	19.5	8.4	27.9
Local anticipated investment 1985-1990 (Mn.)	17	20.4	37.4	9.75	4.2	13.95
Foreign possible investment 1985-1990 (Mn.)	17	20.4	37.4	9.75	4.2	13.95

Table 21

COUNTRY: MALAYSIA

ESTIMATED PRESENT AND TARGETTED COVERAGE FINANCIAL REQUIREMENTS
(\$ in 1985 prices)

I T E M S	Safe Drinking Water Supply			Sanitation/Safe Excreta Disposal		
	Urban	Rural	Total	Urban ^{1/}	Rural	Total
Total population 1985 (Mn.)	10.2	5.5	15.7	10.2	5.5	15.7
Total Population 1985 (%)	65	35	100	65	35	100
Population served 1985 (Mn.)	9.9	3.9	13.8	2.2	3.2	5.4
Population served 1985 (%)	97	71	88	22	59	34
Total population 1990 (Mn.)	11.7	5.8	17.5	11.7	5.8	17.5
Total population 1990 (%)	67	33	100	67	33	100
Population to be covered according to 1990 targets (%)	100	83	94	48	79	58
Target number of population served 1990 (Mn.)	11.7	4.8	16.5	5.6	4.6	10.2
Additional population to be served by new systems (Mn.)	1.8	0.9	2.7	3.4	1.4	4.8
Per capita cost	80-160	60-100	60-160	140-200	20-800	20-200
Average per capita investment cost	120	80	107	170	50	135
Total required investment 1985-1990 (Mn.)	216	72	288	578	70	648
Local anticipated investment 1985-1990 (Mn.)	130	42	172	345	42	387
Foreign possible investment 1985-1990 (Mn.)	86	30	116	233	28	261

^{1/} Only sewerage, rest of population adequately covered by pit latrines and septic tanks.

Table 22

COUNTRY: MALDIVES

ESTIMATED PRESENT AND TARGETTED COVERAGE FINANCIAL REQUIREMENTS
(\$ in 1985 prices)

I T E M S	Safe Drinking Water Supply			Sanitation/Safe Excreta Disposal		
	Urban	Rural	Total	Urban	Rural	Total
Total population 1985 (Mn.)	0.04	0.13	0.17	0.04	0.13	0.17
Total Population 1985 (%)	26	74	100	26	74	100
Population served 1985 (Mn.)	0.008	0.013	0.021	0.028	0.013	0.041
Population served 1985 (%)	20	10	12	70	10	24
Total population 1990 (Mn.)	0.05	0.14	0.19	0.05	0.14	0.19
Total population 1990 (%)	28	72	100	28	72	100
Population to be covered according to 1990 targets (%)	93	80	84	100	25	45
Target number of population served 1990 (Mn.)	0.047	0.112	0.159	0.05	0.035	0.085
Additional population to be served by new systems (Mn.)	0.039	0.099	0.138	0.022	0.022	0.041
Per capita cost	160-200	40-80	40-200	100-200	40-70	40-200
Average per capita investment cost	180	60	93	150	55	110
Total required investment 1985-1990 (Mn.)	7.0	5.9	12.9	3.3	1.2	4.5
Local anticipated investment 1985-1990 (Mn.)	2.5	2.1	4.6	1.2	0.4	1.6
Foreign possible investment 1985-1990 (Mn.)	4.5	3.8	8.3	2.1	0.8	2.9

Table 23

COUNTRY: NEPAL

ESTIMATED PRESENT AND TARGETTED COVERAGE FINANCIAL REQUIREMENTS
(\$ in 1985 prices)

I T E M S	Safe Drinking Water Supply			Sanitation/Safe Excreta Disposal		
	Urban	Rural	Total	Urban	Rural	Total
Total population 1985 (Mn.)	1.3	14.5	15.8	1.3	14.5	15.8
Total Population 1985 (%)	8	92	100	8	92	100
Population served 1985 (Mn.)	1.2	3.8	5.0	22	3	4
Population served 1985 (%)	89	26	32	0.3	0.4	0.7
Total population 1990 (Mn.)	1.7	15.6	17.3	1.7	15.6	17.3
Total population 1990 (%)	10	90	100	10	90	100
Population to be covered according to 1990 targets (%)	94	67	70	28	13	14
Target number of population served 1990 (Mn.)	1.6	10.5	12.1	0.5	2.0	2.5
Additional population to be served by new systems (Mn.)	0.4	6.7	7.1	0.2	1.6	1.8
Per capita cost	60-80	40-60	40-80	70-90	10-30	10-90
Average per capita investment cost	70	50	51	80	20	27
Total required investment 1985-1990 (Mn.)	28	335	363	16	32	48
Local anticipated investment 1985-1990 (Mn.)	10	110	220	5	11	16
Foreign possible investment 1985-1990 (Mn.)	18	225	143	11	21	32

