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REPUBLIC OF YEMEN
COUNTRY WATER RESOURCES ASSISTANCE STRATEGY

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**Water, Environment, Social and Rural Development Department
Middle East and North Africa Region**

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CURRENCY EQUIVALENTS

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ABBREVIATIONS AND ACRONYMS

AAA	Analytical and Advisory Services
AFPPF	Agriculture and Fisheries Production Promotion Fund
APL	Adjustable Program Lending
A21A	Agenda 21 Program for Agriculture
CAS	Country Assistance Strategy
CWRAS	Country Water Resources Assistance Strategy
ESW	Economic Sector Work
GARWSP	General Authority for Rural Water and Sanitation Projects
GOY	Government of Yemen
GSCP	Groundwater and Soil Conservation Project
IIP	Integrated Irrigation Improvement Project
JSDF	Japan Social Development Fund
MAI	Ministry of Agriculture and Irrigation
MDGs	Millennium Development Goals
MENA	Middle East and North Africa
MWE	Ministry of Water and Environment
NWRA	National Water Resources Authority
NWSA	National Water and Sanitation Authority
NWSSIP	National Water Sector Strategy Investment Program
OED	Operations Evaluation Department (World Bank)
PRSP	Poverty Reduction Strategy Paper
RWSS	Rural Water Supply and Sanitation
SFD	Social Fund for Development
SWAp	Sector Wide Approach
UWSS	Urban Water Supply and Sanitation
YRI	Yemeni Riyals

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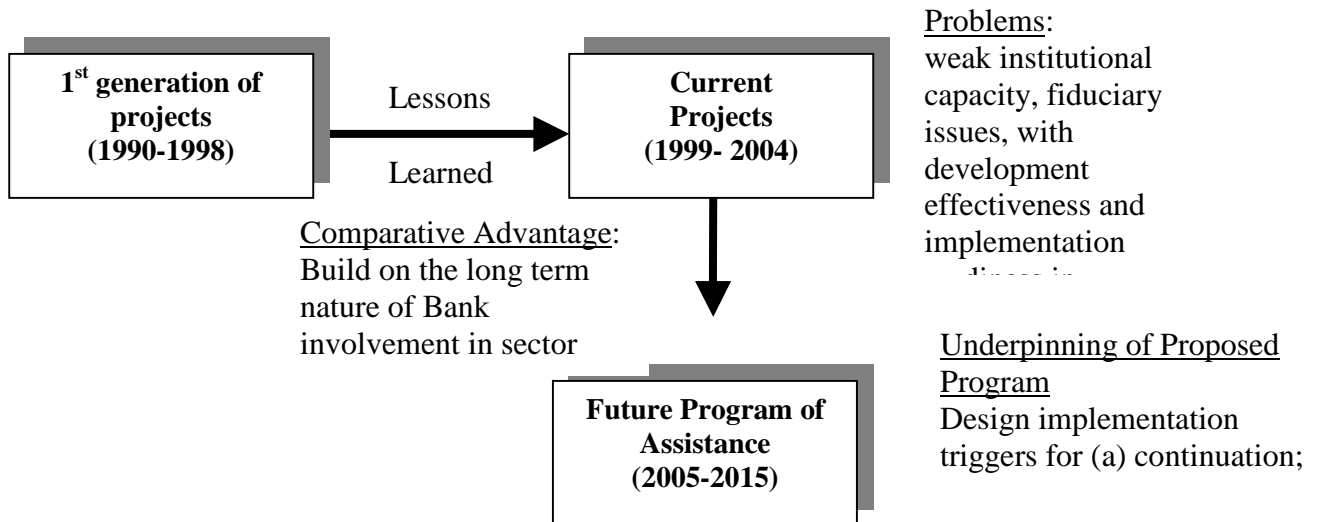
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OVERVIEW AND EXECUTIVE SUMMARY

1. This Country Water Resources Assistance Strategy (CWRAS) for Yemen is very timely on two counts. **First**, with a rapidly growing population (projected to double in 20 years), Yemen is enduring a water crisis that ranks amongst the worst in the world: a severe groundwater overdraft, rural areas and cities drying up, and very low access to drinking water and consequent chronic health and educational problems. With the continued mining of groundwater in all regions of Yemen, some areas will certainly lose their economic viability and even their drinking water supplies, causing displacement and resettlement.

2. **Second**, CWRAS is timely because it facilitates a review of the track record of completed World Bank water projects and of the implementation problems faced by current operations, and so can provide a basis for design of new interventions based on lessons learned. Although only one of the six “first generation” Bank projects through to the mid-1990s was ultimately rated unsatisfactory overall by OED, implementation was generally weak and institutional development impact ranged from negligible to marginal, with sustainability often rated unlikely¹. The five ongoing “second generation” projects² have been designed to correct these earlier faults, and all have significant sector reform objectives. However, implementation of these “second generation” projects is lagging, with procurement and financial management problems caused by weak institutional capacity. If the resulting sluggish implementation continues in this manner, development effectiveness may be impaired.

3. With this backdrop, the schematic below outlines the methodology of the CWRAS, proceeding from a review of challenges and problems to the comparative advantage of the Bank moving forward and continuing the reform dialogue.



¹OED Reports (2001 – 2004).

²Rural Water Supply and Sanitation, Sana’a Basin Water Management Project, Irrigation Improvement Project, and Urban Water Supply and Sanitation (See Annex 4 for description of projects).

4. The methodology highlights the basic message that the Bank is interested in providing investment support in order to achieve development outcomes and improvement in the well being of the Yemeni people. Investments have to result in sustainable management of water resources and delivery of water services. To achieve this requires a combination of continuing sector reforms, increase in capacity, and efficient implementation.

Process and Objectives

5. The core objective of a CWRAS is to produce an operational plan for Bank involvement in a nation's water sector based on lessons learned and global water management principles. Preparation involves analysis, dialogue and decisions that: (i) pinpoint a country's water challenges and opportunities; (ii) set those challenges and opportunities within a framework in which long term objectives, political, social and economic constraints, Dublin principles and the Country Assistance Strategy (CAS) and Poverty Reduction Strategy Paper (PRSP) are reconciled; and (iii) set out the action plan that Government and Bank agree.

6. The preparation process for the Yemen CWRAS began with joint government/donor consultations in October 2003 to define the objectives and the preparation process. In December 2003, five working groups were formed, bringing together over 100 sector professionals, parliamentarians, representatives of civil society, and donors. The reports of the working groups were presented and discussed in a series of workshops in February 2004. The consolidated proposals were discussed at a retreat in Ta'iz in April 2004 by a group of 20 sector professionals and donors. The draft CWRAS was reviewed and agreed by Government in October 2004.

Key Water Challenges in Yemen Today

7. The five most pressing challenges are outlined below.

- **The persistent problem of unsustainable groundwater management in both highland and coastal areas.** Groundwater use is driving rural growth, yet groundwater mining is both unsustainable and inequitable. Mining has to be reined in if the rural economy is to survive, but groundwater policy has to look not only at sustainability, but also at incomes and at the growing need for rural urban water transfer. International experience shows that recovering control of groundwater is difficult and Yemen does not have the essential governance and institutions. There are, however, some high impact actions that can be started now, including intensive user involvement and organization, self-regulation by water user associations, monitoring and information sharing, tradable water rights, and improving incomes through technological improvements. Thus, the next phase of reform will require mobilizing government commitment around this agenda, working on the governance system at the local level, and piloting high impact actions.
- **Moving water to its highest value use by introducing economic instruments for water allocation decisions.** The history of inter-sectoral water transfer in Yemen is marked by aggressive disputes between town and countryside. Water markets represent one way of solving the rural to urban transfer problem, and development of more formal water markets should be a priority. In addition, more attention is needed to mobilizing alternative sources of supply, including desalination, gray water recycling and water transfer.

- **Meeting the Millennium Development Goals (MDGs) in potable water and sanitation.** In water supply and sanitation, the biggest problem is the low rate of coverage. The urban water and sanitation sector reform program is underway but the MDGs are a high target and the reform program faces the risk of slippage. The pace of reforms needs to be accelerated through decentralization, commercialization of service provision, and public-private partnerships. For rural water supply and sanitation, despite new approaches, the program is in disarray and the MDGs are a very high target. Rapid increases in rural water coverage will require clear strategy, institutional reform and extensive external support.
- **Protecting water sources and quality adequately.** Watershed deterioration is a growing problem. Current efforts are concentrated on a program to build small dams which often does not improve overall basin efficiency and which suffers from problems of poor design, questionable contracting practices and low construction standards. Watershed management programs need to be revived using an integrated approach with more focus on upstream communities and on poverty reduction.
- **The challenge of public administration and the alternative options available to building institutional capacity in the Government of Yemen's (GOY's) agencies.** The public sector managing water in Yemen is still widely dysfunctional. Implementation of the ongoing decentralization agenda will help, as Government progressively divests itself of its service delivery functions. Some other problems can be mitigated by working around government, but for essential public sector functions a concerted effort (with WBI support) is needed to build capacity for core tasks. In addition, it is possible that administrative reform can be pushed through effectively with triggers for investment lending by the Bank and other donors as part of a sector wide approach (SWAp).

The Yemen National Water Sector Strategic Investment Program (NWSSIP)

8. Following the creation of a new single water ministry in 2003 and as the Bank proposed to prepare a CWRAS in a participatory way, Government agreed that the time was right for a new strategic focus, and in fact joined to the CWRAS process the preparation of its own national action plan and investment program, the National Water Sector Strategic Investment Plan (NWSSIP). Thus effectively, Yemen seized on a “window of opportunity” to take stock in the water sector and to prepare its own strategic plan. The approach and process employed to prepare NWSSIP included many positive innovations, notably a long-term, integrated approach and an inclusive process. Government has now finalized the draft NWSSIP and presented it to Cabinet for approval before being sent to Parliament.

9. NWSSIP is a comprehensive strategy, action plan and investment program. Integrated management is explicitly dealt with, and measures to improve institutions and governance issues are set out. Proposals are made on economic policy issues, particularly to revise the incentive framework. There is a strong program of support for NWRA in water resources management. It is proposed to reinforce the ongoing sector reform program for urban water supply and sanitation, with increased investment to attain the MDGs. By contrast, proposals for the rural water supply and sanitation sector are “tentative” as the sector strategy is still being developed. Actions on irrigation and watershed management include an overhaul of the dams program, and reallocation of resources to broader water conservation measures.

10. NWSSIP proposes an investment program of US\$1.5 billion over the five years 2005-9 (compared with US\$1.3 billion for the five years 2000-4). The most important proposal is a doubling of investment in rural water. The net financing requirement which will be sought from external sources is US\$577 million, of which half is for rural water.

11. Overall, NWSSIP is more integrated, targeted, participatory and inclusive than previous strategies, and if implemented should make the water sector more service-oriented and more pro-poor. However, some elements remain scattered and some measures are vague or weak. The measures proposed for tackling the groundwater overdraft are a good start but it is unlikely that they are sufficient. It is clear that the MDGs are a very long-term goal, and short-term targets need to be more realistic. Particularly for rural water, the suggested increase in resource transfer and in corresponding absorptive capacity are beyond the implementation capacity of sector agencies. The relation of the MAI, which handles irrigation and watershed management, to NWSSIP is not quite clear. NWSSIP also remains vague on implementation of the water law, and is generally weak on institutions and sector management capacity. Finally, the NWSSIP horizon is quite short term (five years) and there are few benchmarks.

What are the key policies that should act as benchmarks for sector performance?

12. Globally, the test of water sector policies is the application of the three principles of good water management agreed at the Dublin Conference of 1993. An exercise to match NWSSIP against these “Dublin principles” was carried out, testing the strategy against key questions (see table below). In summary, if NWSSIP is carried out as stated, many aspects of Yemen’s water sector will be “managed” in line with global best practice, but with some significant exceptions. The principal exceptions are:

- Uncertainties about urban water supply policy in respect to poverty targeting, genuine financial autonomy of the Local Corporations and the application of least cost approaches.
- Uncertainties about water resource allocation and sustainability. In particular, the outcome on key questions of reducing groundwater mining and facilitating inter-sectoral water transfer remain uncertain. These depend on Government’s willingness to take tough policy decisions – on macroeconomic policy on incentives and on microeconomic policy on water allocation and markets.
- Uncertainties about the effectiveness of public institutions and expenditures, and about the sector’s ability to wean itself off public finance.

13. In the follow up to NWSSIP, clearly these exceptions will be the focus of close scrutiny from the public and from donors. Above all – in the Yemeni context – it will be implementation of these policies which will be uncertain. It is thus vital that the execution of NWSSIP measures and the resulting outcomes and impacts be the object of benchmarking and be tracked systematically within a well functioning monitoring and evaluation system. The Bank is currently helping Government design this monitoring and evaluation system, which will feed into regular joint reviews of progress between Government, civil society and donors.

NWSSIP Policies and the Dublin Principles

Goals	The instrument principle: water as an economic good, use of economic instruments	The institutional principle: decentralization, stakeholder participation	The ecological principle: holistic and inter-sectoral management
Efficient investment and expanded coverage of safe water	<p>Will services be based on demand drive and willingness to pay approaches? <i>Increasingly yes.</i></p> <p>Will services be targeted at the poor? <i>UWSS uncertain. RWSS yes.</i></p>	<p>Will water resources be managed at the decentralized level? <i>Yes.</i></p> <p>Will choice of investments be decentralized to local stakeholders? <i>Yes.</i></p>	<p>Will sector institutions be efficient? <i>Uncertain.</i></p> <p>Will public and private sectors have clearly defined complementary roles? <i>Increasingly.</i></p>
Sustainable water services	<p>Will service delivery agencies have financial autonomy? <i>For UWSS, uncertain. For RWSS, yes.</i></p> <p>Are least cost options first choice? <i>For UWSS, uncertain. For RWSS, yes (but possible “tubewell bias”).</i></p>	<p>Will user organisations be able to hold service providers accountable? <i>Yes.</i></p> <p>Will entrepreneurs be encouraged to participate in the water service business? <i>Partially.</i></p>	<p>Are there mechanisms for promoting integrated management by sector institutions? <i>Partially.</i></p> <p>How effective will public expenditures be? <i>Uncertain.</i></p> <p>Will providers be able to raise local financing outside the budget? <i>Uncertain.</i></p>
Externalities, water resources sustainability and efficient allocation	<p>Will the price of water reflect opportunity cost? <i>Increasingly.</i></p> <p>Will water flow to the highest economic use?</p>	<p>Will there be independent benchmarking? <i>On service performance, yes. On aquifer drawdown, increasingly.</i></p>	<p>Will there be objective monitoring of policy implementation and of related outputs and impacts? <i>Yes.</i></p> <p>Are water concerns being taken up in</p>

	<i>Uncertain.</i> Will users get compensation for externalities and for providing public goods? <i>Increasingly.</i>	Will knowledge on resources be shared with stakeholders? <i>Yes.</i>	national debate? <i>Yes.</i>
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Issues Analyzed in the CWRAS

14. With these challenges in mind, a diagnostic analysis was undertaken of three major areas: (i) effectiveness of public expenditures; (ii) governance issues; and (iii) implementation performance. With the objective of identifying the most promising options to deal with the water challenges, these areas were evaluated by taking a critical look at current and past projects and programs and presenting strategic ways for future engagement as part of the next CAS preparation cycle beginning in 2005.

Effectiveness of public expenditures

15. In the period 2000-2004, expenditures in the water sector accounted for between 7.3% (2001) and 9.2% (2004) of total budget expenditures.

These sizable transfers were at the limit of the absorptive capacity of the sector, as shown by the persistent disbursement lags.

16. Within the sector, allocations were heavily skewed to the urban population, even though Yemen's large poor population is overwhelmingly concentrated in rural areas. Thus 55% of water sector expenditures were allocated to urban water and sanitation, benefiting just 25% of the Yemeni population. Rural water supply and sanitation received only 19% of total expenditures, to serve the remaining 75% of the population.

17. The quality of expenditures was inadequate. Outcomes from the relatively high public expenditures in the water sector over the years are still not satisfactory in terms of coverage, sustainability and efficiency of service delivery (in water supply, sanitation and irrigation). The quality of construction through GARWSP expenditures in rural water and of Agriculture and Fisheries Production Promotion Fund (AFPPF) expenditures on watershed management (dams) has been poor.

18. Despite a decentralization program for water supply and provision for cost sharing in most rural and irrigation programs, Government remained far and away the dominant financier. For the period 2000-2004, water sector capital expenditures were financed mainly by budget transfers (41%) and by loans (29%). "Internally generated revenues" - i.e. cost sharing, cost recovery etc - accounted for only 28% of finance for the investment program.

19. Governance issues. Given the poor track record of Yemeni institutions in sustainable resource management and service provision, how best can sectoral governance and accountability be improved? The possible solutions need to focus on fostering accountability and transparency. Areas for focus include:

- Sustaining the current move of Government and its agencies away from direct service provision and towards core public sector functions: policy making, regulation and strategic management of water resources.
- Promoting the decentralization agenda throughout the sector: creation of new autonomous local corporations and utilities, devolution of resources to GARWSP rural water supply branches, setting up of more local NWRA offices to help implement the water law, establishment of local basin committees for water resources management – and a massive push on the community based water management agenda, whether for water supply, irrigation or resource management.
- Helping decentralized agencies of all types move rapidly towards financial autonomy and an appropriately “arms-length” relationship with Government.
- Setting up a benchmarking system that discloses to users the performance of water utilities and agencies.
- Establishing appropriate regulatory bodies that (i) regulate resource use between competing uses, and (ii) oversee the service performance of water supply providers.

20. Implementation Performance. The Bank has a portfolio of five ongoing water sector projects: UWSS, Sana’a Basin, RWSSP, Irrigation Improvement (IIP) and Groundwater and Soil Conservation Project (GSCP). Of these five projects, two – RWSSP and IIP – are currently rated as problem projects. If implementation problems continue their ultimate development effectiveness – including their ability to move forward the sector reform agenda - could be jeopardized. Therefore, returning these projects to satisfactory implementation status has to be a precondition for continuation not only of the project but also of Bank action in the relevant sub-sector. Efforts must therefore be concentrated on achieving timely implementation – with restructuring if need be.

The Bank and Yemen’s Water Sector

21. Based on the analysis of issues, it was clear that ongoing lending operations are helping GOY address the water challenges, but their impact is dulled by implementation problems. Improving capacity and implementation performance is therefore the most important short-term goal. In the longer term, priorities over the next few years are:

- Getting the institutional structure right, with a correct balance between the management of the resource (NWRA) and the users of water (urban and rural water supply, irrigation).
- Getting the water resources planning and monitoring function operational with user participation and use of public disclosure mechanisms (especially basin planning by NWRA and water quality by EPA).
- Completing the rural and urban water supply reforms (NWSA and GARWSP), which redefine the state’s role as a facilitator and guarantor rather than as a service provider.
- Enhancing the private sector and community role in service provisioning and oversight.
- Completing the reforms in the irrigation sector (MAI), and operationalizing community-based models for management of groundwater and surface water irrigation systems.

22. These priorities are closely linked to the Bank’s poverty reduction goal. In fact, the CWRAS presents the message that “Poor water management creates poverty.” The Yemen PRSP analyses the water and poverty linkages for water supply and water resources management, and for agriculture and irrigation. The links between environmental degradation and poverty are also clear. Acting on Yemen’s water problems is thus a pro-poor strategy. For this reason, the 2002

CAS had a major focus on water. It underscores the need to get the incentive structure right, and to invest in watershed management, water quality improvement, and irrigation efficiency.