Table 24

COUNTRY: PAKISTAN

ESTIMATED PRESENT AND TARGETTED COVERAGE FINANCIAL REQUIREMENTS
(\$ in 1985 prices)

I T E M S	Safe Drinking Water Supply			Sanitation/Safe Excreta Disposal		
	Urban	Rural	Total	Urban	Rural	Total
Total population 1985 (Mn.)	28.9	67.4	96.3	28.9	67.4	96.3
Total Population 1985 (%)	30	70	100	30	70	100
Population served 1985 (Mn.)	22.5	16.2	38.7	15.3	4.0	19.3
Population served 1985 (%)	78	24	40	53	6	20
Total population 1990 (Mn.)	33.9	75.3	109.2	33.9	75.3	109.2
Total population 1990 (%)	31	69	100	31	69	100
Population to be covered according to 1990 targets (%)	100	66	77	59	13	27
Target number of population served 1990 (Mn.)	33.9	50	83.9	20	9.8	29.8
Additional population to be served by new systems (Mn.)	1.4	33.8	35.2	4.7	5.8	10.5
Per capita cost	40-80	10-30	10-80	40-80	10-20	10-80
Average per capita investment cost	60	20	22	60	15	35
Total required investment 1985-1990 (Mn.)	84	676	760	282	87	369
Local anticipated investment 1985-1990 (Mn.)	34	270	304	113	35	148
Foreign possible investment 1985-1990 (Mn.)	50	406	456	169	52	221

Table 25

COUNTRY: PAPUA NEW GUINEA

ESTIMATED PRESENT AND TARGETTED COVERAGE FINANCIAL REQUIREMENTS
(\$ in 1985 prices)

I T E M S	Safe Drinking Water Supply			Sanitation/Safe Excreta Disposal		
	Urban	Rural	Total	Urban	Rural	Total
Total population 1985 (Mn.)	0.4	2.9	3.3	0.40	2.9	3.3
Total Population 1985 (%)	12	88	100	12	88	100
Population served 1985 (Mn.)	0.22	0.29	0.51	0.36	0.09	0.45
Population served 1985 (%)	55	10	16	91	3	14
Total population 1990 (Mn.)	0.47	3.13	3.6	0.47	3.13	3.6
Total population 1990 (%)	13	87	100	13	87	100
Population to be covered according to 1990 targets (%)	70	30	35	100	30	39
Target number of population served 1990 (Mn.)	0.33	0.94	1.27	0.47	0.94	1.41
Additional population to be served by new systems (Mn.)	0.11	0.65	0.76	0.11	0.85	0.96
Per capita cost	100-220	20-40	20-220	70-230	5-35	5-230
Average per capita investment cost	160	30	49	150	20	17
Total required investment 1985-1990 (Mn.)	17.6	19.5	37.1	16.5	0.2	16.7
Local anticipated investment 1985-1990 (Mn.)	7.0	7.8	14.8	6.6	0.1	6.7
Foreign possible investment 1985-1990 (Mn.)	10.6	11.7	22.3	9.9	0.1	10.0

Table 26

COUNTRY: PHILIPPINES

ESTIMATED PRESENT AND TARGETTED COVERAGE FINANCIAL REQUIREMENTS
(\$ in 1985 prices)

I T E M S	Safe Drinking Water Supply			Sanitation/Safe Excreta Disposal		
	Urban ¹ /	Rural	Total	Urban ² /	Rural	Total
Total population 1985 (Mn.)	21.9	32.8	54.7	21.9	32.9	54.7
Total Population 1985 (%)	40	60	100	40	60	100
Population served 1985 (Mn.)	13.1	11.5	24.6	2.2	6.6	8.8
Population served 1985 (%)	60	35	45	10	20	16
Total population 1990 (Mn.)	24.9	35.8	60.7	24.9	35.8	60.7
Total population 1990 (%)	41	59	100	41	59	100
Population to be covered according to 1990 targets (%)	90	40	60	30	30	30
Target number of population served 1990 (Mn.)	22.4	14.3	36.7	7.5	10.7	18.2
Additional population to be served by new systems (Mn.)	9.3	2.8	12.1	5.3	4.1	9.4
Per capita cost	100-120	40-80	40-120	100-140	20-40	20-140
Average per capita investment cost	110	60	98	120	30	81
Total required investment 1985-1990 (Mn.)	1,023	168	1,191	636	123	759
Local anticipated investment 1985-1990 (Mn.)	409	67	476	254	49	304
Foreign possible investment 1985-1990 (Mn.)	614	101	715	382	74	455

¹/ Piped water supply

²/ Sewerage

Table 27

COUNTRY: SINGAPORE

ESTIMATED PRESENT AND TARGETTED COVERAGE FINANCIAL REQUIREMENTS
(\$ in 1985 prices)

I T E M S	Safe Drinking Water Supply			Sanitation/Safe Excreta Disposal		
	Urban	Rural	Total	Urban	Rural	Total
Total population 1985 (Mn.)	2.6	-	2/6	2.6	-	2.6
Total Population 1985 (%)	100	-	100	100	-	100
Population served 1985 (Mn.)	2.0	-	2.0	2.0	-	2.0
Population served 1985 (%)	80	-	80	80	-	80
Total population 1990 (Mn.)	2.7	-	2.7	2.7	-	2.7
Total population 1990 (%)	2.7	-	2.7	2.7	-	2.7
Population to be covered according to 1990 targets (%)	100	-	100	100	-	100
Target number of population served 1990 (Mn.)	2.7	-	2.7	2.7	-	2.7
Additional population to be served by new systems (Mn.)	0.7	-	0.7	0.7	-	0.7
Per capita cost	200-300	-	200-300	200-400	-	200-400
Average per capita investment cost	250	-	250	300	-	300
Total required investment 1985-1990 (Mn.)	175	-	175	210	-	210
Local anticipated investment 1985-1990 (Mn.)	122	-	122	147	-	147
Foreign possible investment 1985-1990 (Mn.)	53	-	53	63	-	63

Table 28

COUNTRY: SOLOMON ISLANDS

ESTIMATED PRESENT AND TARGETTED COVERAGE FINANCIAL REQUIREMENTS
(\$ in 1985 prices)

I T E M S	Safe Drinking Water Supply			Sanitation/Safe Excreta Disposal		
	Urban	Rural	Total	Urban	Rural	Total
Total population 1985 (Mn.)	0.03	0.24	0.27	0.03	0.24	0.27
Total Population 1985 (%)	10	90	100	10	90	100
Population served 1985 (Mn.)	0.03	0.14	0.17	0.02	0.10	0.12
Population served 1985 (%)	96	60	63	80	40	44
Total population 1990 (Mn.)	0.04	0.27	0.31	0.04	0.27	0.31
Total population 1990 (%)	12	88	100	12	88	100
Population to be covered according to 1990 targets (%)	100	100	100	95	75	77
Target number of population served 1990 (Mn.)	0.04	0.27	0.31	0.04	0.20	0.24
Additional population to be served by new systems (Mn.)	0.01	0.13	0.14	0.02	0.10	0.12
Per capita cost	150-250	20-40	20-250	80-100	5-15	5-100
Average per capita investment cost	200	30	42	90	10	23
Total required investment 1985-1990 (Mn.)	2.0	3.9	5.9	1.8	1.0	2.8
Local anticipated investment 1985-1990 (Mn.)	0.7	1.4	2.1	0.6	0.4	1.0
Foreign possible investment 1985-1990 (Mn.)	1.3	2.5	3.8	1.2	0.6	1.8

Table 29

COUNTRY: SRI LANKA

ESTIMATED PRESENT AND TARGETTED COVERAGE FINANCIAL REQUIREMENTS
(\$ in 1985 prices)

I T E M S	Safe Drinking Water Supply			Sanitation/Safe Excreta Disposal		
	Urban	Rural	Total	Urban	Rural	Total
Total population 1985 (Mn.)	4.3	11.5	15.8	4.3	11.5	15.8
Total Population 1985 (%)	27	73	100	27	73	100
Population served 1985 (Mn.)	3.4	3.5	6.9	3.7	8.4	12.1
Population served 1985 (%)	80	30	44	85	65	77
Total population 1990 (Mn.)	4.7	12.1	16.8	4.7	12.1	16.8
Total population 1990 (%)	28	72	100	28	72	100
Population to be covered according to 1990 targets (%)	100	50	64	100	100	100
Target number of population served 1990 (Mn.)	4.7	6.1	10.8	4.7	12.1	16.8
Additional population to be served by new systems (Mn.)	1.3	2.6	3.9	1.0	3.7	4.7
Per capita cost	100-150	10-20	10-150	100-200	10-20	10-200
Average per capita investment cost	125	15	52	150	15	44
Total required investment 1985-1990 (Mn.)	163	39	202	150	56	206
Local anticipated investment 1985-1990 (Mn.)	57	14	71	53	20	72
Foreign possible investment 1985-1990 (Mn.)	106	25	131	97	36	134