23. Regarding the poverty impact of specific Bank-financed operations, Bank investment in water supply and sanitation is pro-poor, especially rural water. The urban tariff structure, however, merits review from a pro-poor perspective. Bank support to spate irrigation is generally pro-poor, but elite capture is a risk. Similarly for groundwater, Bank support to irrigation efficiency is in principle pro-poor, but the better off may capture most benefits. Water user associations are a means of including the poor in benefits. To improve the poverty reduction impact of Bank investment in water, the Bank should do more in rural water, in promoting water user associations, and in watershed management.

Areas of Bank Intervention

24. Based on lessons learned, the Bank's approach should be strategic, with tactical prioritization and inclusion of some "triggers" for: (i) continuation, and (ii) expansion of Bank activities in water. Given the implementation situation described above, successful implementation and the achievement of project development objectives should be the triggers for continuation and expansion of Bank activities in the relevant sub-sector. Alternatively, if implementation performance cannot improve, there has to be agreement to cancel projects if they are jointly agreed to be no longer useful. In addition, new operations must be dependent on achieving APC triggers for a second phase or on achieving agreed benchmark performance under NWSSIP. The proposed triggers are set out in the table below.

Ongoing Bank Water Sector Projects and Ratings

Project	Current IP rating	Trigger for (a) continuation and (b) expansion or second phase
UWSS (APC)	S	(a) none (b) APC triggers and NWSSIP benchmarks
Sana'a Basin (APC)	S	(a) None (b) APC triggers
RWSSP	U	(a) RWSSP satisfactory on IP and DO (b) RWSSP satisfactory on completion, sector strategy in place, NWSSIP benchmarks
IIP (APC)	U	(a) IIP satisfactory on IP and DO (b) APC triggers
GSCP	S	(a) None (b) GSCP satisfactory on completion, CWMP satisfactory on completion.

25. The Bank should agree a near term (2006-8) program in water, to coincide with the next CAS period; and a longer term (2008-2015) indicative program to show what long-term issues the Bank should be working on. Sector-wide, Bank actions should be in the framework of a long term strategic partnership with Government, with lending and multi-annual programmatic economic and sector work agreed, based on triggers designed to ensure that the pace of reforms continues.

- On sector governance - The Bank should assess the scope for capacity building for the water sector and should work with WBI and other donors on a broad capacity building program. The Bank should also help to resolve the institutional location of irrigation and watershed management. The Bank should conduct public expenditure reviews specifically for the water sector, and get agreement and implementation of a broad-based reform of the incentive structure. In this connection, the Bank may consider the possibility of adjustment lending.
- On water resources management - The Bank should support the basin planning approach, working with NWRA largely at the local level. A watershed management project should be prepared. A major focus on groundwater should include emphasis on water use efficiency, user associations and community self-management, tradable water rights concept, together with support to a “groundwater network”. The Bank should also support studies and pilots for inter-sectoral transfer.
- On irrigation – Subject to the proposed triggers, the Bank should continue to support reform in spate irrigation through the Irrigation Improvement APC, water use efficiency through the GSCP, and basin management and irrigation improvements through the Sana’a Basin Project.
- On water supply and sanitation - The urban water reform program should be steered towards expanding coverage, with attention to poverty targeting, service levels and financial sustainability. The Bank should also provide support on planning future supply side investments, including underutilized aquifers, water transfers, desalination and gray water reuse. In line with the Bank’s poverty reduction mandate, involvement in rural water supply and sanitation should increase, but with attention to sustainable water sources and appropriate technology. If the sector strategy is satisfactory, and as good practice emerges from the current RWSS Project, the Bank should finance a full scale APC program to support rural water supply.

Factors and Risks Affecting Success – the Political Economy of Reform

26. The chances of the Bank being effective are raised by the strategic and selective nature of the proposed CWRAS program. The biggest risk is fading of political will - on the incentive structure, on cost recovery, or on water rights and markets. The other major risk is weak governance – “institutional weakness” – at every level. If an illusory reliance is placed on the public administration, sector performance will not improve. Capacity building for core public functions and decentralization of service delivery and of responsibility for local water management are critical to progress in the sector. Government and donors will need to be clear in their analysis and firm in their decisions.

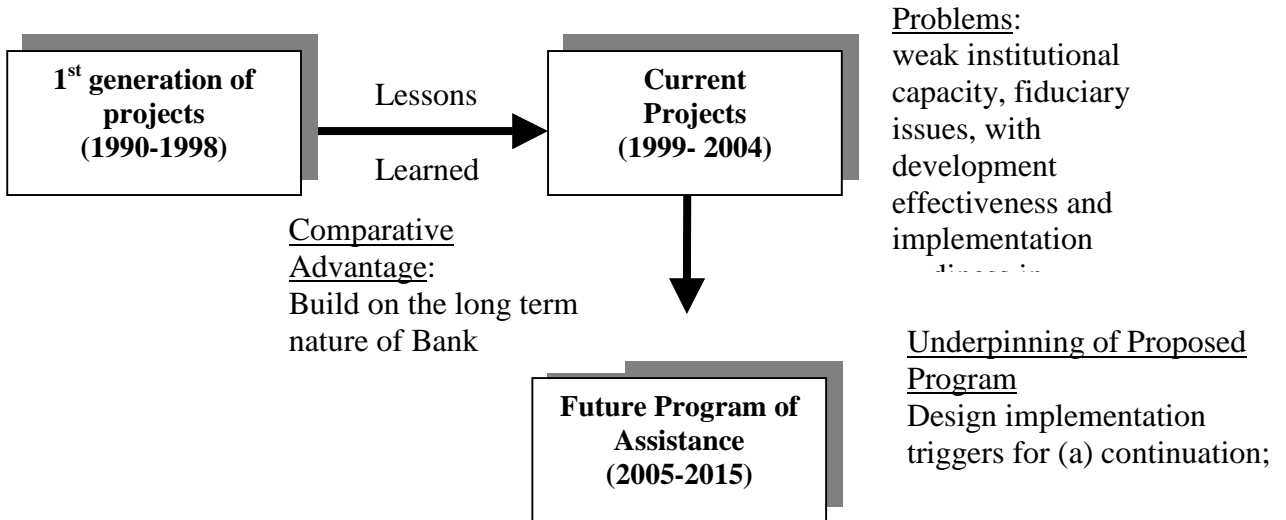
27. There are many discordant voices in water in Yemen, some for reform, some not. Vested interests are strong and those who benefited from the earlier fast development of water may now stand to lose. However, there are some positive movements. The state is now playing more a catalytic than a service provider role, and has adopted a poverty alleviation mandate. Driven by water shortages and fiscal crisis, government policy is changing towards a demand management and decentralization approach. Other stakeholders too are now more likely to be motivated by conservation or by desire for better services. All these factors are beginning to focus Yemen’s water policy more on management than on development. Awareness and reform are slow maturing, but they have been helped along by “decisive moments”. One lesson is that dealing with the “political economy of reform” requires time, dialogue, opportunism, incentives, and leadership.

1. INTRODUCTION AND CONTEXT

1.1 The preparation of a Country Water Resources Assistance Strategy (CWRAS) for Yemen is very timely on two counts. **First**, with a rapidly growing population of approximately 20 million (projected to double in 20 years at current rates Yemen is entering a water crisis that ranks amongst the worst in the world. With the continued mining of groundwater in all regions of Yemen, some areas will certainly lose their economic viability and even their drinking water supplies, causing displacement and resettlement. Evidence suggests that this could change from a current trickle of individuals to a flood of families moving from areas once abundant in water to slightly better endowed coastal areas, resulting in social upheaval and internal friction.

1.2 **Second**, CWRAS includes a review of the track record of completed World Bank water projects and the implementation problems faced by current operations and will contribute to design of new interventions based on lessons learned.

1.3 With this background, the schematic below outlines the methodology of the CWRAS, proceeding from a review of challenges and problems to the comparative advantage of Bank engagement.



1.4 Thus, the document presents the basic **message** that the Bank is not just interested in providing investment support but also in ensuring that the environment is made right for the investments to produce sustainable outcomes in the management of water resources and delivery of water services. The document therefore analyzes the history of sector reforms, together with prospects for reorienting reform efforts and for accelerating their pace.

Process and Objectives

1.5 Following the methodology outlined above, the CWRAS document updates Bank strategy for Yemen's water sector (based on experiences) and proposes a program of future lending and sector work. By its very nature, this process required close cooperation with Government, civil society and donors. At the same time, recent changes in the sector and experience with ongoing reform programs indicated that a broader Government-led updating of national water strategy was opportune. After almost a decade of sporadic reform in the water sector, Government had passed a broad water law in 2003, and grouped all water institutions, with the exception of irrigation and watershed management functions, under a single ministry. Following on these changes, it was agreed that a broader partnership should be formed between Government, civil society and donors to help Yemen define its water sector strategy in more detail, and to set out an action plan and investment program. Preparation of this national strategy - the National Water Sector Strategy and Investment Plan (NWSSIP) - followed a notably participatory and inclusive process, the result of which is a roadmap for sector development over the next ten years.

Box 1: What is a CWRAS?

In general, the core objective of CWRAS is to produce an operational plan for Bank involvement in the water sector based on lessons learned and on global water management principles. Preparation involves analysis, dialogue and decisions that: (i) pinpoint a country's water challenges and opportunities; (ii) set those challenges and opportunities within a framework in which long term objectives, political, social and economic constraints, Dublin principles and the Country Assistance Strategy (CAS) and Poverty Reduction Strategy Paper (PRSP) are reconciled in a strategy; and (iii) set out the action plan that Government and Bank have agreed.

1.6 The preparation process for the Yemen CWRAS began with joint government/donor consultations in October 2003 to define the objectives and the preparation process. In December 2003, five working groups were formed, bringing together over 100 sector professionals, parliamentarians, representatives of civil society, and donors. The reports of the working groups were presented and discussed in a series of workshops in February 2004. The consolidated proposals were discussed at a retreat in Ta'iz in April 2004 by a group of 20 sector professionals and donors. The draft CWRAS was reviewed and agreed by Government in October 2004.

Organization of Document

1.7 The CWRAS document was prepared based upon a diagnostic analysis of three major areas resulting from the consultations: effectiveness of public expenditures, governance issues, and implementation performance. The three areas were analyzed by taking a critical look at current and past projects and programs. The objective of the analysis was to identify the most

promising options to deal with the major water challenges (groundwater management, economic efficiency and inter-sectoral transfer, reaching the MDGs in urban and rural water, protecting water sources and quality, and sector governance). The results are built into a presentation of strategic ways for future engagement as part of the next CAS cycle in 2004/2005.

1.8 Accordingly, the document is organized as follows:

- **Chapter 2** places the central problems of the sector in context and presents the experiences of reform efforts to date.
- **Chapter 3** examines Yemen's water crisis, analyzing the five major water challenges.
- **Chapter 4** summarizes Government's strategic response to the water crisis
- **Chapter 5** explores the role that the Bank may play in supporting the sector, setting out the lessons learned from Bank experience, the role of water in the Yemen CAS, the overall Bank objectives of poverty reduction through water, and the motivations of different constituencies.
- **Chapter 6** proposes ways of working for the Bank, highlights key areas of intervention, and outlines a Bank program in water for the next 10 years.

2. YEMEN'S WATER SECTOR: PROBLEMS, GOALS, AND STRATEGIES

A. SECTOR CONTEXT

2.1 This section assesses the water sector in terms of water resources and uses, and quantity and quality of water, and includes discussions on the institutional situation, policies, financial and economic viability, tariffs and cost recovery, private sector participation and environmental sustainability.

Water Resources and Uses

Yemen has no perennial surface water and depends entirely on rainfall, groundwater and flash flooding

2.2 By world standards, Yemen is a country poorly-endowed in water resources. Even compared to other countries in the Middle East/North Africa (MENA) region, Yemen has among the lowest rates of per capita freshwater availability ($150 \text{ m}^3/\text{cap}/\text{year}$) and one of the highest rate of water use in agriculture (see Figure 1). Moreover, this relative water scarcity is exacerbated by significant physical and temporal variations as well as by significant water allocation problems. With a rapid population growth expected by 2025, water availability per capita will decrease by 35%, well below levels generally reckoned to indicate severe water stress.

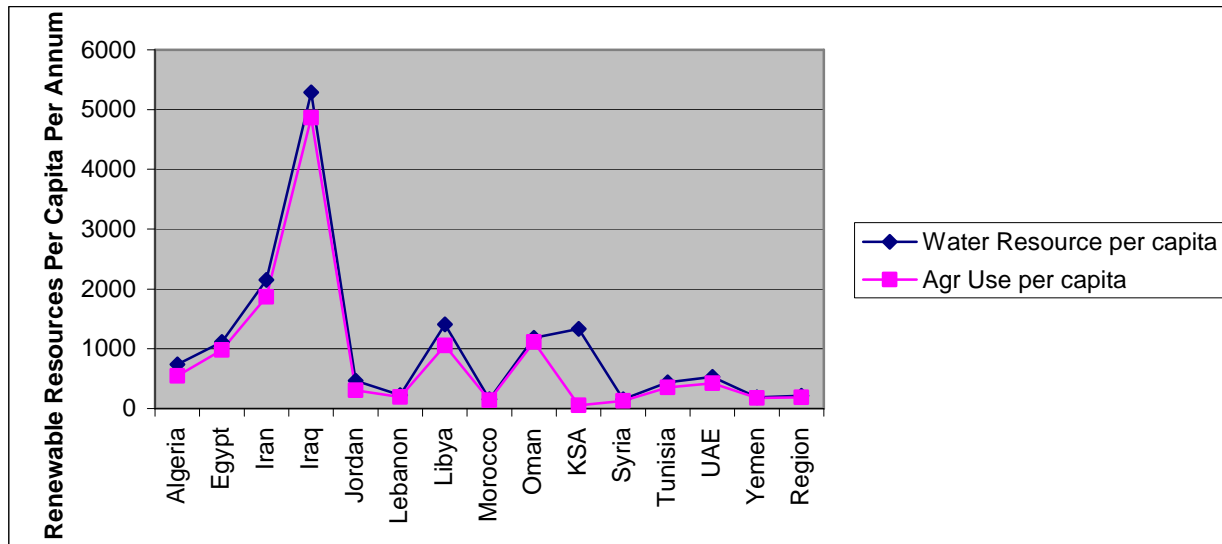


Figure 1. Water Availability Comparisons in Middle East/North Africa (MENA) Region

Rapid development of commercial agriculture and domestic use has stressed Yemen's water resources

2.3 Yemen is one of the oldest irrigation civilizations in the world. In recent times, the country has developed a commercial irrigated agriculture and piped water and sanitation services in both urban and rural areas. Alongside the advantages brought by these developments, a water

crisis has emerged, characterized by very rapid mining of groundwater, extreme water supply shortages in the major cities, and limited access of the population to safe drinking water. The main causes of the water crisis are clear: rising demand as population grows and as market-led agriculture develops; groundwater exploitation getting out of hand; an incentive framework that has promoted expansion rather than efficient use and sustainable management; and very weak governance.

Mining of groundwater is creating problems of equity, an unsustainable “bubble” of agricultural prosperity and competition between urban and rural for the resource

2.4 Most of Yemen is arid or hyper-arid, except in the highlands, and even there the dense population makes this a very water scarce country, with per capita availability only 10% of the regional average, and 2% of the worldwide average. Renewable resources, estimated at about 2,100 million cubic meters a year, are being supplemented by groundwater mining at a rate of about 1,300 million cubic meters a year from deep aquifers (with desalination and reclaimed wastewater accounting for a negligible percentage). This is creating problems of equity between users, and an unsustainable “bubble” of agricultural use. The concentration of population in the relatively water-scarce highland basins - especially in Sana’a and Ta’iz - is leading to extreme water constraints in towns and to aggravated competition for water between urban and rural. In the Sana’a Basin, for example, there are over 8,000 operational wells – but only 70 for public water supply. New supplies for the city will depend on moderating agricultural use. Coastal areas are better endowed, but coastal aquifers are also being mined, bringing quality deterioration and saltwater intrusion.

Now all Yemen’s water resources are developed, although demand is still rising

2.5 The national goal that Government has pursued has been development of all available resources, both for irrigated agriculture and for industrial and domestic use. In drinking water, the target has been full coverage of national water supply and sanitation, largely from groundwater. Now, Yemen’s water resources are fully developed. With the rapid modernization and technological changes of the last three decades, urban supply and demand have increased rapidly. Urban demand was less than 10% of renewable water in 1990 but this is expected to reach more than 20% by 2010. The growing trend in urban water demand is illustrated in Figure 2. In rural areas, domestic demand remains limited but still faces constraints in finding adequate water resources.

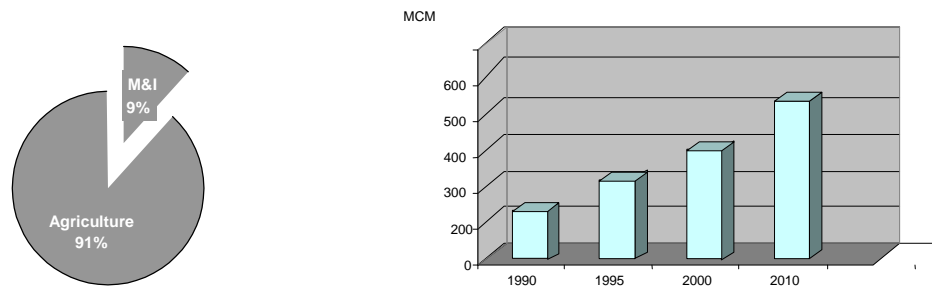


Figure 2: Municipal Water Demand in 2000 (left) and Trend (right)

Irrigation is far and away the biggest user – and “culprit”

2.6 Irrigation has grown rapidly, both from groundwater and surface water. It is far and away the biggest water user, more than 90% of total use, contributing 17% of GDP and providing employment for just under 50% of the population. Traditionally, Yemenis had many ingenious techniques to husband their scant water. Early development of modern spate schemes in the 1950s successfully adapted traditional flood recession technology to a more controlled system. Later, in the 1970s, the introduction of the tubewell and motor pump revolutionized irrigation, and now full or supplemental groundwater irrigation accounts for over two thirds of the value of crop production. Irrigation efficiencies are low (nationwide average about 40%). Water consumption in the irrigation sector continues to increase at an average rate of 30 MCM/year or 5% per year (see Figure 3). Already by 1990, irrigated agriculture alone was consuming 130% of Yemen’s renewable water resources. By 2005, this had reached over 150%. If expansion were to continue, the overdraft would reach 200% by 2025 – although many aquifers would be pumped dry before then.

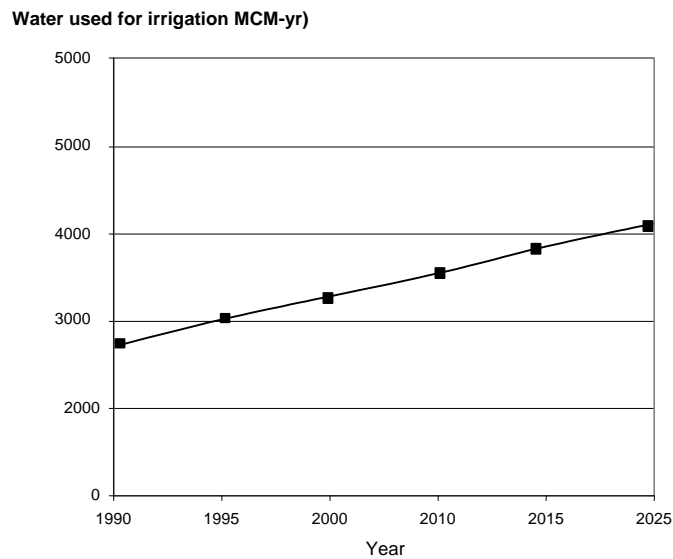


Figure 3: Historical and Planned Irrigation Water Diversions in Yemen

Urban water is provided by both public and private sectors

2.7 Modern potable water supply in urban areas has been developed by both public and private sectors. Public schemes operate in most large towns but have low efficiencies and poor coverage. Private and community piped schemes exist in some places, usually on a small scale. In most cities, private supply by tanker or bottled drinking water is a vital supplement to erratic and inadequate public supply (see Box 2). Urban sanitation is largely by cesspits. Where a sewerage system exists, wastewater treatment is limited and reuse is minimal.