Table 30

COUNTRY: THAILAND

ESTIMATED PRESENT AND TARGETTED COVERAGE FINANCIAL REQUIREMENTS
(\$ in 1985 prices)

I T E M S	Safe Drinking Water Supply			Sanitation/Safe Excreta Disposal		
	Urban	Rural	Total	Urban	Rural	Total
Total population 1985 (Mn.)	11.9	40.0	51.8	11.9	40.0	51.8
Total Population 1985 (%)	23	77	100	23	77	100
Population served 1985 (Mn.)	7.7	30	37.7	7.7	18	5.7
Population served 1985 (%)	65	75	73	65	45	50
Total population 1990 (Mn.)	14.2	42.4	56.6	14.2	42.4	56.6
Total population 1990 (%)	25	75	100	25	75	100
Population to be covered according to 1990 targets (%)	70	95	89	70	50	55
Target number of population served 1990 (Mn.)	9.9	40.3	50.2	9.9	21.2	31.1
Additional population to be served by new systems (Mn.)	2.2	10.3	12.5	2.2	3.2	5.4
Per capita cost	80-110	20-40	20-110	100-130	5-15	5-130
Average per capita investment cost	90	30	41	115	10	53
Total required investment 1985-1990 (Mn.)	198	309	507	253	32	285
Local anticipated investment 1985-1990 (Mn.)	69	108	177	89	11	100
Foreign possible investment 1985-1990 (Mn.)	99	201	330	164	21	185

Table 31

COUNTRY: TONGA

ESTIMATED PRESENT AND TARGETTED COVERAGE FINANCIAL REQUIREMENTS
(\$ in 1985 prices)

I T E M S	Safe Drinking Water Supply			Sanitation/Safe Excreta Disposal		
	Urban	Rural	Total	Urban	Rural	Total
Total population 1985 (Mn.)	0.03	0.07	0.10	0.03	0.07	0.10
Total Population 1985 (%)	30	70	100	30	70	100
Population served 1985 (Mn.)	0.03	0.06	0.09	0.03	0.07	0.10
Population served 1985 (%)	91	90	90	100	97	98
Total population 1990 (Mn.)	0.04	0.08	0.12	0.04	0.08	0.12
Total population 1990 (%)	32	68	100	32	68	100
Population to be covered according to 1990 targets (%)	100	100	100	100	100	100
Target number of population served 1990 (Mn.)	0.04	0.08	0.12	0.04	0.08	0.12
Additional population to be served by new systems (Mn.)	0.01	0.02	0.03	0.01	0.01	0.02
Per capita cost	80-120	40-60	40-120	60-80	10-50	10-80
Average per capita investment cost	100	50	67	70	30	50
Total required investment 1985-1990 (Mn.)	1.0	1.0	2.0	0.7	0.3	1.0
Local anticipated investment 1985-1990 (Mn.)	0.3	0.3	0.6	0.2	0.1	0.3
Foreign possible investment 1985-1990 (Mn.)	0.7	0.7	1.4	0.5	0.2	0.7

Table 32

COUNTRY: VANUATU

ESTIMATED PRESENT AND TARGETTED COVERAGE FINANCIAL REQUIREMENTS
 (\$ in 1985 prices)

I T E M S	Safe Drinking Water Supply			Sanitation/Safe Excreta Disposal		
	Urban	Rural	Total	Urban	Rural	Total
Total population 1985 (Mn.)	0.03	0.10	0.13	0.03	0.10	0.13
Total Population 1985 (%)	19	81	100	0.19	81	100
Population served 1985 (Mn.)	0.03	0.05	0.08	0.03	0.06	0.09
Population served 1985 (%)	90	50	62	86	64	69
Total population 1990 (Mn.)	0.04	0.12	0.16	0.04	0.12	0.16
Total population 1990 (%)	22	78	100	22	78	100
Population to be covered according to 1990 targets (%)	100	100	100	100	100	100
Target number of population served 1990 (Mn.)	0.04	0.12	0.16	0.04	0.12	0.16
Additional population to be served by new systems (Mn.)	0.01	0.07	0.08	0.01	0.06	0.07
Per capita cost	80-120	20-100	20-120	60-100	5-15	5-100
Average per capita investment cost	100	60	65	80	10	20
Total required investment 1985-1990 (Mn.)	1.0	4.2	5.2	0.8	0.6	1.4
Local anticipated investment 1985-1990 (Mn.)	0.3	1.3	1.6	0.2	0.2	0.4
Foreign possible investment 1985-1990 (Mn.)	0.7	2.9	3.6	0.6	0.4	1.0