Box 2: Public and Private Supply in Ta'iz

Ta'iz is an example of a city where supplies are limited, urban growth rapid and unplanned, and service is poor in both quantity and quality. A two tier (potable, non-potable) system has emerged, and the private sector has provided a flexible complement to the public supply. People use the intermittent public supply for washing, and buy drinking water from the ubiquitous desalination shops and water tankers.

In two thirds of rural households drinking water is still fetched by women and girls

2.8 Rural drinking water supply was traditionally from springs, or wells or from ponds that collected run off. Much of the days of women and girls could be taken up in fetching the small daily ration of domestic water. Modern technology has brought relief in some areas. Some modern systems developed by communities themselves are working well. Systems installed under official projects have fared less well. The coverage is estimated at 25% for water supply and 20% for sanitation in rural areas, one of the lowest coverage rates in MENA.¹

Box 3: Women, Children and Water

Women and girls have traditionally been the principal fetchers and users of domestic water. Women and girls are also the principal farmers, especially in livestock care where the watering of stock is a major preoccupation. The modern era has brought some changes. First, as women play little role in irrigation, the advent of the tubewell has shifted the focus of many farming systems towards male-dominated irrigated agriculture, and the tubewell has also relieved the burden of assuring the domestic supply for some women. Second, for women benefiting from modern supply there are new challenges of improving hygiene and sanitation, and of evacuating and reusing wastewater. But for most rural women and girls, the trudge to the spring remains a daily drudgery. Very poor health and education indicators are linked to this problem. Fewer than 40% of girls under 12 attend school and 46% of children under five are malnourished.

Institutions

Traditional water rights, customs and institutions cannot cope with the tubewell

2.9 Traditionally, water rights have been ruled by twin threads that often intertwine: (i) formal law - *sharia*, case law and the official legal apparatus; and (ii) *'urf* - custom and local practice (see Box 3). This traditional system is, however, poorly adapted to tubewell technology

¹ In Egypt, for example, adequate rural water supply and sanitation coverage is 70% and 6%, respectively.

and to the economic individualism encouraged by modernization. In the absence of clear individual rights to water and of a regulatory system that can limit use, farmers with tubewells simply pump out as much water as they want, draining the aquifer to the detriment of other areas – and of future generations.

Modern water supply institutions have been centralized and inefficient

2.10 In the 1980s, Government established a national urban water utility, the National Water and Sanitation Authority (NWSA) to take responsibility for urban water supply and sanitation in all towns. NWSA was successful in expanding coverage but its centralized nature led to lack of local accountability and to inefficiency. In the face of very poor efficiency indicators and notorious interruptions in supply, a process of decentralization back to autonomous utilities, the Local Corporations (LCs) began in the 1990s. A parallel organization for rural water, the General Authority for Rural Water (GAREW – later named GARWSP), was created in the early 1990s to bring together all government activities on rural water supply and sanitation; dramatically poor performance is currently compelling restructuring of the whole rural water sector.

Separate public institutions are responsible for irrigation and waterbed management

2.11 The Ministry of Agriculture and Irrigation (MAI) is responsible for irrigation, with decentralized units managing the major spate schemes, and a central department, the General Directorate for Irrigation (GDI), responsible for dams and support to groundwater irrigation. MAI's Forestry Department is responsible for watershed management.

Box 4: *Sharia* and *'urf* : Formal Law and Local Custom on Water Rights

Although there are regional differences, in general water rights are as follows:

- spate – upstream first
- spring – time share ownership rights
- run off – goes with land
- groundwater – what can be extracted by digging under owned land

Most water functions have recently been brought under a new ministry

2.12 Water resource management is the responsibility of the National Water Resources Authority (NWRA), created in 1996. Water quality and environmental protection are the responsibility of the Environment Protection Agency (EPA). In May, 2003, Government embarked on an extensive reorganization that included the formation of a new water sector ministry, the Ministry of Water and Environment (MWE). Most water sector agencies were transferred to MWE. Figure 4 shows the latest organizational structure of MWE. Only the Ministry of Agriculture and Irrigation's (MAI) responsibilities (irrigation and watershed management) remain outside MWE's ambit.

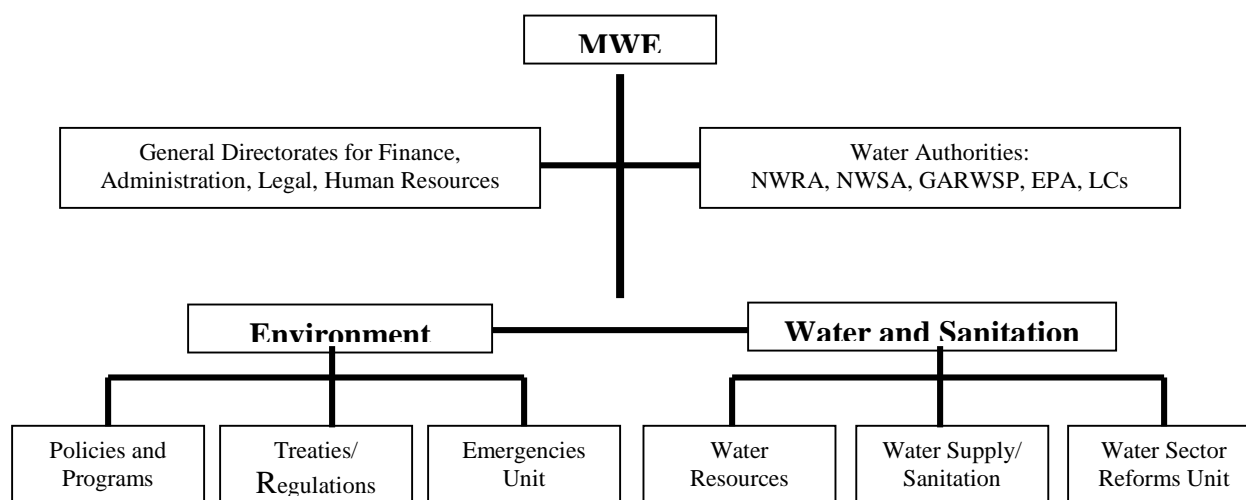


Figure 4. Organization Structure of MWE

The Modernization of Water in Yemen

Enormous changes influencing the way water is developed and used have come about over the last thirty years

2.13 The principal vectors of change in irrigated agriculture have been the power of the tubewell, and the explosion of market-linked irrigated agriculture, which has driven a wholesale shift to higher value crops, most notably the mild drug qat (see Box 4). The price of diesel fuel as the major input into groundwater pumping, increased in nominal terms in 1999 partly to dull incentives to groundwater mining, is no higher today than it was prior to the 1999 increase and is only a fraction of the border parity price. Cheap energy is plainly one factor driving groundwater overuse. In human water use, where piped supply schemes exist, per capita consumption has shot up from a traditional 5-10 lpd (to 200 lpd in urban areas). Demographic pressure has driven rising water use, both rising potable demand and the need for ever more agricultural incomes for the rural population.

Table 1. Diesel Fuel Prices in Yemen

Year	Nominal price (YR/liter) *	CPI	Price in real terms (1999 YR/liter)
1997	10	86	12
1998	10	92	11
1999	10	100	10
2000	17	105	16
2001	17	117	15
2002	17	131	13
2003	17	143	12

*The price has decreased by 30% in real terms since 1997.

Box 5: Qat and Water

Qat, a bush from which the leaves are culled and chewed in afternoon social sessions, is a very Yemeni phenomenon. Like amphetamines, it races up the heart and induces a mild euphoria. For farmers, it is in many ways a miracle crop and the motor of the rural economy, giving excellent financial returns.

Although qat is not a heavy water user, the rapid growth of the area under the crop (9% annual area expansion in recent years) means that a growing share of Yemen's scant water is going to its production.

The purchase of qat occupies 11% of the average household budget, and poor people are heavy users. Poverty incidence would decline by 6 percentage points (from 42% to 36%) if qat money were spent instead on food and clothing.

Most Yemenis view qat as a fact of life – and farmers see it as an irreplaceable source of wealth for rural areas.

Recent policy on qat has avoided a “prohibitionist” approach – which would be politically impossible and a catastrophe for the rural economy. Instead, Government is attempting to bring qat within regular economic management and planning; excluding it from public life and benefits but not banning it; documenting qat technically and researching it so that water saving possibilities can be identified; and working on “hearts and minds” through NGOs to cut down on consumption. This agenda seems about as far as it is possible to go in the Yemeni context.

The role of Government in water has greatly increased

2.14 The development of the apparatus of a modern state and the concentration of oil revenues in government hands has greatly increased the role of government in every aspect of Yemeni life. Over the last thirty years, the state has been involved in very many water projects, particularly in irrigation and urban supply.

Economic Aspects

Cost recovery and demand management policies are starting to replace old patronage and supply-driven approaches

2.15 Government has in the past kept irrigation and drinking water prices down in order to promote development, keep down the cost of living, raise farm incomes and give patronage to powerful influence groups. Now this system is under pressure (both economic and environmental) and new pricing regimes are being introduced that target cost recovery and – to a lesser extent – demand management. Government is working with user groups in state irrigation to increase cost recovery and has set financial autonomy as a policy for both urban and rural decentralized water supplies.

Water markets exist – but in the margins for the time being

2.16 The private sector and market institutions are active in water, particularly in water sales in irrigation and to tankers, and private water supply institutions in towns. However, these markets are informal: there is a lack of clear rights in groundwater; third party effects (“externalities”) are not accounted for; and there is no enabling or regulatory environment.

Yemen’s food import policy is sound, and is not a constraint to water management

2.17 Yemen’s large and growing dependence on imported basic foods has been fostered by Government’s policy to keep food cheap. This policy has an economic logic. In a water-scarce country, it is better to import cheap basic commodities that consume a lot of water per US\$1 value; this frees up water resources to produce higher value crops. In the future, domestic demand in Yemen for cereals will increase and world cereal prices are likely to remain low for decades. Government is thus likely to favor continued growth in cereals imports, a rational policy.

The three problems identified in 1997 persist – in an aggravated form

2.18 Based on the discussion in this chapter, it will be clear that there are some quite alarming issues in the water sector. In the Bank’s 1997 Water Sector Report these were summarized as three central problems which had to be tackled if the water sector was to contribute to – and not constrain – Yemen’s human and economic development: (i) *water resources management* and how to reverse the deteriorating and unsustainable trend of groundwater mining. (ii) *inter-sectoral allocation of water*, particularly how to source water for thirsty cities; and (iii) *access to potable water for the population*, particularly how to broaden access for the rural population. These problems persist today in an aggravated form. Attempts at change are discussed in Section B below and the nature and dimension of these challenges today are discussed in Chapter 3.

B. A DECADE OF REFORM

2.19 With the background on Yemen’s water tradition, recent changes and current crisis that was provided above, this section sets out the principal governance problems in the water sector and the reform measures that have been introduced over the last ten years to try to tackle the problems. The section then evaluates the reform program to date in terms of activities, outputs and impacts.

Recognizing the Problem – the Origins of Yemen’s Water Reforms

From the early 1990s, government and civil society in Yemen began to become aware of the problems of the water sector

2.20 From the early 1990s, UNDP and Dutch projects to support water resources assessment and management contributed to Yemeni understanding that there was a growing water crisis. By the mid-1990s there was agreement on the problems, and elements of a strategic approach to solutions were emerging. The World Bank participated in this process of diagnosis and strategizing, and together with government and donors prepared a key report in 1997 *Yemen: Towards a Water Strategy* (see Box 6). This report summarized the nascent consensus about key problems of the water sector.

Unmanaged resource mining, thirsty cities, and poor access to safe water and sanitation

2.21 For a number of years, growing agricultural use of groundwater contributed to the growth of rural incomes; agriculture was the best performing sector in the 1990’s (5.5% growth rate 1996-2000). However, agricultural use outran the renewable groundwater resource, and this led to aquifer mining, a sharp decline in aquifer levels and an increasingly inequitable allocation of the dwindling resource. Agricultural use predominated in overall water use (93%). Regulatory or market mechanisms were lacking to reallocate adequate quantities of water to supply growing domestic and industrial demand in towns. As a result, the burgeoning cities were increasingly short of water. Overall access to safe drinking water was – and still is - very low, estimated at 31 % nationwide (see below Chapter 3). Access to sanitation is lower still – 21%. This low coverage contributes to Yemen’s dramatically poor indicators of human development: a 42% poverty headcount, 78% of adult females illiterate, 46% of under fives malnourished.

Box 6: The 1997 Report *Yemen: Towards A Water Strategy*

Although the 1997 report *Yemen: Towards a Water Strategy* was a World Bank document, it was widely adopted as a guide to water sector reform within Yemen. Several thousand copies were distributed in Arabic, it was reprinted in its entirety in the Arabic press, and the report was the subject of numerous seminars and discussions. The “agenda” summarized in that document is therefore taken here as a proxy for the reform program, and progress of the program is evaluated against the actions discussed in that report.

It was clear that Yemen was very constrained in its ability to respond to water crisis

2.22 In Yemen, it was clear that central planning and regulation were likely to play a limited role: that decentralization and partnership with stakeholders were essential, that management of change in rural areas had to work from existing rights systems and management practices, and that Government’s most powerful levers on water resources management had to be through the incentive framework (particularly energy prices and trade policy) and public expenditures.

Early measures focused on institutional restructuring and reform

2.23 With this understanding, Government moved first on the institutional front. NWRA was created in 1996 with UNDP and Dutch support, with the intention of locating responsibility and creating capacity for an integrated approach to water resources management. For urban water, a restructuring program was developed 1996-8 with GTZ and Bank support and formally adopted in 1999. Studies were carried out for rural water supply. Attempts were made (largely under the IDA-financed Land and Water Conservation Project) to refocus irrigation development on water use efficiency on participatory approaches to spate management, and on groundwater recharge and watershed management. Following a diesel price hike in 1996, Government created the Agriculture and Fisheries Production Promotion Fund (AFPPF) to invest a proportion of the extra revenue from diesel sales in projects promoting agricultural productivity.

Yemen's water sector reforms from the mid-1990s

2.24 Although Yemen was definitely in "reform mode" from the mid-1990s, the reform agenda was not formalized in a single policy document, partly because sector institutions remained scattered. The best summary remains the 1997 Bank report "Yemen: Towards a Water Strategy" (Box 5 and Table 2). The following paragraphs trace the implementation of the various reforms, assess their impact to date, and note the future potential of each measure.

Table 2: Summary of Water Sector Reforms Proposed in 1997

Problem	Macro and integrated solutions	Sector management solutions	Local level solutions	Longer term agenda
Water resources management, especially groundwater mining	<p>Create an incentive structure for water.</p> <p>National debate and public awareness.</p> <p>Reorient public expenditures.</p> <p>Act on qat.</p>	<p>Basin planning, regulation and water markets.</p> <p>Water conservation in agriculture.</p>	<p>Decentralization, community partnership and self-regulation.</p>	<p>Capacity building.</p> <p>Policy and strategy.</p>
Cities are short of water		<p>Basin planning, regulation and water markets.</p>		

Limited access to potable water		Urban water sector restructuring and promoting local private supply. Action plan for rural water supply.		
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Reform measure: *The incentive framework*
Result: *Low to moderate impact*

2.25 Government has removed some of the elements of the incentive framework that previously drove groundwater overdraft. Low cost credit and targeted loans are no longer available for groundwater development. However, low diesel prices are still contributing to groundwater overdraft. Government has been reluctant to increase the diesel price to import parity levels, despite recognizing that cheap energy has played a role in driving groundwater overdraft. The last increase (in 1996) provoked riots and Government has considered that the political risk and the negative impact on other sectors of the economy outweigh the possible water conservation benefits. There is some empirical evidence that higher pumping costs push cropping patterns towards higher value crops (see Box 7). But there has been no measured impact on groundwater overdraft. Evidently, the price rise has been insufficient to reduce demand (diesel is still only a minor percentage of average production costs) and the diesel price is too blunt an instrument by itself to contain groundwater overdraft. It needs to be combined with other measures to increase water use efficiency and to get farmers to reduce pumping.

Box 7: Farmers Reacting to Higher Diesel Prices

In early 2004, farmers in one of the small side wadis of the Sana’a basin were asked what they would do if and when Government implements the latest round of diesel price increases. They all replied: “Grow more qat!” It seems that only qat will be able to pay the higher returns the farmers need if diesel prices rise.

Reform measure: *National debate on water - public awareness*
Result: *High impact (National debate) – Low impact (public awareness)*

2.26 There has been considerable activity on national debate, including a number of Consultative Council and National Assembly debates and three WBI workshops. The parliamentary committee on water is well briefed on water issues. The passage of the Water Law

in 2003 was the subject of wide national and parliamentary debate. The impact of the national debate appears quite high, and some recent progress can be attributed in part to the growing level of knowledge and concern amongst decision makers - the passing of the water law, the sector reorganization under one ministry in 2003, and the preparation of a new sector strategy (NWSSIP, see Chapter 4) through a participatory approach. By contrast, public awareness campaigns have been a disappointment. NWRA has conducted a low key campaign with support from UNDP and the Bank. The quality of outputs has been mixed and the impacts are only low to moderate. There is evidence from the press and NGOs that awareness of the problem is now high, but there is no evidence that public awareness has contributed to private responsibility.

Reform measure: *Improving the quality of public expenditures*

Result: *Moderate impact*

2.27 With some support from the Bank through involvement in successive public expenditure reviews 1998-2004, there has been some improvement in the quality of public expenditures in the water sector. In irrigation, the quality has improved: public support for groundwater development has been abandoned, and some public resources have been reallocated to investments in water use efficiency and in improving sustainable spate schemes. The quality of investment in urban water has improved too, with industry benchmarks and service improving across the board. By contrast, public investment in rural water has been wasteful with many schemes left incomplete or operating only for a short period. Only now are there signs that a new sector strategy will help improve quality. Similarly, in watershed management, major resources have been devoted to a highly contentious program for the development of small dams. Many dams have been based on inadequate hydrological and engineering studies and have not improved overall basin efficiency. The program has also been dogged by inadequate governance in respect of contracting. Overall, the impact has been mixed. Expenditures in irrigation and urban water have improved. Rural water and watershed management programs continue to cause worry. Efforts on donor coordination have been largely successful. Formal Government-donor coordination on water had lapsed until the recent NWSSIP initiative (see Chapter 4), but through a number of joint processes (“participatory” CAS, PRSP etc.) and informal coordination between the relatively small number of donors, donor programs have been aligned, with synergy and without overlap. Table 3 lists the focus areas for some major donors in the water sector over the past ten years.

Table 3: Major Donor Support to the Water Sector in Yemen

Donor	Major Focus Areas
Germany (GTZ and KfW)	Institutional development, urban water supply, hydrogeology.
Netherlands	Rural water supply, water resources management, institutional development, urban water sector governance.
Japan	Rural water supply, community water management.
Arab Fund	Urban water and sanitation.
UNDP, EU, others	Institutional development.
World Bank	Urban, rural, water resources, irrigation, institutional development.

Reform measure: *Act on qat*

Result in 2004: *Low impact*

2.28 From 1999, Government launched a national debate on qat while the Bank and other donors contributed some empirical and analytic studies. A national conference in 2000 described proposals for an action plan on qat, including measures on education and public awareness and possibly action on the incentive structure (e.g. allowing qat imports of cheaper qat from Ethiopia). The conference put the question on the agenda and led to increased NGO activity but there was no decision and no discernible impact on behavior. Qat consumption has continued to increase and the area planted to qat has grown at 9% a year.

Reform measure: *Action on planning, regulation and water markets*

Result in 2004: *Low impact*

2.29 NWRA has devoted considerable effort to basin planning, and plans for Ta'iz, Tuban/Abyan and Hadramawt are ready. Broad stakeholder consultation has generated some ownership, and preparation of further plans is starting. However, the impact of planning has been moderate. The Ta'iz plan, ready since 2000, has not yet resulted in action. IDA and KfW are financing integrated basin programs in Sana'a and Sa'ada with some chance of success, but NWRA has not yet completed preparation of the basin plans that were supposed to accompany them. The passage of the 2003 water law gives more clarity on water rights and on the regulatory framework. By-laws are being promulgated and training of local authorities and NWRA branches has commenced. Beginning in 2004, MWE and NWRA began to implement well licensing and control of drilling rigs in key water protection zones, particularly the Sana'a Basin. The Sana'a Basin Project is promoting regulation and self-regulation. Informal water markets continue, but up to now there has been no action to develop market based inter-sectoral water transfers. Overall, action on planning, regulation and water markets has had little impact up to now. It remains to be seen whether recent more assertive implementation of regulation under the Water Law can be sustained and effective. The brightest sign is on decentralization, community partnership and self-regulation of groundwater (see below), where the Sana'a basin approach and early results appear to confirm the potential of self-regulation by farmers in partnership with public agencies.

Reform measure: *Water conservation in agriculture*

Result in 2004: *Moderate impact*

2.30 MAI has devoted a major effort to water use efficiency activities, and this was confirmed by the national irrigation policy (1999, produced with FAO support). Groundwater conservation was promoted under the IDA-financed Land and Water Conservation Project (LWCP, 1994-2000), and now through the follow up IDA-financed Groundwater and Soil Conservation Project (GSCP, 2004). Spate irrigation improvement and user organization for efficient management are being promoted under the IDA-financed Irrigation Improvement Project (IIP, 2000 on). Groundwater recharge is being heavily promoted by MAI under its dams program, and the rapid impact program for research and extension ("RIP", from 1996) developed various water saving cropping patterns and husbandry techniques. Impact of these efforts has been mixed:

- Water use efficiency technology is accepted by farmers (especially if subsidized) but in the absence of water rights and regulation has a modest impact on groundwater use, as some farmers simply expand their cropped area. GSCP adds an Irrigation Advisory Service to the package, which should help farmers improve water use efficiency.

However, prospects of real impact on groundwater overdraft remain modest until a full package approach is designed: regulation/self-regulation; incentives; technology; and farmer institutions.²

- MAI's dams program has proved controversial both technically and managerially; in some cases dams have had a palpable effect on groundwater, in other areas, they have proven to be white elephants. A full evaluation of this poorly managed program is needed.
- In spate irrigation, water use efficiency improvements were expected from user participation and cooperation. However, land tenure and socio-economic differentiation make the participatory approach difficult on some schemes. Prospects for irrigation management transfer are distant at present.)

Overall, the impact has been moderate. Water conservation techniques have been tried and tested but the institutional framework that will encourage farmers to reduce water use has not been developed. In the meantime, groundwater mining has continued apace.

Reform measure: *Urban water supply and sanitation reforms*

Result in 2004: *Moderate impact*

2.31 After a process of participatory study and discussion, Government adopted a reform program for urban water supply and sanitation which began to move Yemen from an era where urban water supply was seen as a public good and an obligation of the state, to a pragmatic approach of "water supply as a business". This change was stimulated by the critically poor performance of supply in the face of rapid urban growth, and by fiscal crisis. Autonomous Local Corporations have been set up and are being supported under various donor programs. Tariffs are moving towards full cost pricing, with a step tariff structure. The current changes are accompanied by a more business-like approach - contracting out, private sector involvement. *One concern* is the very rapid pace of reform: there are worries about speed and readiness, and the lack of regulatory and back up capacity. *A second concern* is the supposed autonomy of the Local Corporations: cost recovery is inadequate to finance all capital replacements, and Government is at present draining off part of the depreciation reserves to finance sector services. *A third concern* is whether the tariff structure is really pro-poor: virtually all consumers fall into the lowest "lifeline tariff". Overall, the reform is clearly going in the right direction, but improvements are needed – and the population has not yet felt the impact. Problems persist, notably poor quality of service – highly intermittent supply, poor water quality – and the difficulty of sourcing adequate bulk water in some cities. A review of the reform program for urban water to be carried out through the urban water Adjustable Program Lending (APL) will look at progress on the reform program and allow corrections.

Reform measure: *Rural water supply and sanitation reforms*

Result in 2004: *Low impact*

2.32 A reform program for rural water was first mooted in 1996, and a demand-driven community-managed approach is being piloted under the IDA-financed Rural Water Supply and Sanitation project (RWSSP, 2001). In addition, the Social Fund for Development (SFD), the Public Works Program (PWP), and several NGOs are undertaking successful, albeit limited programs. Currently, a rural water sector strategy, investment program and institutional reform program are under preparation (with support from the Bank-managed global Water Supply and

² A pilot project – the Community Water Management Project – financed by JSDF to test this "full package" will start in mid-2005.

Sanitation Program). Impact of these efforts so far has been poor. The main sector institution, GARWSP is in a critical condition, and coverage is lagging well behind population growth. Practice in rural water supply is not yet all aligned on the “demand responsive approach”, despite an official statement of intent to that effect. Investment quality has been poor. However, the process of preparing the sector strategy and the lessons emerging now from the field are promising.

Reform measure: *Decentralization, community partnership and self-regulation*

Result in 2004: *Moderate impact*

2.33 A key element of the strategic approach considered in 1997 was decentralization and a partnership between agents of change (Government, NGOs, donors) and communities to develop practical proposals for local groundwater management, working from existing rights systems and management practices. This approach was tested under the Ta'iz Water Supply Pilot Project (TWSSP, 1996-2000), where NWRA decentralized responsibility to its local branch and a community-based self-management approach was piloted.³ The approach has been strengthened under the Sana'a Basin Project (2003). Despite the evident potential of the idea, a model replicable on a large scale has not yet been developed. Recent moves by Government in general - and by water sector agencies in particular - to decentralize strengthens the feasibility of the approach for the future. A fully decentralized community self-management approach is to be piloted by the new Japanese financed CWMP.

Reform measure: *Capacity building in NWRA*

Result in 2004: *Low impact*

2.34 Capacity building in recent years has focused on building up NWRA. UNDP, the Netherlands and IDA all devoted significant resources to NWRA, and this helped produce the water law and basin plans, to set up the national water information system, and to conduct awareness campaigns. This contributed to a significant capacity building effort. However, impact has been muted. Despite a good initial human resource endowment and all the support provided, NWRA has been largely ineffectual in bringing about change in water resources management. The exception is in one or two decentralized branches where dedicated managers have been able to “make a difference”. The new water sector structure with most water institutions under MWE enhances NWRA's role but structural and management problems are far from solved, and the institution has yet to make an impact on key problems in the sector. Capacity building in other water institutions has been very limited in recent years; institutional change has created uncertainty and reduced motivation while there has been a “brain drain” away from public institutions. Overall, the capacity of sector institutions and staff has not kept pace with the challenge of the reform program.

Reform measure: *Water strategies for all sub-sectors*

Result in 2004: *Moderate impact*

2.35 Government adopted a national water strategy and an urban water reform program in 1998, an irrigation sector policy in 1999 and a water law in 2003. These have had varying impact. The national water strategy preparation was not very participatory and the resulting document received little publicity and has had little impact. It is replaced by NWSSIP (see Chapter 4), which was prepared by a much more participatory process, and which proposes a richer agenda. The urban water reform program was prepared in a participatory way, was

³ In the event, this project proved more a learning experience than a success (see Chapter 5 and Box 18).

adopted by cabinet, is clear and well understood, and is a genuine guide to implementation. The rural water strategy now finally under preparation is a key document, eagerly awaited. The 1999 irrigation sector policy has had little impact on behavior. The 2003 water law was prepared after long consultations both within Yemen and internationally. It provides clear guidelines on sector priorities, and on key questions of water rights and regulation. By-laws have been issued. It could be the key instrument for sector governance: the test will be whether the nation has the tenacity and political will to sustain implementation.

Assessment of the Overall Reforms to Date

Overall, the reforms have made a contribution to reaching sector objectives, but broader, more sustained strategic actions are needed to make a difference

2.36 Overall, set against the key objectives in the water sector, the reform program has made a difference, but results have been slow in coming. In water resources management, some instruments have been prepared and tested, but no significant difference to groundwater overdraft, inter-sectoral allocation or water use efficiency is evident. In water supply and sanitation, reforms have begun, but only in urban has some limited impact been felt by the consumer. In irrigation, some efficiency gains have been achieved but resource depletion has continued. In watershed management, resources and management effort have been tied up in a controversial dams program to the neglect of broader objectives of basin efficiency and poverty reduction.

Lessons from Experience and Future Directions

National debate and actions on groundwater overdraft should be continued . . . as should actions on sector policy and strategy formulation, and financial resource allocation . . . and water supply and sanitation reforms need to be deepened

2.37 The review of experience suggests that many of the reforms started in the mid-1990s should be pursued but with varying emphasis and correction. Among the “high potential activities”, promoting national debate is a slow maturing, unseen investment that is well worth pursuing. It represents the best hope for getting acceptance of real change in the incentive structure, a necessary (albeit not sufficient) condition for reining in groundwater overdraft. Water conservation programs for agriculture and the package of “decentralization, community partnership and self-regulation” have a vital role to play here too. Taken together, these actions, if vigorously applied, give some hope of braking resource depletion. Following the 2003 reorganization of the water sector, a new strategic focus (see Chapter 4) means that clear water policy and strategy have an exceptional chance of influencing what happens on the ground, and the completion of the ongoing strategic exercises is therefore top priority. Similarly, public expenditure review and donor coordination in the current climate are likely to be productive. Finally, amongst the high potential actions, water supply and sanitation reforms need to be deepened, if coverage and service standards are to be improved.

Other actions have less potential and should receive less emphasis

2.38 Other actions – low to moderate impact and potential – should receive less emphasis, although the potential of work on water markets to facilitate rural to urban transfers should not be neglected.

Lessons are that reform takes time, that clear strategy helps, that integrating institutions are needed, and that donor projects can promote reform effectively

2.39 Four lessons on the process of reform can be drawn from the reform experience of the last few years.⁴

- *Reform is a long haul.* Recent “successes” like the sector reorganization can be seen as a return on years of earlier effort at dialogue, debate, etc. These successes thus give hope that momentum is building up and that future potential in this area is higher than past track record.
- Reform works best where there is a *clear assessment and strategy*, as in urban water.
- An *integrating water institution* is needed, particularly on water resources management and irrigation. The 2003 reorganization should help resolve this problem.
- *Donor-financed projects have been successful vehicles of reform*, combining investment with support to push through difficult reform agenda.

Table 4 below presents a matrix of **impact** vs. **potential** to show which reforms should be more vigorously pursued, given the constraints of the current political economy of the water sector. These results are carried forward in the next sections leading to a Bank program of support.

Table 4: Which Ongoing Reforms Merit Further Emphasis?

CURRENT IMPACT	POTENTIAL		
	Low potential	Moderate potential	High potential
High			National debate.
Moderate			Incentive structure. Urban water supply/sanitation reforms. Water conservation in agriculture. Improving the quality of public expenditure. Decentralization, community partnership and self-regulation. Water policy and strategy.
Low	Act on qat	Public awareness. Basin planning. Regulation/ water markets. Capacity building.	Rural water supply and sanitation.

3. KEY WATER CHALLENGES IN YEMEN TODAY

⁴ See also Chapter 5 for discussion of the “political economy” of reform

3.1 Chapters 1 and 2 of this report discussed the characteristics of the water sector in Yemen and the initiation of reform efforts in the 1990s. The present chapter reviews the most important challenges in the water sector **today**. The discussion maintains the emphasis of the previous chapter on three central problems:

- Groundwater mining.
- The problem cities have in assessing water resources.
- Limited access by the population to safe water and sanitation.

3.2 This chapter also discusses two other problems whose importance has become clear during the first phase of reform: (i) the *need to protect water sources and the quality of water*; and the challenge posed by (ii) *Yemen's chronically weak water sector institutions*. A final section summarizes some of the common themes discussed and examines the likely impact of various water management scenarios on Yemen's macro, sectoral and regional economies, and on incomes at the microeconomic level.

A. THE FIVE KEY CHALLENGES

Challenge 1. The persistent problem of groundwater in highland and coastal areas

Groundwater use is driving rural growth, but groundwater mining is unsustainable and inequitable

3.3 Groundwater has been a motor of the rural economy over the last thirty years, and is seen as a godsend by farmers. Aided by technology and a profitable market (particularly in *qat*), groundwater abstraction has steadily increased since the mid 1980s in most areas of Yemen. It is estimated that there are about 50,000 private wells in the country (8,000 operational wells in the Sana'a Basin alone, half of which are tubewells) together with more than 200 drilling rigs. Government's sporadic attempts to license and control wells and drilling rigs have not been successful.

3.4 The use of groundwater has successfully driven rural growth and employment. Over the last decade, agriculture has grown faster than the rest of the economy, notching up a 5.5% growth rate in 1996-2000. Agriculture created most of the new jobs in the 1990s, with employment growing at 4%. Expectations are higher still: almost 7% annual growth in agricultural employment is anticipated in the 2001-5 period. There is firm evidence that Yemen has been overdrawing or "mining" its groundwater resources for many years. Groundwater use began to exceed recharge in the mid-1980's with more than 80% of abstraction going to irrigated agriculture (half of which is for *qat* in some areas). At the present rate of depletion, the sustainability of livelihoods, especially in such a poor country as Yemen, is jeopardized. In a number of areas, farming has been reduced or abandoned, and some communities and towns are running out of domestic water too.

3.5 Groundwater mining is not only unsustainable, it is also inequitable. Under current anarchic conditions, better off farmers have captured the lion's share of groundwater, and there is evidence that both shallow groundwater and springs available to poorer farmers have been depleted or exhausted.

Box 8: Threatened aquifers...and dwindling water supplies

The Sana'a case...

The simplified groundwater configuration of the Sana'a Basin shows a shallow aquifer with depths from 30 to 70 meters and a deep confined aquifer ranging in depth from 100 metres to 1000 metres. There is no perceptible recharge from the shallow to the deep fossil aquifer. Total water abstraction from the Sana'a Basin is currently running at around 250 MCM/year, which is **over 400% higher** than the nominal recharge of about 42 MCM/year. Estimates are that all of the deep fossil water will be exhausted in twenty years – if nothing changes.

...and the threat to Greater Aden water supply

The major coastal aquifers along the Red Sea Coast and in the western part of the Gulf of Aden are experiencing rapid aquifer depletion and seawater intrusion due to increased water demands of both urban and rural sectors. There is no regulatory mechanism. For example, in the lower Tuban Delta, depth to groundwater (generally between 20 to 50 m) is dropping due to excessive exploitation of the aquifer. In the water supply well fields at Bir Nasr, a decline exceeding 8 m was registered in the five years from 1998 to 2003. By-mid 2004, Aden water supply, long able to maintain 24 hour service, was cut to an intermittent 12 hour service.

Groundwater policy has to look at incomes, not just sustainability

3.6 The paradox of groundwater in Yemen is that the nation has three objectives which are prima facie incompatible: conserving groundwater, sustaining the rural economy and transferring water from agricultural to higher value domestic and industrial use. If poverty reduction objectives are added to these, it is clear that Yemen faces tough choices.

Lack of groundwater governance creates the wrong incentives, and policy has made it worse

3.7 The factors driving groundwater overdraft are common to many countries: strong economic incentives to access this controllable source of irrigation water, a technology that allows individual access on a farmer's own land, and open access to a shared aquifer leading to a "race to pump". In Yemen's case, these factors allowing competitive overdrawing of groundwater are compounded by the lack of governance and institutions: no clear water rights, no traditional or modern regulatory system, no formal water market - just open access and prevalence of the "law of capture". The Government, far from correcting these weaknesses of the governance structure, has introduced distortions in the incentive structure through trade and energy policy.

International experience shows that recovering control of groundwater is difficult and Yemen is very poorly placed

3.8 Few countries have succeeded in recovering control over groundwater (see Box 9). Examples from the developing world include Jordan and some local areas of Latin America. Table 5 summarizes "elements of good groundwater governance" drawn from worldwide experience. Set against these elements, it is clear that, at present, Yemen fulfils virtually none of the basic conditions for groundwater governance.

There are, however, some high impact actions that can be started now...

3.9 Although high levels of control can only be produced by all these factors together, this is possible only in a high governance society and is not at present feasible in Yemen. Nonetheless, the checklist in Table 5 shows some high impact actions that can be started now (some in fact already have been started). Groundwater programs in Yemen should take as far as possible an integrated approach and stress actions that are feasible in the Yemeni context, notably those that can be introduced in the near term, are feasible technically and socio-politically, and are high impact. The following four “elements” from Table 5 satisfy these conditions for Yemen:

- Demonstrated strong government commitment and actions (#1).
- Intensive user involvement and organization, including self regulation by water user associations (#2).
- Monitoring and information sharing (#3).
- Technological improvements (#9).

...mobilizing government commitment, working on the governance system at the local level, and piloting other long term and high impact actions

3.10 Based on this analysis, *key areas* for progress on groundwater in Yemen are *first*, mobilizing government commitment to act, with emphasis on the incentive framework which Government largely controls. This need not be interpreted only in the narrow sense of “negative” incentives like price increases that have proven so difficult, but also the “positive” incentives like technical support, subsidies to compensate for public goods and externalities, recognition of water rights, etc. A *second key area* is to work on the governance system at the local level, giving priority to capacity building and investment programs with water user associations in groundwater areas. This could comprise the pursuit and generalization of the kind of community self-management initiative that will be piloted under the “Community Water Management Project” that the World Bank is executing with financing by a Japan Social Development Fund (JSDF) Grant (see Box 8). A *third key area* of emphasis has to be the development and dissemination of technological improvements. Worldwide, enormous advances have been made in both irrigation efficiency and in improving yields and income per unit of water. The doubling of wheat and rice production worldwide over the last 30 years has occurred without any increase in water use. Yet few of these improvements have been translated into practice at the farmer level in Yemen. Technological paths to more income for less water are essential if Yemen is to conserve groundwater whilst sustaining the rural economy and reducing poverty. *Finally*, further work is indicated on piloting and development of other longer term but high impact actions, such as water markets, dispute resolution mechanisms, the legal framework and registered entitlements.

More sustainable groundwater use is possible with the above measures.

3.11 The schematic diagram (Figure 5) shown below identifies the impact on water levels of different rationalization scenarios. Depending on a host of possible measures and actions, water levels could be recovered gradually, stabilized over an extended period of time, or orderly depletion to “tolerable” mining threshold in conditions of sustainable allocations/ reallocations between different water sectors.