Table 33

COUNTRY: VIETNAM

ESTIMATED PRESENT AND TARGETTED COVERAGE FINANCIAL REQUIREMENTS
(\$ in 1985 prices)

I T E M S	Safe Drinking Water Supply			Sanitation/Safe Excreta Disposal		
	Urban	Rural	Total	Urban	Rural	Total
Total population 1985 (Mn.)	12.6	47.2	59.8	12.6	47.2	59.8
Total Population 1985 (%)	21	79	100	22	79	100
Population served 1985 (Mn.)	6.3	16.5	22.8	5.0	28.3	33.3
Population served 1985 (%)	50	35	38	40	60	56
Total population 1990 (Mn.)	14.3	50.9	65.2	14.3	50.9	65.2
Total population 1990 (%)	22	78	100	22	78	100
Population to be covered according to 1990 targets (%)	80	80	80	60	90	83
Target number of population served 1990 (Mn.)	11.4	40.7	51.8	8.6	45.8	54.4
Additional population to be served by new systems (Mn.)	5.1	24.2	29.0	3.6	17.5	21.1
Per capita cost	50-70	10-30	30-70	40-60	10-30	10-60
Average per capita investment cost	60	20	27	50	20	25
Total required investment 1985-1990 (Mn.)	306	484	790	180	350	530
Local anticipated investment 1985-1990 (Mn.)	153	242	395	90	175	265
Foreign possible investment 1985-1990 (Mn.)	153	242	395	90	175	265

Table 34

COUNTRY: WESTERN SAMOA

ESTIMATED PRESENT AND TARGETTED COVERAGE FINANCIAL REQUIREMENTS
(\$ in 1985 prices)

I T E M S	Safe Drinking Water Supply			Sanitation/Safe Excreta Disposal		
	Urban	Rural	Total	Urban	Rural	Total
Total population 1985 (Mn.)	0.03	0.13	0.16	0.03	0.13	0.16
Total Population 1985 (%)	20	80	100	20	80	100
Population served 1985 (Mn.)	0.029	0.122	0.151	0.026	0.108	0.134
Population served 1985 (%)	97	94	95	86	83	84
Total population 1990 (Mn.)	0.04	0.13	0.17	0.04	0.17	0.17
Total population 1990 (%)	22	78	100	22	78	100
Population to be covered according to 1990 targets (%)	100	100	100	100	100	100
Target number of population served 1990 (Mn.)	0.04	0.13	0.17	0.04	0.13	0.17
Additional population to be served by new systems (Mn.)	0.011	0.008	0.019	0.014	0.022	0.036
Per capita cost	160-200	60-100	60-200	180-220	35-55	20-220
Average per capita investment cost	180	80	137	200	45	106
Total required investment 1985-1990 (Mn.)	2.0	0.6	2.6	2.8	1.0	3.8
Local anticipated investment 1985-1990 (Mn.)	1.0	0.3	1.3	1.4	0.5	1.9
Foreign possible investment 1985-1990 (Mn.)	1.0	0.3	1.3	1.4	0.5	1.9

WATER SUPPLY DIVISION

Table 35

SCHEDULE OF APPROVED LOANS AND AVERAGE
DOMESTIC WATER CONSUMPTION
(BY COUNTRY)

Date Approved	Loan No.	Name of Project	Amount (\$ Million)	Average Domestic Consumption (lpcd)
<u>BANGLADESH</u>				
17 Jun 1982	571-BAN(SF)	District Towns Water Supply	<u>14.40</u>	<u>43</u>
		Subtotal (1)	<u>14.40</u>	<u>43</u>
<u>BHUTAN</u>				
13 Dec 1984	722-BHU	Second Multiproject	<u>7.40</u>	<u>118</u>
		Subtotal (1)	<u>7.40</u>	<u>118</u>
<u>BURMA</u>				
11 Dec 1973	162-BUR(SF) / 163-BUR	Rangoon Water Supply	8.50	108
			4.50	-
18 Dec 1978	382-BUR(SF)	Rangoon Water Supply - Supplementary	7.96	-
30 Sep 1982	584-BUR(SF)	Mandalay Water Supply	<u>15.00</u>	<u>104</u>
		Subtotal (4)	<u>35.96</u>	<u>106</u>
<u>HONG KONG</u>				
06 Apr 1972	93-HKG	Sea Water Desalting	21.50	233
09 Oct 1975	234-HKG	Sha Tin Sewage Treatment	<u>20.00</u>	-
		Subtotal (2)	<u>41.50</u>	<u>233</u>
<u>INDONESIA</u>				
07 Nov 1974	195-INO(SF)	Bandung Water Supply	11.50	92
29 May 1979	401-INO	Bandung Water Supply- Supplementary	8.00	97
11 Dec 1980	493-INO	Small Towns Water Supply Sector	32.00	69
25 Nov 1981	547-INO	Semarang Water Supply	35.50	195
17 Jan 1985	731-INO	IKK Water Supply Sector	<u>40.20</u>	<u>45</u>
		Subtotal (5)	<u>127.20</u>	<u>80</u>