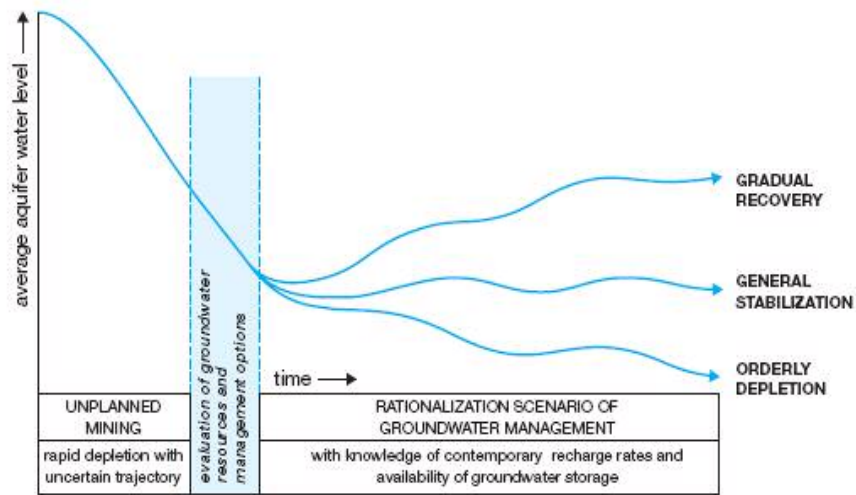


Figure 5: Typical Groundwater Overdraft Scenarios (Source: World Bank GW-Mate)

Box 9: International Experience with Groundwater Governance

Although groundwater brings many advantages, the biggest problem is over abstraction. Even the benefits to the poor are vulnerable, as the richer farmers can pump out deeper and faster. Experience shows that the only workable groundwater management systems are those with intensive user involvement and user/government partnerships. A governance system is needed that establishes clear and measurable entitlements and allows self-management by user groups supported by Government in resource assessment, regulation and dispute resolution.

Although farmers have adapted quickly to groundwater and there is potential for substantially more “crop per drop”, use is often inefficient and there is a need for research and technology transfer programs. The incentive structure has to promote efficiency; often energy pricing creates strong distortions that drive groundwater overdraft.

Use of groundwater in most developing countries is unregulated and farmers over-exploit the resource, often to the detriment of smaller users and the poor. Over-abstraction leads to wells falling dry, water quality deterioration, land subsidence, reduced flow to rivers and wetlands, and seawater intrusion in coastal areas. Because the resource is unseen and erratically developed, governments tend to ignore the need for regulation and management of the resource. Attempts to allocate the use of groundwater and manage these entitlements in a sustainable manner have achieved only limited success and represent a major challenge to the water sector.

Sustainable groundwater management requires: good knowledge of the hydrogeology and reliable monitoring; a legal framework establishing an equitable allocation system with registered entitlements; regulations and institutions to manage abstractions at both governmental and user level; a system of dispute resolution with peer-level enforcement; and a conducive incentive framework, particularly regarding energy prices (subsidized energy is often the biggest driver of depletion).

Chances of success increase where there is strong government commitment and intensive user involvement. Programs of groundwater governance must be tailored to the local political and cultural situation, and be supported by education and public information programs. Experience has shown that the most successful management systems are those that have strong participatory self-governance by user organizations with regulatory oversight by the government or the court system. Ultimately, the system must be seen as fair to all concerned, or it will fail.

Where water use is highly inefficient, technological improvements on either the supply side or the demand side may be able to offer the same or more income for less water, a win-win scenario that if properly managed can contribute greatly to success. Finally, where water markets exist that allow farmers to realize the full opportunity cost of water, incentives to good management substantially increase.

Adapted from “Groundwater Governance” (IN0504) in the forthcoming Agricultural Water Management Investment Sourcebook..

Table 5: Checklist of What Could Be Done to Reduce Yemen’s Groundwater Overdraft

Elements of good groundwater governance	Exists now in Yemen ?	Can be done soon?	Easy to introduce ?	Impact likely?	Observations
1. Strong government commitment.	Yes	Yes	Moderate	High	Government is increasingly committed, but subject to political constraints.
2. Intensive user involvement.	No	Yes	Moderate	High	Pilots of self-regulation by WUAs are starting. Scaling up could be arduous.
3. Knowledge of hydrogeology and monitoring.	No	Yes	Moderate	High	Poor past experience. Needs an energetic NWRA.
4. Legal framework with equitable allocations and registered entitlements.	No	Longer Term	Hard	High	No past experience. Water Law provides a framework but very hard to implement. Needs good local governance and community institutions.
5. Regulations and institutions to manage abstractions at both governmental and user level.	No	Yes	Hard	High	Little past experience. Needs good local governance and community institutions.
6. Dispute resolution with peer-level enforcement.	No	Longer term	Hard	High	Historic tradition requires adaptation. Needs good local governance and community institutions.
7. Conducive incentive framework.	No	Yes	Hard	High	Yemen experiences great difficulty in “getting the prices right”.
8. Education and public information programs.	No	Yes	Moderate	High	Past experience with NWRA’s campaigns is not convincing.
9. Technological improvements.	Yes	Yes	Easy	High	Past programs like LWCP have shown

					feasibility and some impact, but have been more focused on physical conveyance than on on-farm water use efficiency.
10. Water markets that value water at opportunity cost of water.	No	Longer term	Hard	High	Politically difficult. Requires clear water rights, community institutions and regulation.

Challenge 2. Moving water to its highest value use - by introducing economic instruments for water allocation decisions

The history of inter-sectoral water transfer in Yemen is troubled

3.12 Towns in Yemen have typically helped themselves to water from rural areas, leading to social unrest and rural impoverishment (for example, the case of Al Haima, a green wadi made desert when Ta'iz city pumped out its water). Attempts to negotiate transfers, tried in the Ta'iz Pilot Project, have not produced a workable model.

Water markets represent one way of solving the rural to urban transfer problem

3.13 In practice, water markets already exist, successfully serving 30% of the needs of Sana'a, and large proportions of needs in other towns. In Ta'iz, 90% of drinking water is provided from private purification plants. The problems with the present private market approach are:

- It is economically inefficient and high cost, especially when tankers are involved.
- It is informal – operating at the margins of the law – and therefore no enabling framework exists to encourage investment.
- There is no regulation of quality or resource sustainability.
- Water rights are unclear and there is no provision for equity or sustainable management in the source area.

Box 10: Yemen Community Water Management Project

The Japanese government is providing a grant for a Community Water Management Project. The project, which is executed by the World Bank, will test and develop replicable models for sustainable self management of local water resources by poor farming communities in areas of Yemen where water, particularly groundwater, is becoming increasingly scarce.

The project would have three components:

- A participatory water management component which would: (i) identify areas where social conditions are appropriate for local community self management of water resources; and (ii) build the capacity of local user groups over a discrete hydrological unit to manage the resource.
- A water management and monitoring component which would work with user groups to define the water balance and a hydraulic goal, to draw up and carry out water management plans, and to monitor progress against the plan.
- A monitoring and evaluation component which would document the project in full, evaluate and disseminate results, propose ways of scaling up successes, and create and support a network of practitioners.

At the end of the four-year grant period, the project is expected to have developed models and institutional capacity in at least three representative areas. In these areas, local user groups will have the capability to work in partnership with local and central government

agencies and to set, enforce and monitor local water management plans that result in reductions both in net water loss and in pumping from the aquifer whilst sustaining incomes equitably. The project will have documented the proven models, created a network of practitioners capable of scaling up the models, and influenced the policies and practices of local and central government agencies to work with communities on local water management on a partnership basis.

The development of more formal water markets should be a priority

3.14 If equitable and legal water markets can develop – whether rural-rural or rural-urban – they can also contribute to sustainable water use by valuing water at opportunity cost. The development of more formal water markets should clearly be a priority. Recent experience under the IDA-financed Sana’a Basin Water Management Project (“Sana’a Basin Project”) suggests that alternative, locally brokered solutions may be possible: in the Sana’a Basin Project, there is an implicit compact that farmers will be provided with extra surface and shallow groundwater, leaving the deep, high quality sandstone aquifer for future potable use. Alternatives in other areas could include swapping non-conventional water (e.g. treated wastewater) for higher quality water in some equitable ratio. A pilot water market project is due to start in the Ta’iz area in 2005. Lessons from this project should indicate the institutional reforms needed to allow equitable market-based rural/urban water transfers.

Challenge 3. Meeting the MDGs in potable water and sanitation

In water supply and sanitation, the biggest problem is the low rate of coverage

3.15 In water supply and sanitation, the biggest problem is the low rate of coverage, with only 47% of the urban population and 25% of the rural population having access to safe water. Quality of service is a major problem too, with many urban systems suffering highly intermittent supply, high levels of unaccounted for water, and very poor water quality. In rural areas, sustainability and affordability are major problems, too.

Urban Water Supply and Sanitation

Table 6: Urban, Rural and Total Water Supply and Sanitation Coverage

	Urban population (million)	%	Rural population (million)	%	Total population (million)	%
<i>Water supply coverage</i>	2.4	47%	3.4	25%	5.8	31%
<i>Sanitation coverage</i>	1.3	25%	2.8	20%	4.1	21%
<i>Total population</i>	5.2	100%	13.8	100%	19.0	100%

The urban water sector reform program is underway but the MDGs are a high target

3.16 In the case of urban water, the sector reform program is underway (see Box 11) and will produce results in terms of improved coverage and service levels. However, the urban population is growing fast and a very high rate of investment will be necessary for Yemen to achieve its

MDG target of “halving the number of people unserved by 2015” (see Table 7). Achieving the MDG target will also require adapting service levels to what people want and are willing to pay for. It may, in fact, be better to treat the MDGs as long-term goals rather than fixed time-bound targets and progressively to muster the financing and implementation capacity needed to reach these goals.

Rapid implementation has left the new LCs with teething problems

3.17 Implementation of the reform program to create the Local Corporations (LCs) is ahead of schedule, which, whilst impressive, has tended to leave essential institutional development behind. Insufficient attention has been paid to strengthening of management. Some LCs have preliminary business plans, but arrangements for capacity building and technical support are urgently needed. The proposed regulatory framework has not yet been established. The future role of NWSA, once all service delivery operations have been decentralized, remains to be determined.

Box 11: UWSS Reform Principles

The objectives for urban water supply and sanitation (UWSS) were set out in the cabinet resolution CR237 of 1997 that adopted the ten-year reform program. Those objectives remain valid:

- ☐ increased coverage
- ☐ financial sustainability
- ☐ separation of policy and regulatory functions from service provision functions
- ☐ decentralization to Local Corporations
- ☐ knowledge and skills development
- ☐ community involvement

Table 7: Reaching the UWSS MDGs
(Source: NWSSIP)

	2002	2015
Urban water supply coverage target	47%	75 %
Urban sanitation coverage target	25%	63%
Population covered urban water supply	2.4 million	6.7 million
Population covered urban sanitation	1.3 million	5.6 million
Total urban population	5.2 million	8.9 million
Annual investment required	US\$120	US\$150

	million	million
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Revenues generated cover the O&M cost for delivering the service but the tariff structure is not pro poor or water conserving

3.18 Local Corporations have different tariff structures approved by local authorities and the governorate. In Sana'a, the tariff structure consists of six blocks beginning at 35 m³/month; five blocks for household use and one for commercial and industrial use. However, this notionally pro poor and water-conserving structure is dysfunctional: because practically all urban users consume less than 35 m³ per month, the most expensive tariff steps become irrelevant.

Some tariffs do not even cover operating costs

3.19 The average tariff in Sana'a for domestic water supply and sanitation is YR100 per cubic meter (US\$0.52/m³), corresponding to a household that consumes less than 35 m³ per month. The water supply tariff includes an 80% added tariff for wastewater collection. Given the efficiency losses in the distribution system, the average monthly bill is not enough to cover O&M costs plus depreciation, let alone investments.

The performance of LCs has not been uniform across the board

3.20 Table 8 summarizes the financial and operational status of the four largest LCs for the year 2002. The data indicate that for the major cities, total revenues cover O&M costs, and collection rates are in the range 91 -100%. These results represent a baseline at the time of LC establishment. A benchmarking and monitoring system has now been prepared and this will become operational in 2005 to allow stakeholders to track performance and hold the LCs accountable. In smaller cities, the LCs are not functioning to this level due to the relatively low number of connections and consequent low water sales.

Table 8: Summary of Financial and Operational Status of Selected LCs
(Source: Urban Water Supply and Sanitation Project)

Fiscal Year 2002					
	Unit	<u>Hodeida</u> <u>h</u>	<u>Ta'iz</u>	<u>Sana'</u> <u>a</u>	<u>Mukall</u> <u>a</u>
Key Networks Indicators					
Number of Connections (Water)	Unit	45,957	39,471	69,889	37,899
Number of Connections (Sewerage)	Unit	28,164	25,576	34,293	12,437
Water produced	1000 m ³	13,209	6,281	18,469	11,867
Water billed	1000 m ³	8,266	3,779	11,825	7,273
UFW	%	37%	40%	36%	39%
Key Financial Indicators					

Fiscal Year 2002					
	Unit	<u>Hodeida</u> <u>h</u>	<u>Ta'iz</u>	<u>Sana'</u> <u>a</u>	<u>Mukall</u> <u>a</u>
Key Networks Indicators					
Revenue Components					
Water sales	Mill of YRL	369	299	922	673
Sewerage Services	Mill of YRL	152	116	365	
Services	Mill of YRL	52			
New Connections	Mill of YRL	15	15	59	
GOY Subventions & Other Revenues	Mill of YRL	54	49	143	17
Total revenues	Mill of YRL	642	479	1,489	690
Financial ratios					
Cash Collection rate ⁵	%	95%	100%	91%	97%
Working ratio ⁶	%	168%	150%	116%	125%
Operating ratio ⁷	%	126%	106%	69%	83%
Period Acc Receivable Outstanding	Months	14.00	6.90	11.69	8.63
Current Ratio ⁸		9.98	1.06	1.94	1.28
Personnel expenses/Oper. Revenues	%	23%	28%	28%	44%
Employee/Thousands of water & sanitation connections	Employee/ 1000 connect	5.1	6.1	9.6	14.5

Low tariffs send the wrong signals to both consumers and utility managers

3.21 At these low levels of tariff, consumers see no incentive for water conservation whilst suppliers have no incentive to improve performance. Consumers are generally willing and able to pay much higher prices for water services than those currently charged within the country. It appears that there is ample room to increase water tariffs from an affordability perspective. There may be some initial resistance to such a move but this can be mitigated by demonstrating improved service delivery, increasing efficiency and improving accountability of the Local Corporations. Low tariffs also restrict the ability to invest in expanding service and maintaining existing assets. Cost recovery would also encourage private sector participation (PSP) and financing in building new infrastructure for water supply, as well as sewerage collection and treatment.

Rural Water Supply and Sanitation

⁵ Cash collection rate = Cash collected during the year/ Total revenues

⁶ Working ratio = Total revenues (Inc government subventions) / Total Oper. expenses

⁷ Operating ratio = Total revenues (Inc Government subventions) / Total Oper. expenses plus depreciations

⁸ Current ratio = Total Current assets (Receivables + Cash+ Stock)/ Total Current Liabilities (Payables)

Despite new approaches, the rural water program is in disarray and the MDGs are a very high target

3.22 In the case of rural water supply and sanitation, since the sector review carried out by the Government with the Bank and the Netherlands in 1996, new approaches have been defined: (i) to work through community-based organizations; (ii) to adopt a demand responsive approach; (iii) to improve field implementation; (iv) to aid emergence of NGOs; and (v) to develop low cost and appropriate technology. Several agencies – Social Fund for Development (SFD), Public Works Program (PWP), some NGOs – are working basically in line with these principles, and the Bank-supported Rural Water Supply and Sanitation Project is piloting a full package of “demand-driven” interventions (Box 12). However, the sector is still in disarray, largely because sector strategy is still under preparation and because GARWSP – the major governmental agency involved – needs radical overhaul. Under present circumstances, the possibility of reaching the MDGs is non-existent. They certainly represent a very high bar of coverage for an extra 10 million people (water supply) and 8 million people (sanitation) and this is represented already in NWSSIP where goals have been scaled down (see Table 9).

Table 9: Reaching the RWSS MDGs

	Base (2000-2003)	MDGs in 2015	NWSSIP revised target in 2015
Rural water supply coverage target	25%	65%	33%
Rural sanitation coverage target	20%	52%	26%
Population served			
- water supply	3.4 million	13.6 million	7.0 million
- sanitation	2.8 million	10.9 million	5.0 million
Total rural population	13.8 million	20.9 million	
Total annual investment	US\$50 million	US\$130 million	US\$100 million

The problems in the rural water supply and sanitation sub-sector include both technical and institutional challenges

3.23 Rural water and sanitation face many problems: water resources are limited and the difficult topography makes distribution of water difficult and expensive. In implementation, agencies have a predilection for pumped schemes, and rainwater collection is not utilized to a great extent despite its cost and sustainability advantages. There are in many areas serious water source problems, and in implementation this is made worse by insufficient geophysical studies, no proper inventory of water sources and even lack of information on how much water is being consumed.

Water quality is also a problem with schemes

3.24 Water quality⁹ is often affected by pollution from human waste, agricultural fertilizer use, and, in some cases, seawater intrusion and other point source pollutants (for example, in the north of the Sana'a basin, close to the treatment plant). Hygienic sanitation in the rural areas is very limited. Coverage is 5–10% of households in small villages, and up to 20% of households in larger settlements.

There is a lack of an agreed approach

3.25 Most public financing continues to go through GARWSP. Investment levels are low compared to urban levels (US\$4 per head of the rural population in 2002/3 compared to US\$25 a head in urban areas) and public investment is focused in peri-urban areas with no mechanism for poverty targeting. Human resources and technical abilities on the ground are extremely limited and, in most cases, women are not involved. Many projects have been started and abandoned by GARWSP, and normally, at the completion of GARWSP projects, the community is in charge of the maintenance but with limited training.

Rapid increases in rural water coverage require clear strategy and institutional reform

3.26 Rapid increases in rural water coverage will depend on a number of institutional factors. Clearly, the sector strategy currently under preparation will be a key document. The results of the IDA-financed Rural Water Supply and Sanitation Project (“RWSS Project”) also need to be monitored closely and the lessons scaled up as soon as ready. These are likely to include; adoption of the demand-responsive approach; autonomous self-financing community water user associations; offer of a broader range of low cost technologies; greater involvement of NGOs in implementation; objective poverty targeting; and systematic involvement of women. A key element will be to foster coordination and information in the sector, aligned on emerging best practice. This could be effected through a periodic “practitioners’ forum”. Centralization and diversification of partners will be essential, and Government will need to facilitate the entry of further NGOs and ensure they have access to flexible financing for projects.

⁹ Water quality details are not known for the whole of Yemen, even though there is a water laboratory in each governorate: the laboratory only checks the water quality of each new well, with no arrangements for periodic monitoring.

Box 12: RWSS Existing Programs

Governmental Strategy (GARWSP)

- The implementation of projects that are mainly dependent on ground water.
- The central office receives around 1,000 applications per year and starts implementation of around 100 projects. Very often in the first year of the project cycle the wells are drilled, the second year the pumps are provided and then in the third year the pipes.
- There is no “prioritization” system to allocate the funds to the most needy villages.
- There is no strategic investment plan. Based on local demands, approximately US\$16 million is allocated annually with some additional donor projects.
- GARWSP has endeavoured to establish 19 Governorate Branch Offices (BO’s) but with limited effectiveness, and most of the BO’s are marginally functional.

Social Fund for Development (SFD)

- The SFD is an independent Yemeni Government multi-sectoral development funding and implementation agency. It was established to assist and provide development support in economically productive activities with poor communities.
- Funding sources include the World Bank, the European Commission, Government of Yemen and other bilateral donors.
- In the water and environment unit, priority is given to rural water supply projects operated by gravity (springs, small streams) or based on shallow wells, which can be operated by hand pumps. In earlier years, the SFD was also involved in mechanized systems, but has stopped due to the non-sustainability (fiscal and resource wise) of these projects.
- Emphasis on rainwater harvesting in cisterns and small dams.
- Funding for the rural water sector is up to US\$5 million per years (approximately 10% of the total SFD budget)
- The work conducted by SFD is largely through contractors.