Date Approved	Loan No.	Name of Project	Amount (\$ Million)	Average Domestic Consumption (lpcd)
<u>KOREA</u>				
30 Mar 1971	64-KOR	Seoul Water Supply	8.80	171
16 Jun 1972	95-KOR	Busan and Daegu Water Supply	5.70	127
21 Dec 1972	119-KOR	Metropolitan Water Intake	25.60	-
20 Dec 1977	336-KOR	Regional Water Supply	30.00	165
26 Apr 1979	398-KOR	Second Busan Water Supply	15.00	166
30 Aug 1979	409-KOR	Sewage Treatment	2.10	-
15 Dec 1980	498-KOR	Sewage Treatment	27.90	-
20 Oct 1981	534-KOR	Han River Basin Environmental Master Plan	4.10	-
12 Nov 1981	539-KOR	Provincial Cities Water Supply	38.10	142
23 Nov 1982	603-KOR	Rural Sewage Treatment Sector	25.50	-
23 Aug 1983	635-KOR	Small Towns Water Supply Sector	60.00	139
10 Nov 1983	650-KOR	Second Sewage Treatment	62.80	-
15 Nov 1984	705-KOR	Eighth Water Supply	67.00	254
11 Dec 1984	720-KOR	Ninth Water Supply	27.00	298
3 Dec 1985	763-KOR	Third Sewerage Treatment	35.00	-
		Subtotal (15)	434.60	180
<u>LAOS</u>				
18 Apr 1974	183(LAO(SF))	Vientiane Water Supply	6.00	130
		Subtotal (1)	6.00	1.30
<u>MALAYSIA</u>				
19 Sep 1968	4-MAL	Penang Water Supply	7.200	-
12 Nov 1970	41-MAL	Malacca Water Supply	5.00	82
09 Nov 1972	107-MAL	Greater Ipoh Water Supply	6.10	-
30 Oct 1973	145-MAL	Kuching/Sibu Water Supply	6.46	125
23 Nov 1976	283-MAL	Johore and Kelantan Water Supply	15.00	91
08 Nov 1978	316-MAL	Sabah Water Supply	15.30	91
07 Nov 1978	364-MAL	Johore, Perak, Trengganu Water Supply	31.74	166
19 Dec 1980	500-MAL	Rural Water Supply	2.81	-
15 Nov 1983	652-MAL	Kedah Water Supply	24.50	173
		Subtotal (9)	114.11	121
<u>NEPAL</u>				
11 Dec 1984	719-NEP	Rural Water Supply Sector		
		Subtotal (1)	9,600	37
<u>PAKISTAN</u>				
13 Apr 1976	263-PAK(SF)	Hyderabad Water Supply	22.00	86
15 Dec 1977	331-PAK(SF)	Faisalabad Water Supply	39.50	178
		Subtotal (2)	61.50	132

Date Approved	Loan No.	Name of Project	Amount (\$ Million)	Average Domestic Consumption (lpcd)
<u>PAPUA NEW GUINEA</u>				
11 Nov 1976	278-PNG(SF)	Water Supply	13.50	100
25 Jul 1978	346-PNG(SF)	PNG Second Water Supply	<u>5.40</u>	<u>110</u>
		Subtotal (2)	<u>18.90</u>	<u>105</u>
<u>PHILIPPINES</u>				
28 Aug 1974	190-PHI	Manila Water Supply	51.30	180
16 Dec 1975	251-PHI	Provincial Cities Water Supply	16.80	180
07 Sep 1978	351-PHI	Second Manila Water Supply	49.00	190
24 Jun 1980	457-PHI	Manila Sewerage	42.80	-
25 Nov 1981	545-PHI	Water Supply Sector	46.00	152
27 Oct 1983	645-PHI	Manila Water Supply Rehabilitation	<u>39.00</u>	<u>-</u>
		Subtotal (6)	<u>245.20</u>	<u>176</u>
<u>SINGAPORE</u>				
23 Dec 1970	57-SIN	Singapore Water Supply	8.30	-
13 Apr 1976	262-SIN	Second Water Supply	23.60	195
09 Oct 1979	416-SIN	Bedok Sewage Treatment Plant Expansion	<u>15.10</u>	<u>-</u>
		Subtotal (3)	<u>47.00</u>	<u>195</u>
<u>SOLOMON ISLANDS</u>				
30 Oct 1980	478-SOL(SF)	Honiara Water Supply	<u>1.65</u>	<u>135</u>
		Subtotal (1)	<u>1.65</u>	<u>135</u>
<u>THAILAND</u>				
24 Jul 1973	137-THA	Bangkok Water Supply	19.60	180
17 Dec 1979	443-THA	Second Bangkok Water Supply	68.00	190
21 Dec 1982	618-THA	Songkhla Lake Basin Planning Study	3.00	-
21 Mar 1985	735-THA	Third Bangkok Water Supply	<u>130.90</u>	<u>225</u>
		Subtotal (4)	<u>221.50</u>	<u>198</u>
<u>VIETNAM</u>				
27 Sep 1973	139-VIE(SF)/ 140-VIE	Ho Chi Minh Water Distribution	3.15	136
			<u>1.45</u>	<u>-</u>
		Subtotal (2)	<u>4.60</u>	<u>136</u>
		TOTAL (55)	<u>1,391.1</u>	<u>133</u>

SUMMARY OF CONCLUSIONS OF ASIA DONOR MEETING

Manila, Philippines

21-25 October 1985

I. INTRODUCTION AND BACKGROUND

1. The Bank, in connection with the International Drinking Water Supply and Sanitation Decade (IDWSSD), from 21 to 25 October 1985, hosted the Regional External Support Consultation. The consultation, co-sponsored by the Bank, the World Health Organization (WHO), and the Ministry for Economic Cooperation of the Federal Republic of Germany (BMZ), was held at Bank headquarters. The consultation was attended by some 40 senior representatives from multi- and bilateral agencies, non-government organizations (NGO), and by selected water supply and sanitation (WSS) experts from the Asia region, acting as resource persons. The consultation was opened by Vice President (Projects). The discussions covered primarily the WHO/BMZ European Donor Consultation 1/, held in Bonn, Federal Republic of Germany, in October 1984, and the subsequent meeting of the Development Assistance Committee (DAC) 2/, held in Paris, in May 1985. The main points of the conclusion of the regional consultation are summarized below.

II. MAIN DELIBERATIONS AND CONCLUSIONS

A. Cooperation and Coordination of External Support Agencies

2. In order to initiate necessary action for aid coordination at the country level, the consultation felt that it is always preferable that the recipient country itself take the initiatives, through their National Action Committees (NAC) or the equivalent body coordinating Decade activities. Recipient countries encountering difficulty in taking initiatives should be encouraged to engage the assistance of UN organizations such as UNDP and WHO; External Support Agencies (ESA) can also use the services of UN organizations in efforts to coordinate sector efforts. It was agreed that the role of NGOs should also be strengthened.

3. In discussing the priority issue of coordination and cooperation among ESAs and among recipient countries, the Consultation observed that aid coordination was necessary, regardless of whether a recipient country had already established sector strategies and programs for the Decade.

4. The consultation agreed that availability of adequate and regularly updated information at the country level, in the form of "external support profiles", and the dissemination of this information to government agencies and ESAs concerned is essential. On the other hand, it was agreed that ESAs should provide to a "clearing house institution" data

1/ Report by the Secretariat, Bonn/Geneva, February 1985.

2/ Development Assistance Committee: Improving Aid Effectiveness in the Drinking Water Supply and Sanitation Sector, Conclusion and Recommendations Emerging from DAC Consultation (Report distributed by DAC on 19 September 1985).

on ongoing and planned sector activities; such information would then be compiled, edited and distributed to all ESAs active in the sector. It was further agreed that ESAs should develop their own sector policies, taking into account the Decade approaches 1/, that such plans should be discussed with other ESAs and with recipient countries.

5. As an important follow-up on the above recommendations, the consultation felt that aid coordination meetings should be held at the country level, sufficient in number and frequency and with adequate preparation, through the initiative of the respective National Action Committees or equivalent bodies, assisted by UNDP/WHO, if necessary. The consultation agreed that such meetings should not be meant as pledging sessions.

B. Technical Cooperation, or "Software"

6. The consultation emphasized that the installations of WSS systems -- "hardware" -- should be accompanied by supporting measures -- technical cooperation, or "software". Such software would ensure the best use of the system established. Software would include baseline socioeconomic studies, the strengthening of sector agencies, community organization, health/hygiene education, environmental sanitation, water quality surveillance, research and development, and monitoring and evaluation. It was emphasized that such software would not be available unless specific investments for this purpose were made by both recipient government and donor countries or agencies.