Public Works Project (PWP)

- The PWP is a Yemeni Government multi-sector development funding and implementation agency. Funding sources include the World Bank, the European Union, Government of Yemen and other bi-lateral donors.
- In the water and environment unit, priority is given to rural water supply projects operated by gravity (springs, small streams) or based on shallow wells, which can be operated by hand pumps.
- Rainwater harvesting in cisterns and small dams.
- Projects in rainwater harvesting sector are very successful, projects involving mechanical pumps are much more difficult and less sustainable.
- Funding for the rural water sector is up to US\$4 million per year.

- The work conducted by PWP is largely through contractors.

Donors working in the sector include the Royal Netherlands Embassy (RNE), the World Bank, RWSS, Japan and UNDP. The global WSP, administered by the Bank, is supporting the development of a national strategy, expected to be adopted during 2008.

Challenge 4. The need to protect water sources and the quality of water adequately

Watershed deterioration is a growing problem...

3.27 Yemen's ancient terrace systems and historical dams provide excellent examples of traditional watershed management, reducing soil erosion and slowing damaging run-off, aiding infiltration to groundwater and streams, and retaining water and providing high yielding agricultural land for the farmer. However, modern Yemen has proven not so good at dealing with public goods and externalities. Modern Yemeni communities have no tool to manage the classic watershed management trade off between upstream and downstream interests. As a result, there are frequent signs of catchment deterioration affecting both land and water: erosion, deforestation, groundwater depletion, saline intrusion, dried up springs, flood events.

...and watershed management programs need to be revised using an integrated approach with more focus on upstream communities

3.28 Current watershed management activities are concentrated on the flawed small dams program financed by AFPPF. Investments under the Sana'a Basin Project also concentrate on dams and downstream interventions, with no investment in the upstream watershed. A broader approach to "integrated watershed management" is required (see Box 13). Watershed management is, however, one of the hardest challenges in development – multi-functional, multi-institutional, with pervasive externalities. Support should be mobilized for this neglected investment. Given the multi-institutional challenge, there is scope for pro-active donor and NGO involvement to relieve the burden on government agencies which typically find it hard to coordinate the multiple interventions needed for watershed management.

Box 13: International Best Practice in Sustainable Watershed Management Projects

Empirical evidence shows that the most sustainable watershed management projects focus on poverty reduction in the catchment through improvements to market access, education, diversification and wider livelihood improvement. Thus, sustainability starts with the farm family and its livelihood as the unit of development and recognizes the role of watershed communities as "conservation managers".

A typical approach is a participatory project with a poverty focus aimed at changing land use and boosting incomes through higher value crops and more sustainable practices, combined with conservation investments. Policy and regulation play a role, too: restrictions on pasture use and improving security of land tenure are two ways that have been tried successfully. Innovative solutions have been piloted. In Latin America, downstream beneficiaries such as water utilities or tourism groups pay for "environmental services" like protection of catchments and maintenance of scenic and water quality assets.

The benefits of sustainable watershed management are considerable. Public benefits include carbon sequestration, ecotourism potential and hydrological benefits. Upstream community benefits include improved food security, better health and sanitation, better access, and community education and empowerment.

Community participation in design, implementation and funding of works is essential. The community is the unit that must carry on the work without major subsidy. Cash contributions from beneficiaries bring commitment and realism about interventions. Successful approaches typically start with careful land use planning. Secure land tenure, a cash crop orientation and profitability of investments are crucial. Experience shows that investments like the planting of fruit trees or the adoption of micro-irrigation allow both income improvement and soil conservation. Early returns are needed to maintain interest. Evidence also shows the importance of reducing women's workload and diversifying their livelihood source if families are to make resource conservation a priority.

Adapted from a note prepared for the Agricultural Water Management Sourcebook (2004)

Challenge 5. The challenge of public administration and the alternative options available to building institutional capacity in GOY agencies

The challenge of public administration in Yemen is great

3.29 Despite an impressive record in creating a modern administration from virtually nothing over the last thirty years, Yemen faces an enormous set of problems in its public service. Competencies, management and motivation are all low and, as a result, performance is frequently negligible or perverse. This contributes to a very weak governance environment; not surprisingly, Yemen scores amongst the weakest countries in the world on governance. Even flexible instruments like AFPPF appear to have lost their way. The more complex or innovative activities are a particular problem – for example, the promotion of conjunctive use of surface water and groundwater, or wastewater reuse, or watershed management – require energy and coordination skills lacking in the public sector.

The problems can be mitigated by working around Government...

3.30 Although the problem is pervasive in Yemen, there are some possible ways to mitigate it. Clearly, it is essential to minimize the burden placed on government, and to place more reliance on NGOs, community organizations, the universities, or the private sector. For functions that are the core responsibility of Government, outsourcing and contracting may be possible. Participation at every level is key. Wherever possible, public interventions should be carried out through decentralized structures which are more accountable and subject to feed back from communities.

...and there are some limited possibilities of working effectively through Government

3.31 Where there is no alternative to working through the public sector, civil service reform may offer some hope. For the water sector, MAI's reform program "Agenda 21 for Agriculture" (A21A) prepared in 1998-9 is one such program "ready to go". When the agenda is difficult, donors and projects may be able to help push it through or implement multi-functional or multi-institutional programs - the Sana'a Basin project provides a good example of a proactive donor role in assisting policy change. Decentralization within government is another important route, particularly to decentralized units with a degree of autonomy and local accountability such as the LCs (and perhaps, in the future, GARWSP branches). For some public functions of sector governance, persistent capacity building, including education and training, is essential. Finally, there are a few public sector successes such as the Social Fund for Development (SFD), and practice could be aligned as far as possible on these models. For example, SFD could provide a model for re-launching AFPPF.

Common Themes

3.32 This Section has looked at five central problems of the water sector: groundwater, inter-sectoral allocation, potable water, protection of the resource, and the flimsy sector institutions. Evidently, there are no easy solutions to such intractable problems, but some common themes emerge from the discussion:

- The incentive structure is key to change. It has a direct impact on farmer behavior – and in Yemen the farmer is the sole manager and regulator of groundwater.

- Partnership and participatory approaches, building on existing rights and practices, are the key to responsible management, good investment choices and sustainability.
- Institutions (i.e. rules and organizations) at all levels will have to adapt to respond to the persistent problems the sector faces.
- Market-based approaches and private participation can improve service and keep costs down. For example, existing private markets in water can be the basis for more formal markets.

B. THE IMPACT OF SCENARIOS ON THE ECONOMY AND ON THE POPULATION

3.33 A qualitative exercise was conducted during CWRAS preparation to gauge the impact of various scenarios on the macroeconomy, on the treasury and on different segments of the population. The scenarios comprised: (i) no change in existing policies; (ii) changes in macroeconomic policies; and (iii) sector specific and microeconomic reforms. The results are presented in Table 10. Amongst the findings from the exercise that are relevant to water sector reform are the following:

- **All status quo scenarios are negative** for all segments, although for some there are short term benefits from existing policies, as from groundwater mining.
- **All reform scenarios bring benefits** to all participants, although in some cases there is a difference between segments in terms of timing – for some there will be costs in the early years.
- **The poor have a bigger stake** in reform than the better-off.
- **Many reforms have a fiscal cost**, as they will involve public investment and subsidy. Cost recovery reforms will have a positive fiscal effect.
- **The economy and all segments of society benefit in the longer run** from reform. However, the costs of changes in relative prices will have an initial negative impact on cities and on better off farmers.

3.34 Although the exercise conducted contains partial and subjective elements and does not have the robustness of a well-supported quantitative model, there are nonetheless some policy lessons that can appropriately be drawn:

- Reforms are well justified in the national interest.
- There may be a short-term negative impact on growth, public finances and household incomes, and this could be a justification for possible balance of payments support at the macro level, or safety net interventions at the household level.
- The costs of adjustment will fall mainly on the urban population who will have to pay more for scarce water, and on better-off farmers who will cease to reap windfall gains from resource mining.
- Reform is a pro-poor policy.

3.35 The next chapter describes to what extent government’s new “action plan” – the NWSSIP – addresses the central problems of the sector, and how it reflects the themes developed here.

Table 10: The Impact of Sample Reform Scenarios on the Economy and on the Population

	Macro growth impact	Fiscal impact	Highlands cities population	Coastal cities population	Better-off farmers	Rural poor
Existing policies unchanged	On average, negative impact on macro-economy and population					
1. Groundwater overdraft	Positive short-term, negative longer term	n.a.	Negative	Negative	Positive short term, negative long term	Negative
2. Rural urban transfer	Negative	n.a.	Negative	Negative	Positive	Neutral
3. Inadequate drinking water	Negative	n.a.	Negative	Negative	Negative	Negative
Changes in national policies	On average, positive impact on macro-economy and population					
1 Incentive structures reflect opportune cost of water	Negative short term, positive longer term	Positive	Negative	Negative	Negative short term, positive longer term	Positive
2. Reform of public expenditures	Positive	Positive	Negative short term, positive longer term	Negative short term, positive longer term	Positive	Positive
Sector specific reforms	On average, positive impact on macro-economy and population					
1 Agricultural water use	Positive	Negative	Positive	Positive	Negative short	Positive

efficiency					term, positive longer term	
2. Community self-management	Positive	Negative	Positive	Positive	Negative short term, positive longer term	Positive
3. Increased cost recovery	Positive	Positive	Negative short term, positive longer term.	Negative short term, positive longer term.	Negative short term, positive longer term.	Positive

4. YEMEN'S STRATEGIC RESPONSE TO WATER CRISIS: THE NATIONAL WATER SECTOR STRATEGIC INVESTMENT PROGRAM (NWSSIP)

Preparation of a New Integrated Strategy

The time is right for a new strategic focus on water...

4.1 Chapter 3 characterized five pressing problems within the water sector. Yemen has been struggling to resolve these problems for almost a decade. There has been some progress but economic and demographic processes have, if anything, aggravated the problems. Now, several factors have created an environment in which a new strategic focus on Yemen's water sector is possible and timely:

- The creation of the new Ministry of Water and Environment (MWE) has brought under one umbrella all water institutions except those for irrigation and watershed management.
- Management of most water institutions has changed and comes under the leadership of a minister who is a very experienced water professional with good international and Yemeni experience.
- Yemen has embarked on a decentralization process that will help both the parallel decentralization of water institutions and the current movement in the water sector favoring participatory and bottom up approaches.
- The PRSP exercise has brought a nationwide focus on poverty reduction and inclusion, and therefore on the water sector, which is key to poverty reduction (see Chapter, Section C below).
- There has been almost a decade of reform experience and about five years of fairly focused reform effort in several sectors, and there is broad consensus that now is the time for stock-taking and reorientation.

...and Government has prepared a national strategic action plan for water, the NWSSIP

4.2 When the Bank proposed to prepare a CWRAS in a participatory way, Government agreed that the time was right for a new strategic focus, and in fact joined to the CWRAS process the preparation of its own national strategic plan, the National Water Sector Strategy and Investment Plan (NWSSIP). Thus effectively, Yemen seized on a "window of opportunity" to take stock in the water sector and to prepare a comprehensive and integrated national water strategy. The approach and process employed to prepare NWSSIP included many positive innovations, notably the long-term, integrated approach and the inclusive process. Box 14 summarizes the most important of these innovations in approach and process.

Key actions in NWSSIP

4.3 Government's NWSSIP is a dense document, and it spells out many detailed actions. The following bullet points attempt to summarize the main points of the proposal:

Integrated management is explicitly dealt with:

- There is an attempt to pull together measures on groundwater into a coherent “package” (see Box 15), although no specific implementation plan or quantitative target is set.
- A study will be carried out to identify scenarios for changing the economic incentive framework.
- A pilot project to test the feasibility of water markets for rights-based rural/urban water transfer will be carried out.
- A working group will examine how to deal with source protection and quality.

Box 14: What’s New in the NWSSIP Approach and Process

- ◆ 10 year horizon
- ◆ integrated policy, strategy and investment plan
- ◆ inter-institutional
- ◆ participatory, bottom up, national
- ◆ brings in donors as full partners
- ◆ comprehensive
- ◆ targeted (to an extent)
- ◆ detailed lists of actions, ready to implement
- ◆ MWE/MAI working jointly
- ◆ works within key national development strategies, and particularly within the pro-poor framework of the PRSP
- ◆ thought has been given to implementation, monitoring and evaluation and coordination

Measures to improve institutions and governance issues are set out

- There are steps – not quite an action plan - for getting MWE and NWRA fully operational, including early presentation of the MWE by-law and organization chart (this has in part been done).
- MWE and MAI will set up permanent coordination mechanisms.
- A needs assessment will be conducted to prepare proposals for developing sector human resources.
- There are some ideas about resolving problems of public sector capacity, including “improving motivation”.

Proposals are made on economic policy issues

- Support to increase in the energy price.
- A proposal for reorienting AFPPF towards water resources management and efficiency and for improving its performance.

There is a strong program of support proposed for NWRA in water resources management

- Information and monitoring programs will be strengthened.
- NWRA will progressively decentralize, working through basin plans and participatory basin committees.
- The monitoring and enforcement provisions of the Water Law will be implemented.
- NWRA's programs for education and awareness will be continued and expanded.
- NWRA will also play a role in facilitating multi-functional, multi-institutional investments and in developing sector human resources.

The ongoing sector reform program for urban water supply and sanitation will be reinforced, with increased investment to attain the MDGs

- Investment of US\$750 million 2005-2009 is proposed.
- The MDG target of 6.7 million people served by 2015 can be reached if this rhythm of investments is maintained.
- The decentralization process would continue at the rate of two new Local Corporations set up each year.
- The missing regulatory and support functions will be set up.
- The future of NWSA and its residual functions will be decided.
- Benchmarking will be introduced to track performance.
- The tariff system will be studied to see if a more pro-poor system can be introduced.
- Tariffs will be set to recover full operating and maintenance costs plus electromechanical works as a first step towards gradual implementation of full-cost recovery.
- A study will be conducted of appropriate low-cost technology.
- Public private partnership (PPP) will be through management contracts for Sana'a and Aden rather than a lease for the time being.
- Efforts will be made to develop equitable ways of sourcing water from rural areas fairly, and non-traditional sources will be mobilized, such as brackish water desalination and wastewater for fresh water swaps.

Box 15: Measures Proposed in NWSSIP on Groundwater

The following measures are proposed in NWSSIP to help reverse the trend of groundwater mining:

(a) National policy is to decentralize these key water resources management issues to the water basin committees, within basin plans. The preparation of basin plans is therefore top priority.

b) NWRA will coordinate information, education, public awareness, licensing, monitoring and enforcement. NWRA will work with other agencies, decentralize to branches, cooperate – at the field level – with local authorities, especially regarding enforcement, and work with farmers groups through its community mobilization teams.

(c) The programs in Sana'a and Sa'adah Basins are piloting integrated packages based on water use efficiency investments and practices, enhanced supply options, and farmer responsibility and self-regulation. These programs will be closely monitored through regular workshops, and lessons will be drawn and applied in other basins.

(d) A study on options for changing the economic incentive structure, particularly for groundwater management, will be carried out. This will cover both positive incentives like investment cost sharing as well as negative ones like pricing. It will also cover the overall incentive regime for irrigated agriculture that results from agricultural and trade policy (including qat trade), fiscal policy regarding taxation, water charges and subsidy on water-related equipment, and the role of public investment, including AFPPF.

(e) Further pilot projects will be undertaken, including a pilot project to test a system of tradable water rights in Ta'iz.

(f) Further immediate actions will be identified through a stakeholder symposium. This will review the results of the study on incentive structure.

(g) As sustainability is no longer attainable in all areas and as some mining may be in Yemen's interest, NWRA will also propose a "rational groundwater policy" to set out the expectations of the nation regarding use of the groundwater resource.

Proposals for the rural water supply and sanitation sector are "tentative" as the sector strategy is still being developed

- The strategy and investment plan will be ready in 2005.

- Investments will start low but build up to a high level of US\$130 million annually by 2009.
- The MDG target of 13.6 million people served with safe water by 2015 is unlikely to be attained and a lower target of 7 million has been adopted.
- A central reform office is proposed; GARWSP will be restructured and authority will be delegated to branches.
- A common demand responsive approach (DRA) and implementation methodology will be adopted.
- Community organizations will be the partners and they should be financially autonomous.
- Financing will be targeted to the greatest need.
- New partners like NGOs will be sought.
- Technology choices will be broadened and sanitation and hygiene systematically included.
- Gender will be systematically factored in.

MAI has proposed actions on irrigation and watershed management within the overall integrated framework of NWSSIP

- A strategy for improving irrigation efficiency (from 40% to 70%) will be prepared.
- Service orientation will be improved by decentralizing and implementing the MAI reform agenda (A21A).
- MAI will strengthen programs in water use efficiency and community groundwater management.
- Farmers' water rights will be recognized according to the law.
- Research and extension will be refocused on water use efficiency and on rainfed agriculture.
- The dams program will be reviewed and integrated into watershed management programs.
- AFPPF resources will be increasingly allocated to modern irrigation technology.
- The dams program will be reviewed and integrated into broader watershed management programs.
- Cost recovery will be progressively implemented on public schemes.
- Water user associations will be systematically promoted.
- MAI will work with NGOs as service delivery partners.
- A study on qat and crop alternatives will be conducted.

Human and environmental aspects are also covered

- A pro-poor environmental MDG will be set in 2005.
- A central water quality lab will be established.
- EIAs will be used systematically for all water projects.

Implementation, monitoring and coordination measures are also included

- There will be Government-donor meetings regularly.
- A monitoring and evaluation program will track NWSSIP progress.
- NWSSIP will be updated in 2006.

The NWSSIP Investment Program

The NWSSIP investment program proposes a doubling of investment in rural water

4.4 NWSSIP proposes an investment program of US\$1.5 billion over the five years (Table 11). This compares with actual and budget totals for the five years 2000-4 of US\$1.3 billion, so is not a quantum leap in aggregate terms. The resources proposed for urban water are not very much higher than in the reference period, so in principle the program should be manageable. Rural water is the sub-sector that shows the highest increase in investment requirement, doubling to US\$482 million; there are doubts over absorptive capacity, and the feasibility of this high investment will need to be verified when the sector strategy is produced later in 2005. The “decline” in allocations for irrigation and watershed management is puzzling; it probably represents a problem of classification rather than a real drop in requirements.

The net financing requirement is US\$559 million, of which half is for rural water

4.5 Of the proposed investment program of US\$1,538 millions, about US\$550 million is already committed by donors and US\$429 million is expected to be financed by government and beneficiaries. The balance of US\$559 million is the “net financing requirement”, for which government is seeking further external aid. Of this net requirement, US\$297 million is for rural water supply and sanitation, US\$153 million for urban water, US\$70 million for irrigation and US\$19 million for the environment.