7. It was agreed that investment for software should be made not only prior and during project implementation, but also after a project is implemented. The consultation underlined the need for a longer-term commitment of governments and ESA inputs, until community capabilities develop to the point of communities being able to assume full responsibility for the projects implemented. Only in this manner was it considered realistic to expect that communities could realize the full functioning, utilization and benefit of the facilities established.

8. Along the same line, the consultation noted that under certain country-specific conditions, some ESAs could accept to support recurrent costs of operation and maintenance (O&M) during a similar transitional period, particularly in least-developed countries.

1/ - complementarity in developing water supply and sanitation
- strategies giving precedence to underserved rural and urban population
- programs promoting self-reliant, self-sustaining action
- community involvement at all stages of project implementation
- association of water supply and sanitation with relevant programs in other sectors, particularly primary health care, concentrating, for example, on health education, human resources development and the strengthening of institutional performance.

9. The consultation emphasized that investments in improved drinking water supply should be complemented by wastewater and excreta disposal and by hygiene education, in order to maximize the health impact.

C. Institutional Development

10. The consultation noted that institutional structures and modes of operation established over the years now need to be improved, to meet changing circumstances and to achieve intended objectives. The importance of community involvement at all stages of project planning, implementation, operation and maintenance, especially in the rural subsector, demands a strategy that includes institutional realignment such that community involvement will be promoted. Wider community participation would also help close the gap between the people and the planners that is at least partly the result of existing institutional structures. Wider community participation would also bring into the project cycle those groups that traditionally been excluded, such as women.

11. The consultation also noted that managerial and training policies of the sector institutions require review that would help align them more closely to community needs. The innovative approaches now employed in Nepal and Thailand were discussed. It was agreed that ESAs and recipient countries could well consider these models in new projects and programs under development, whether external assistance is available or not, as such efforts would also help focus on much needed inter sectoral coordination at all levels. It was agreed that information on such developments should be made available widely.

D. Intersectoral Coordination and Project Linkages

12. The consultation considered that intersectoral coordination and linkages between WSS programs and programs for health improvements, particularly those for primary health care, are essential for software inputs, i.e., health education, the strengthening of community organization, and the training and use of community workers. Resources are needed to make these linkages effective; the consultation considered that this aspect of WSS projects should receive more support from ESAs. At the same time, it was the view of the Consultation that both governments and donors should establish more effective coordination between WSS programs and projects and activities in other fields, such as in agriculture, irrigation, housing, roads, general rural development, and that specific attention should be given to similarities in program objectives, target populations, and location.

E. Cost Recovery

13. The consultation agreed that the services of WSS have a cost that must be borne, or at least shared, by beneficiaries. The recovery of this cost would ensure proper operation, maintenance and expansion of the WSS schemes, and would discourage waste and loss of water, as well as facilitate an equitable distribution of water to various income groups.

14. The consultation agreed that in urban areas, the recovery of full cost (O&M, including depreciation and debt service in excess of depreciation) is a long-term objective and that achieving this would help to enable WSS agencies to achieve financial autonomy. However, it was considered that in the short-run, revenues from water sales and sewerage taxes should at least cover O&M costs and replacement of short-term assets; this should be reflected in national policies for progressive tariff structures that could include elements of cross-subsidization between different consumer groups. It was considered that tariffs should be structured and kept under review, but with the criteria of affordability preserved. Based on experience in Asia, preserving affordability would include limiting expenditures for WSS services to less than 3-5 per cent of family income. Net income from revenues should be reserved for the exclusive use of the WSS sector.

15. It was noted that in rural areas, motivating populations to request WSS services -- through hygiene education and awareness campaigns, for example -- is a prerequisite to creating a willingness to pay. It was also noted that communities should increasingly absorb the cost of O&M and, in the long run, absorb a part of the capital cost, through cash payments or through contributions in kind or labor. The consultation agreed that the communities concerned should be involved at all levels of project preparation and implementation and that prior to project preparation, governments and donor agencies should make sure that the implications of O&M costs and labor are discussed with the communities, so that they can decide on the appropriateness 1/ of the systems to be constructed for their use.

16. The above concerns would also encourage ESAs to give increasing support to the rural subsector.

1/ Appropriate technology is defined as technology which, among several alternatives, satisfies the identified demand or need, in a technical, socioeconomic and culturally acceptable manner that is affordable to the user (see Koenigswinter Report, p. 42).