Table 11: NWSSIP Investment Program

	2000-2004		2005-2009	
	US\$ million	%	US\$ million	%
Water resources management	32	2%	47	3%
Urban water supply and sanitation	707	55%	798	52%
Rural water supply and sanitation	244	19%	482	32%
Irrigation	314	24%	190	12%
Environment	-	-	21	1%
TOTAL	1,297	100%	1,538	100%

Source: Yemen Water Sector Public Expenditure Analysis, and NWSSIP

Critique of NWSSIP from a Bank Perspective

NWSSIP is an impressive integrating program, but some elements remain scattered and some measures are vague or weak

4.6 Overall, NWSSIP is an impressive program that for the first time brings an integrating vision to Yemen's water sector within one document. The strong points of NWSSIP are summarized in Box 16. Areas which are less strong or where perhaps more emphasis will be needed in the future include the following:

- The measures proposed for tackling the groundwater overdraft are necessary but it is unlikely that they are sufficient. Actions on the problem remain scattered and would benefit from consolidation into a “matrix” program led by NWRA, with provision for monitoring and learning (see Chapter 6 below on this)
- Reform of the very important incentive structure is dependent on a process of study for which the recommendations are unknown and commitment to subsequent implementation will be uncertain. The proposals for a water markets pilot and for rural/urban water swaps are good and deserve support, but they would benefit from integration within a monitoring and learning framework. NWRA's role here will be central.
- The MDGs are a worthy and appropriate target. However, they require massive resource transfer and – for rural water supply and sanitation at least – an increase in absorptive capacity. NWSSIP has not been able to spell out in detail how this will happen. Government is correct to align sights on the MDGs as goals, but time-bound action plans should remain fixed on nearer term, more realistic targets that can be attained as decentralized implementation approaches and - for rural water - participatory community institutions are built up.
- The proposed increase in resource allocation raises the issue of implementation capacity especially given the present slow pace of implementation and substantial disbursement delays. Some measures for increasing absorptive capacity are intended in NWSSIP but it is likely that external financiers will not provide a significant increase of financial resources until these measures have demonstrated their efficiency, measured by timely completion of quality works at reasonable unit costs.
- The proposed financing plan suggests local financing – both budgetary and self-financing – as high as US\$429 million (28% of the total). Given the declining prospects for final revenues for oil, a growing share of finance will have to be mobilized outside the Government budget. It is not clear how feasible this will be. MAI retains a somewhat separate stance, and its internal reorganization plans are still at the drawing board stage. NWSSIP does not offer clarity on how MWE and MAI will work together, nor on what will happen and when regarding A21A.
- On the same lines, the water use efficiency agenda is referred back to “research and extension” but past history in Yemen does not give confidence that this structure can really deliver and there are no specifics on how this is expected to change.
- The proposal to clean up and reorient AFPPF and the related dams program is encouraging, but past experience suggests that this will be an uphill struggle.
- NWSSIP remains vague on implementation of the Water Law. Evidently the regulatory and enforcement function will be carried out by NWRA in partnership with decentralized authorities and communities, but there is no clarity on how this will happen.

- NWSSIP is disappointing on institutions and sector management capacity. In particular, it is not clear from NWSSIP how administrative reform will get MWE and NWRA fully effective.

The NWSSIP horizon is quite short term and there are few benchmarks

4.7 The NWSSIP exercise was intended to propose a vision up to 2015, with more specific plans for a five-year period that would coincide with the next five-year plan. In practice, little thought has been given to beyond the five year horizon. Apart from the MDG targets for water supply and sanitation, there are few benchmarks or clear targets proposed in NWSSIP itself (although the monitoring and evaluation system now being designed¹⁰ is setting far clearer indicators and benchmarks for NWSSIP's impact, outputs and inputs).

Overall, NWSSIP is more integrated, targeted, participatory and inclusive than previous strategies, and if implemented should make the water sector more service-oriented and more pro-poor

4.8 Government's proposals in NWSSIP are based on the continuation of existing programs, but they also introduce significant innovations, particularly in the way of doing business (more integrated, targeted, participatory and inclusive) and in the nature of that business (more service-oriented, more pro-poor). Huge challenges persist, and there are some less strong points in the proposal, but overall NWSSIP represents a bold new departure worthy of support.

Box 16: The Strengths of the NWSSIP Proposals

There are many strengths in the NWSSIP proposals:

On water resources management

- ☐ A more integrated set of measures on groundwater
- ☐ Attention to water allocation and transfer issues
- ☐ Factoring in of multi-functional, multi-institutional investments, including joint MAI/MWE approaches
- ☐ Focus on source protection and quality
- ☐ A start on pulling together IWRM interventions on a basin level and for watershed management
- ☐ Proposals to improve the troubled dams program

On water supply and sanitation

- ☐ Formal adoption of the water supply and sanitation MDG targets
- ☐ Proposals for a large increase in resource transfer
- ☐ A new, pro-poor, emphasis, especially in the priority given to rural water supply and sanitation

On sector approaches and management

- ☐ Recognition of the importance of the incentive structure and of cost recovery

¹⁰ With Bank support under PESW

- ☐ Proposal for an innovative pilot on water markets
- ☐ Emphasis on participatory approaches, water user associations, partnerships

On sector institutions

- ☐ MAI/MWE cooperation mechanisms
- ☐ Review and reorientation of the AFPPF
- ☐ Recognition of the importance of improving public sector management
- ☐ Sector wide approaches to human resource development

What are the key policies that should act as benchmarks for sector performance?

4.9 Globally, the test of water sector policies is the application of the three principles of good water management agreed at the Dublin Conference of 1993 (see Box 17). An exercise to match NWSSIP against these “Dublin principles” was carried out (see Table 12), validating the strategy against key questions. In summary, if NWSSIP is carried out as stated, many aspects of Yemen’s water sector will be “managed” in line with global best practice, but with some significant exceptions. The principal exceptions are:

- Uncertainties about urban water supply policy in respect to poverty targeting, genuine financial autonomy of the LCs and the application of least cost approaches.
- Uncertainties about water resource allocation and sustainability. In particular, the outcome on key questions of reducing groundwater mining and facilitating inter-sectoral water transfer remain uncertain. These depend on Government’s willingness to take tough policy decisions – on macroeconomic policy on incentives and on microeconomic policy on water allocation and markets.
- Uncertainties about the effectiveness of public institutions and expenditures, and about the sector’s ability to wean itself off public finance.

4.10 In the follow up to NWSSIP, clearly these exceptions will be the focus of close scrutiny from the public and from donors. Above all – in the Yemeni context – it will be implementation of these policies which will be uncertain. It is thus vital that the execution of NWSSIP measures and the resulting outcomes and impacts be the object of benchmarking and be tracked systematically within a well functioning monitoring and evaluation system.

Box 17: The Dublin Principles

Globally, the Dublin Principles are accepted as the guide to water resources management. These are:

The *instrument principle*, which argues that water is a scarce resource, and that greater use needs to be made of incentives and economic principles in improving allocation and enhancing quality.

The *institutional principle*, which argues that water resources management is best done when all stakeholders participate (including the state, the private sector and civil society), that women need to be included, and that resource management should respect the principle of subsidiarity, with actions taken at the lowest appropriate level.

The *ecological principle*, which argues that independent management of water by different water-using sectors is inefficient, that the basin should be the unit of analysis, that land and water need to be managed together, and that great attention needs to be paid to the environment.

Next Steps on NWSSIP

4.11 Government finalized the NWSSIP proposal in late 2004. In the first half of 2005 it is expected that NWSSIP will be approved by cabinet and then by parliament. Donors active in the sector have signed a “declaration of support” endorsing NWSSIP, and it is expected that Government and donors will meet at a high level to confirm this support and to agree on next steps, financing and other commitments.

4.12 Government is preparing a NWSSIP monitoring and evaluation framework and it is expected that this will be operational by mid-2005. It is proposed that twice yearly joint meetings of stakeholders be held to review progress and evaluate outputs and impacts.

Table 12: How Does NWSSIP Improve Yemen's Policies For Water?

Goals	Economic instruments	Decentralization	Holistic and inter-sectoral management
<p>Efficient investment and expanded coverage of safe water</p>	<p>Will services be based on demand drive and willingness-to-pay approaches? <i>For UWSS and RWSS, increasingly yes:</i> user consultation on technology and willingness to pay, and cost recovery levels covering O+M plus most replacements. <i>For groundwater irrigation,</i> a continuing capital subsidy on irrigation efficiency equipment will reflect public good aspects.</p> <p>Will services be targeted at the poor? <i>UWSS uncertain:</i> the tariff structure needs to be more pro-poor. <i>For RWSS,</i> new strategy will include poverty targeting.</p>	<p>Will water resources be managed at the decentralized level? <i>Yes,</i> basin committees and basin plans will target overall basin efficiency.</p> <p>Will choice of investments be decentralized to local stakeholders? <i>Yes:</i> demand drive and willingness-to-pay approaches will combine with at least partial cost recovery to give local stakeholders predominant voice for choice of RWSS and irrigation investments.</p>	<p>Will sector institutions be efficient? <i>Uncertain:</i> capacity-building efforts are needed, but the challenges are very great.</p> <p>Will public and private sectors have clearly defined complementary roles? <i>Increasingly:</i> in UWSS and RWSS, future public role will reduce towards regulatory and facilitating functions, but public involvement in service provision is likely to persist for some time.</p>
<p>Sustainable water services</p>	<p>Will service delivery agencies have financial autonomy? <i>For UWSS, uncertain:</i> autonomy is the goal, but surpluses in LCs represent a temptation for central government. <i>For RWSS,</i> autonomy is likely due to decentralization and WUA</p>	<p>Can user organizations hold service providers accountable? <i>Yes:</i> LC Boards contain local representation, and RWSS scheme management will be accountable to WUAs.</p> <p>Will entrepreneurs be</p>	<p>Are there mechanisms for promoting integrated management by sector institutions? <i>Partially:</i> creation of MWE and drafting of NWSSIP brings most sector institutions under one ministry, but MAI remains apart.</p> <p>How effective will public expenditures</p>

	<p>responsibility for scheme management.</p> <p>Are least cost options first choice? <i>For UWSS, uncertain:</i> a study on least cost options will be carried out, but implementation needs watching. <i>For RWSS,</i> least cost options are already in principle offered, but implementation has a strong “tubewell bias”.</p>	<p>encouraged to participate in the water service business? <i>Partially:</i> for UWSS, management contracts and further outsourcing are proposed, and local contractor capacity will be developed (target 50% of contract value through local contractors) but private supply is marginalized and no systematic approach to PSD has been proposed.</p>	<p>be? <i>Uncertain:</i> current problems of slow implementation and poor governance should reduce as decentralization and user voice grows.</p> <p>Will providers be able to raise local financing outside the budget? <i>Uncertain:</i> dependence on Government and donor funds should reduce as cost recovery increases, and financial autonomy should ultimately allow capital to be raised on the market.</p>
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<p>Externalities, water resources sustainability and efficient allocation</p>	<p>Will the price of water reflect opportunity cost? <i>Increasingly</i>: action on the incentive structure should raise the price of water for irrigators. Recognition of water rights and development of water markets should increasingly align price and opportunity cost.</p> <p>Will water flow to the highest economic use? <i>Uncertain</i>: rights and market based rural to urban transfers will be piloted.</p> <p>Will users get compensation for externalities and for providing public goods? <i>Increasingly</i>: subsidies to irrigation efficiency will compensate for reduced groundwater use. Watershed management programs will compensate poor riparians for providing environmental services.</p>	<p>Will there be independent benchmarking? <i>On service performance, yes</i>: the new PIIS system will benchmark and track service provision and LC performance. <i>On aquifer drawdown, increasingly</i>: the NWRIC water monitoring program has started in selected basins and will expand gradually.</p> <p>Will knowledge on resources be shared with stakeholders? <i>Yes</i>: NWRIC monitoring data is publicly available, and will in future be web-based.</p>	<p>Will there be objective monitoring of policy implementation and of related outputs and impacts? <i>Yes</i>: a NWSSIP monitoring and evaluation function will report to stakeholder meetings twice a year.</p> <p>Are water concerns being taken up in national debate? <i>Yes</i>: creation of MWE and drafting NWSSIP has raised sector profile, and water issues are high on the agenda of Cabinet, Parliament and the press.</p>
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5. THE BANK AND YEMEN'S WATER SECTOR

A. BANK INVOLVEMENT AND LESSONS LEARNED

Thirty Years of Support to the Water Sector in Yemen

After twenty years of support to basic infrastructure, the Bank moved in the 1990s towards a more integrated and demand-management approach to water in Yemen, reflecting growing awareness of water scarcity

5.1 Over twenty years, beginning in the early 1970s, IDA financed many urban and rural water supply and irrigation projects in Yemen (see Annex 2). Until the early 1990s, these projects focused on creating the physical infrastructure. In 1994, following Dublin and the Bank-wide water sector strategy, the Yemen National Environmental Action Plan (NEAP) first identified sector-wide problems of sustainability and water shortages. At the same time, the Bank financed a first project (Land and Water Conservation Project) to promote water use efficiency in agriculture. In 1995, a MENA regional exercise on water identified Yemen as the country in the region most vulnerable to water stress. The creation of NWRA in 1996 gave promise of an interlocutor on the Yemeni side on integrated approaches. As a result, an intensive water strategy ESW activity was conducted 1996-7 in partnership with Government and donors, a process that led to the preparation of the report *Yemen: Towards a Water Strategy*. WBI played a key role in the process of debate around the report and its proposals.

The Bank helped initiate reform in the urban water sector

5.2 At the project level, poor performance, including a critical OED report, prompted the Bank in 1996 to propose a process of reform in urban water. This process culminated in a cabinet decree adopting a wide-reaching reform program, the creation of a "technical secretariat" in support of reform, and a series of lending operations that carried forward the reform agenda and extended urban water coverage. WBI contributed considerably to the agenda on public private partnership (currently the Sana'a WSS Project and the APL UWSS 1 Project.) A pilot project in Ta'iz tackled the difficult problem of rural-urban water transfer (although this has to be counted more of a learning project than a successful investment (see Box 18 below).

...and carried out a review of rural water supply and sanitation

5.3 Stemming from the 1997 Strategy, the Bank also initiated a process of review of rural water that culminated in the preparation of a Rural Water Supply and Sanitation Project ("RWSS project"). Project objectives were to pilot new demand-driven approaches and to prepare a rural water sector strategy that would scale up the lessons and prepare a program to solve the institutional weaknesses of the sector.

In water resources management, the Bank has maintained a continuous dialogue with NWRA

5.4 In water resources management, the Bank has maintained a continuous dialogue with NWRA through a series of project components. These components were intended to capitalize on NWRA's unique role and the heritage of skilled staff that had been transferred to it. Although they did not directly address capacity building (this was the object of a massive UNDP/Dutch

program), the components did have as a subsidiary objective getting NWRA operational in key areas such as basin planning and water resource monitoring.

Irrigation investments have focused on water use efficiency and water user associations

5.5 In irrigation, the LWCP (1994-1999) piloted WUE improvements for groundwater and innovative approaches to watershed management. A follow up project, the Groundwater and Soil Conservation Project (“GSCP”, 2004) has built on this exercise and added a key element: a technical advisory service that can complement physical investment in water use efficiency equipment with improved water management, cropping patterns and crop husbandry. The linked Community Water Management Project, financed on a Japanese grant, is testing community self-management approaches to water conservation. For spate irrigation, WBI facilitated a process of review of the prospects for water user associations and ultimate transfer of spate schemes to users. This review resulted in the Irrigation Improvement Project (“IIP”, 2001), an APL program to support physical rehabilitation and to move the reform agenda forward.

Box 18: Ta’iz Project A “Learning Experience” Rather Than A Success

The principal lessons of the Ta’iz Project are:

- It is essential to start with a good understanding of the water resource balance, and to set a clear “hydraulic goal” for the project in a local water resources management strategy.
- There is a need for initial stakeholder analysis to understand who are the stakeholders and to make sure that water rights are clear.
- There has to be an assessment of stakeholder institutions, to identify adaptive capacity and to select potential partners to guide change.
- There has to be a clear institutional development plan that defines the nature of partnerships, defines respective rights and responsibilities and sets out a roadmap for institutional development.
- Any proposal for water transfer has to be scrupulously analyzed not only from the viewpoint of law and water rights but also from that of inclusion and equity.
- There has to be an enabling framework set up by the state to empower decentralized water management.

Source: ICR

At the macroeconomic level, the Bank’s advice has been on the incentive framework and financial resource allocation

5.6 At the macroeconomic level, the Bank backed up advice to Government to adjust the incentive framework, notably energy prices, with adjustment lending and links to IMF programs. Some improvements resulted, although energy prices have always remained well short of border parity and are lower today in real terms than ten years ago (see above, Chapter 2). The Bank also promoted civil service reform, both for the public service as a whole and for the particular case of MAI, where the Bank supported preparation of A21A. Advice on the water sector was also integrated into broader policy advice. Both the 1999 and the 2002 CAS processes and the 2003 PRSP gave high priority to the reform movement in the water sector.

Current implementation of projects is weak

5.7 From the CWRAS consultations with Government and donors, there was unanimity that implementation is the greatest challenge, and that at present implementation in the water sector is unsatisfactory. The systemic and severe environmental and service problems that persist demonstrate that Bank projects have not solved Yemen's water problems. In Yemen's weak governance environment, implementation is indeed a persistent problem - typically slow, with significant disbursement lags. Currently, two of the six active water projects are considered "problem projects" by the Bank. However, this negative picture does not preclude positive outcomes and impacts from Bank projects within their range of focus: OED assessments show that in only one of the six first-generation water projects completed between 1994 and 1998 were outcomes rated as "unsatisfactory". The picture is evidently a complex one: of weak implementation but - in the end - of generally satisfactory outcomes (at least for the first generation of projects); and of a Bank effort that has not yet contributed to the solution of systemic sector problems. Those problems are the focus of the current second generation of Bank projects, and assessments of development effectiveness at completion will rate these projects against tougher criteria.

Strengths and Weaknesses in the Bank-Yemeni Partnership on Water

Overall the Bank has been strong on analysis and advice at all levels, and has backed reform with lending

5.8 The Bank's work on the Yemen water sector has been recognized as strategic and with strong advocacy and a willingness to back up reform with lending. The Bank's "partnership approach" with Government has kept dialogue open at all times and ensured that the Bank is always listened to on the subject of water. In particular, the Bank's high level insistence on the importance of water sector reform has raised the issues to the highest level and contributed to the broad awareness of the problems in Yemen. This partnership approach has been reinforced and extended into civil society and the donor community through the treatment of water in participatory policy and planning processes like the CAS and PRSP. The Bank's willingness to back reform programs with physical investment lending has facilitated the progress of reforms, moving forward from vision into both policy change and improvement in service delivery, but at a much slower pace than anticipated by the Bank.

Working within a clear strategic framework, the Bank has allocated very significant resources to the water sector

5.9 Since the late 1990's, the Bank has allocated very significant ESW and lending resources to the water sector. This commitment has been backed up by a generally consistent management approach and by good teamwork within the Bank. Linkages amongst the Country Department, the Sector Departments and the Center have been reasonably articulated. The Bank has worked within the 1997 strategy report and has acted on almost all of that report's recommendations (see Table 13 below), albeit with sometimes low to moderate effectiveness. The impact of the Bank's investments and interventions in reform is palpable. Bank inputs have materially driven – and continue to drive – service expansion and improvement as well as reform in water resource management, in water supply and sanitation, and in irrigation.

In some areas, the Bank has been less than effective

5.10 Despite this generally positive picture of the Bank's action-oriented engagement, there are a number of areas where Bank efforts have not yet produced the intended results. As these areas contain useful lessons for the future, they are discussed in some detail in the following paragraphs.

Sustaining an integrated dialogue has been difficult

5.11 Until recently, sustaining an integrated dialogue with Government has been very difficult, as institutional responsibilities were scattered. All the strategic work the Bank did attracted many adherents but no powerful owner. NWRA's notional role as the "resource manager" was never fulfilled, due to institutional and managerial weaknesses and to NWRA's curious position reporting to the Prime Minister outside the ministerial structure. Parallel dialogues with different institutions were often conducted by the Bank, and twice the Ministry of Planning and International Cooperation (MOPIC) had to intervene (for the RWSS Project, and for the Sana'a Basin Project). The new structure that brings most sector institutions under MWE, and the fact of NWSSIP preparation, give promise of improvement.

5.12 However, there is still concern that irrigation and watershed management responsibilities - areas which account for over 90% of water use and recharge - lie outside MWE's authority. Institutional coordination between MWE and MAI is weak and is not always promoted by the Bank.

5.13 A second concern is that dialogue with Government, however integrated, has its limits in Yemen's water sector: virtually all water resources management decisions are taken by rural water users outside Government control. The Bank has made little progress with understanding what drives the behavior of the real rural water resource managers.

5.14 The lessons are: first, an integrated approach in water cannot be achieved unless the organizational structure is conducive to it and unless the Government is clearly behind the reforms. Second, Government's good intentions cannot be taken as a proxy for change in real user behavior. The Bank has to measure its effectiveness by real outcomes and impacts in terms of real changes in resource use by farmers and real benefits to water users..

Table 13: Performance Against the Recommendations to the Bank of the 1997 Strategy

Recommendation	Output	Effectiveness and Impact in 2004
Support national debate through WBI, policy dialogue and sector studies.	Done. WBI workshop on water management 1997. Multiple seminars on water strategy.	Effective
Conduct a study on options for efficiency pricing.	Postponed for political reasons. Now a NWSSIP proposal.	Less effective than anticipated – weak adaptive capacity of institutions, political economy constraints.
Support capacity building for NWRA.	Done (Ta'iz Project, Sana'a Basin Project, GSCP).	Much less effective than anticipated – adaptive and absorptive capacity constraints. Sana'a Basin, a second generation project, designed to develop NWRA decentralized capacity in conjunction with new self-management capacity.
Study options for qat.	Done. Report presented to national qat conference in 2001.	Qat analysis is on the agenda but no impact discernible.
Study small dams program.	Done. Study 1999, technical assistance 1999-2001.	Ineffective. Political rather than social or technical considerations driving the dams program.
Prepare a rural water project.	Done. RWSS Project effective 2001.	Partly effective. Currently a problem project due to institutional difficulties in implementation. A new rural water strategy is under preparation.
Continue LWCP, support research on water use efficiency.	Done. LWCP successfully completed, follow up GSCP underway. Support to research was provided 1996-9 under ASMSP project.	Effective. LWCP had demonstration effect and saved some water. Successor project GSCP is scaling up lessons.
Support dialogue on participatory irrigation management and prepare a spate improvement project.	Done. WBI workshop 1998. Irrigation Improvement Project (IIP 2001).	Not so far effective. IIP currently a problem project due to problems with original design and difficulties with institutional issues. Not clear that WUA/PIM/IMT model is the solution.
Support pilot on groundwater management.	Done. Ta'iz Project 1996-2000.	Partly effective, largely for lessons on what <u>not</u> to do. Project design combining intensification of agricultural groundwater use with contentious rural-urban transfer gave little chance of success.
Promote PSP in urban water, and prepare urban water projects.	Done. WBI workshop on PSP 1999. Sana'a Water Supply Project 1997, Ta'iz WSP 1996, Urban APL 2001.	PSP ineffective. Lease contract did not materialize at end of UWSS in Sana'a in 2002 – political economy, economic instability of country, retrenchment of international operators from risky contracts. Urban project preparation: effective.

There has been little impact on groundwater mining

5.15 The Bank invested considerable resources in dialogue and projects on the groundwater question, pushing on macroeconomic tools like the incentive structure, and financing the comprehensive LWCP, followed now by GSCP. Again, institutional fragmentation and NWRA weakness meant no integrated vision on the Yemeni side, neither to steer the process nor to keep track of progress and report on it. LWCP had some success in demonstrating technical improvements and saved a modicum of groundwater but a sustainable groundwater model has not yet emerged. The lesson is that Bank involvement in groundwater is potentially useful but needs more than just irrigation improvement; Bank support should be conditional on an understanding on the overall integrated framework for groundwater management.

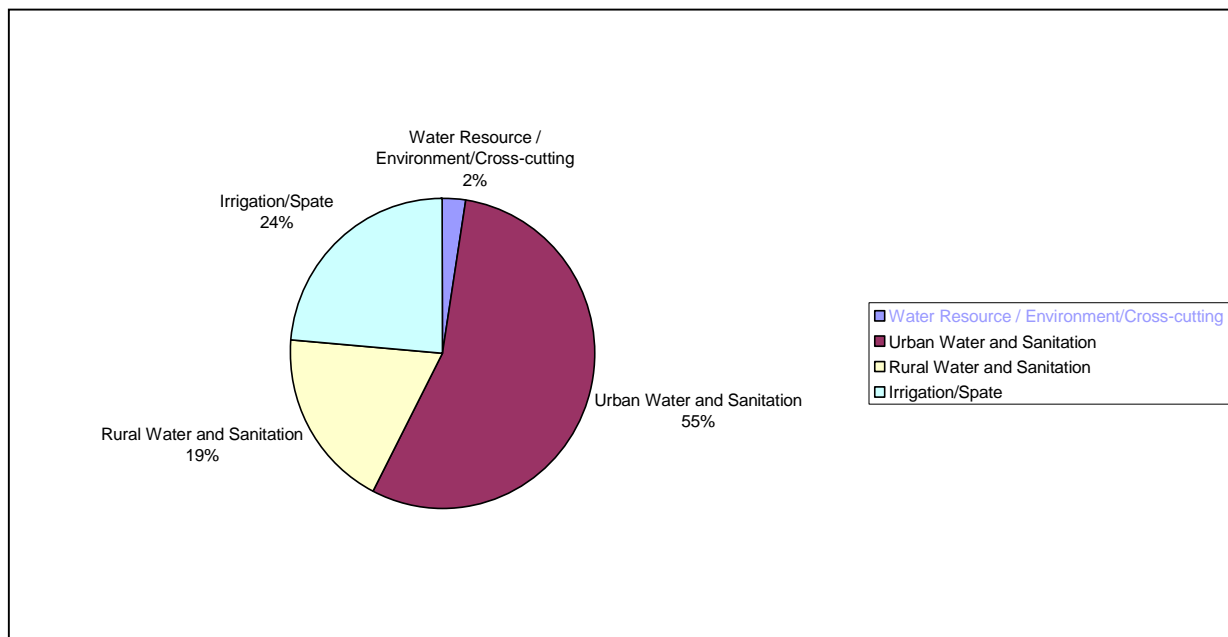
...and no progress on inter-sectoral transfer

5.16 The Bank responded to Government's call to finance the Ta'iz Pilot Project not only in order to relieve the urgent supply problem of the city, but also to try out ways of making equitable rural-urban resource transfers. The project turned out to be unsatisfactory and became a "learning experience" rather than a success (Box 18). The Sana'a Basin Project is now trying out a rather different approach, but the major challenge of inter-sectoral transfer remains to be dealt with. The upcoming pilot for Ta'iz (under UWSS APC) will test market-based transfer approaches. The lesson is that Bank support should be within a framework that provides clarity on which mechanisms – market-based or other – are being promoted, and what is the ultimate governance framework intended.

Public expenditures have improved but in many areas are still wasteful and allocation is biased towards urban areas

5.17 During the last seven years, the Bank has put in a vast effort in helping to improve the quality of public expenditures. In urban water and irrigation, this has paid off, but the quality of GARWSP expenditures in rural water and of AFPPF expenditures on watershed management (dams) has been poor. The Bank has always reviewed the public expenditure program by individual sub-sector (urban water, rural water, irrigation and so on...) and only during the CWRAS exercise was a "water public expenditure review" carried out. The weakness in resource allocation for water revealed by this integrated approach is apparent: for the period 2000-2004, total expenditure appears strongly biased towards urban areas with 55% of expenditure allocated to urban water and sanitation and therefore benefiting around 25% of population. Rural water supply and sanitation receives only 19% of total expenditure for the remaining 75% of the population. Irrigation and spate received 24%, while water resource management received only 3% of total expenditure (see Figure 6). However, the percentage for water resource management would increase if the contribution of spate irrigation structures to recharge of shallow aquifers was recognized. The lesson from this water PER is that the sub-sectoral approach the Bank has pursued for previous public expenditure reviews has not captured fundamental weaknesses in resource allocation for water. Future reviews should take water as a sector for separate analysis.

Figure 6. Distribution of Total Public Expenditures in the Water Sector, 2000-2004



Bank attempts at improving the performance of Yemen’s institutions have so far failed

5.18 Despite the difficulties of working with the administration (Chapter 3 above), the Bank made considerable effort to improve the key public agencies which had an indispensable role to play – NWRA for water resources management, MAI for irrigation, and AREA for research and extension. The context was a dismal one, an essentially dysfunctional civil service – salaries in the year 2000 were 9% of their levels of ten years previously, management was very weak, and the structures seemed unable to absorb technical assistance profitably. There were some high spots – the Rapid Impact Program (RIP) for agricultural research at AREA, for example, and the enthusiasm generated by A21A in MAI. However, with hindsight, there has been little sustainable impact of these initiatives to date. Future Bank interventions in the water sector will need to address the institutional issues more explicitly, working in partnership with donors and using the framework developed in Chapter 3 above.

Making the Most of the Bank’s Comparative Advantage

The Bank’s comparative advantages as a development partner in the water sector in Yemen are considerable...

5.19 Based on worldwide experience, and particularly on the experience described above, the Bank’s comparative advantages as a development partner in the water sector in Yemen are considerable. Typically, the Bank can bring global expertise to bear, and provide strategic thinking skills, with good linkages between macro, sectoral and inter-sectoral issues. In general, the Bank has a willingness to take risks and innovate. In Yemen, the Bank has developed

experience through three decades of sector work and lending, with a generally successful track record. The Bank has shown a capacity to back up advice on policy reform with lending, and vice versa. This has been matched with an ability to access the highest levels, to work across government agencies and between government and civil society, and to link field work – talking to farmers, for example – to policy and program decisions. The Bank has also demonstrated its staying power in Yemen’s water sector, in the shape of continuity of advice and investment. The consistency of Bank support for long term processes and programs backed by flexible long-term instruments has been considerable (see Box 19).

Box 19: The Long Term Nature of Bank Commitments in the Water Sector

Over the last ten years, the Bank has been a consistent policy advocate and investment lender in the following areas of the water sector:

- ◆ water strategy work (continuous inputs from 1995 onwards)
- ◆ groundwater management (beginning in 1993 under LWCP, now supported by GSCP and the Japanese financed CWMP)
- ◆ integrated basin water resources management (beginning in 1999, now supported by the Sana’a Basin APL).
- ◆ urban water reform (beginning in 1996, now supported by the Urban Water Supply and Sanitation APL)
- ◆ rural water (sector work beginning in 1996, now supported by the RWSS Project and by technical assistance under the global Water and Sanitation Program)
- ◆ spate irrigation reform (sector work beginning in 1997, now supported by the Irrigation Improvement APL)
- ◆ resource allocation (sector work including a review of AFPPF in 1998 and a water sector PER in 2004)

WBI has also contributed consistently to the reform program in water resources management, urban water and irrigation.

5.20 The Bank’s position and performance has also brought the respect of the donors and their trust in playing a lead role in donor coordination. Finally, the Bank has breadth in Yemen, with a wide palette of operations and the ability to make the institutional and programmatic links between them. Good examples are the links in the Sana’a Basin Project between irrigated agriculture, urban and rural water supply and sanitation, health, water resources management and environment. The Bank has also been able to link water sector operations with related operations like civil service reform and local administration support.

... but the Bank has had less impact in sustained capacity building

5.21 On the negative side, an area where the Bank had less impact, based on experience in the water sector in Yemen, is capacity building. Attempts in MAI, AREA and NWRA at training, development of management instruments and education have produced minor results at high cost. It is only at the level of overall sector management that Bank (especially WBI) capacity building performances have had palpable results.

B. WATER AND THE CAS

The 2002 CAS has a major focus on water, including watershed management

5.22 The 2002 CAS has an excellent analysis of the water sector, notably identifying the groundwater overdraft as a major problem. The CAS points out that the poor are more dependent on rainfall and spate irrigation, and argues that where groundwater runs out, farmers may revert to those simpler systems. The policy and program implication of this finding is that investment in watershed management is important.

... and underscores the need to get the incentive structure right

5.23 The CAS highlights some minimum conditions for sustainability: (i) investments in aquifer recharge, in runoff capture and irrigation efficiency; (ii) a progressive shift of emphasis from irrigated agriculture back to rainfed and spate fed agriculture, combined with a new emphasis on non-farm rural enterprise; and (iii) getting the incentive structure right by raising diesel tariffs. The water sector is a focus of Bank economic and sector work and lending, under the CAS program “ensuring environmental sustainability” (Table 14)

Table 14: The CAS Program and Water

LENDING		ECONOMIC AND SECTOR WORK	
FY 2003	US\$	FY 2003	US\$
Urban Water APC	130.0	PER	150,000
Sana'a Basin APC	40.0	Water Sector Reform	80,000
FY 2004		FY 2004	
GSCP	35.0	PER	150,000
		Water Sector Reform	90,000
		Coastal Aquifers Development	100,000
		Poverty Assessment	150,000
FY 2005		FY 2005	
		PER	150,000
		Water Sector Reform	90,000
		Agricultural Export Strategy	200,000
		Development Policy Review	200,000

C. IMPACT OF BANK INTERVENTIONS ON POVERTY REDUCTION

Water and the PRSP

Poor water management creates poverty....

5.24 The Bank has attached increasing importance to the water sector worldwide because of the demonstrated links between access to water and the Bank's overriding poverty reduction goal. Nowhere are these links closer than in Yemen, where the groundwater overdraft, degradation of watersheds and low access to safe water and sanitation are amongst the principal motors of impoverishment. The present section, therefore, reviews linkages between poverty and the water sector and assesses the contribution of Bank water programs to poverty reduction.

The Yemen PRSP analyses these water and poverty linkages

5.25 The PRSP highlights four major poverty challenges in Yemen (Box 20). All of them affect or are affected by the water sector.

Box 20: Yemen's Four Major Poverty Challenges

- ◆ high population growth
- ◆ water shortages
- ◆ development of human resources, including health and education
- ◆ poor institutional capacity of the state

All these challenges affect water – or are affected by it.

Source: PRSP

...for water supply and water resources management

5.26 PRSP correctly cites “efficient and equitable water resources management as critical to poverty reduction”. The PRSP draws out the poverty linkages in urban supply and sanitation (low coverage, scarcity of the resource, polluted water); in rural supply and sanitation (very low coverage, strong impacts on health, education and gender); and in water resources management (overemphasis on supply management, conflict between private rights and public interest, weak management and regulatory capacity and the need to act on wastewater reuse).

...and for agriculture and irrigation

5.27 In agriculture and irrigation, the PRSP highlights the negative poverty impacts of water use, noting that water resource capture is unsustainable and anti-poor, as current access is inequitable, and the current de facto water rights pattern and water mining practices exacerbate inequalities. The PRSP also points out the high impact on poverty that intervention in agriculture and irrigation would have: agriculture is the biggest but poorest sector, and agricultural water use efficiency is key to raising incomes and reducing poverty.

Environmental degradation drives poverty too

5.28 The PRSP has also an excellent analysis of the impact of environmental degradation on the poor, an analysis that supports the productive logic that environmental degradation can drive poverty, rather than the more usual litany that “the poor are destroying the environment”.

Are Bank water interventions in Yemen pro-poor?

5.29 The previous subsections have highlighted the interactions of water and poverty. This subsection now assesses Bank water programs in Yemen through the poverty lens.

Investment in water supply and sanitation is pro-poor, especially rural water

5.30 Clearly investment in improving access to safe water and sanitation is pro-poor, and the Bank’s focus on this materially contributes to poverty reduction. Up to now, the Bank has focused on urban water, an approach justified by the presence of a viable reform program. However, it is clear that rural water represents a more pro-poor investment, as poverty is overwhelmingly a rural phenomenon and there are numerous “multiplier” effects of rural access to safe water and sanitation in terms of health, education and gender impacts. Costs per capita are much lower in rural areas too. The constraint to broader Bank involvement in rural water has been the lack of a viable strategic and institutional framework. The lesson is that first priority should go to establishing the framework and learning lessons from the current RWSS Project. Thereafter, there would be a poverty reduction argument for shifting the emphasis of Bank water supply and sanitation interventions progressively from urban to rural areas and to actions on gender.

The urban tariff structure merits review from a pro-poor perspective

5.31 Within urban water supply and sanitation, the Bank has supported a tariff policy that aims at a high level of cost recovery but with cross-subsidy of poorer elements. However, implementation of the policy has not produced the desired effect, as almost all water users fall within the lifeline tariff block. Government’s NWSSIP includes a proposed review of the distributional impacts and of options for making the tariff structure more pro-poor. In addition, NWSSIP also proposes better consultation on service levels that people are prepared to pay for.¹¹

Support to spate irrigation is generally pro-poor, but elite capture is a risk

5.32 Investment in spate irrigation systems is generally pro-poor, as most scheme farmers are poor. However, the current experience in the Irrigation Improvement Project (IIP) raises the problem that the initially inequitable land holding patterns on the Tehama schemes may lead to a form of “elite capture”. Working through community based farmer organizations is one way that makes interventions in irrigation more equitable, but it will have to be shown that this approach produces a pro-poor impact before scaling up the model.

¹¹ This was an issue in the KfW-financed Hajja system, where high supply costs drove tariffs up to quite unaffordable levels, making full recovery of even O&M costs impossible.

Similarly for groundwater, combating mining is pro-poor, but the better-off may capture most benefits

5.33 In water resources management, the key issues are groundwater mining and watershed management. Groundwater mining certainly has a negative effect on the poor, so in principle all actions directed to reduce mining should have at least a generalized pro-poor character. Under LWCP, a pro-poor filter was applied to the project's subsidized investments in water use efficiency by means of a ceiling on the area that the project would cofinance. However, this proved a weak mechanism and there was certainly a bias towards the better off who had land and water and could afford the cost sharing.

Water user associations are a means of including the poor in benefits

5.34 It is clear that the better-off farmers now control the lion's share of groundwater and therefore Bank-supported actions to reduce overdraft will inevitably have to deal with those farmers. There is this risk of exclusion of the poorer farmers, the landless and women.¹² The design of the Japanese-financed CWMP (see Box 10) attempts to deal with this problem by promotion of water user associations that integrate all water users, from big well owners to those who own no resource at all, on the basis of common responsibility.

Watershed management improvements can have a high impact both on water and on poverty reduction

5.35 Watershed degradation has a deleterious impact on poor people's livelihoods, both upstream and downstream. Improvement in watersheds can have a correspondingly positive impact on poverty reduction (see Box 12 above). The Bank has invested only in partial approaches (under LWCP, Ta'iz Project, Sana'a Basin), never yet in a broad watershed management operation.

Thus, the Bank should do more in rural water, in promoting water user associations and in watershed management

5.36 This analysis suggests some areas for more emphasis in future because of their demonstrated pro-poor impact:

- More emphasis on well targeted and efficient rural water supply and sanitation, including an accent on gender, sanitation, hygiene and environmental health.
- Pushing for a more pro-poor tariff system in urban water supply.
- Encouragement of water user associations generally and especially as a component in integrated approaches to groundwater management.
- Investing in watershed management, adopting participatory mechanisms and a broad poverty alleviation approach.

D. CHANGING ATTITUDES TO WATER: THE POLITICAL ECONOMY OF WATER SECTOR REFORM AND THE BANK'S ROLE

¹² This was an issue in the Ta'iz Project where there was a debate on the ethics of a Bank project dealing directly with the "sheikhs" who controlled most groundwater rather than with water user associations who were poor and needy but did not actually "own" much water.

There are many discordant voices in water in Yemen, some for reform, some not

5.37 Stakeholders in water include political leaders and parliamentarians, central and local government, traditional leaders, NGOs, the private sector, the media, farmers and domestic water users. Table 15 gives a brief characterization of each of these stakeholders. As Yemen remains dependent on external support, donors are also stakeholders. Donors are powerful agents for change because of their investment resources and the accompanying ability to influence what the Government does.

Government attitudes are changing, driven by water shortages and fiscal crisis

5.38 Until recently, Government policies have been promoting the rapid development of water resources and use. Examples of these policies include:

- Public investment in water resources development.
- Subsidies to private investment and use of water.
- Development of an unregulated market economy.
- A legal framework allowing individual appropriation of the water resource.
- Donor support directed to increasing water supply and use

Now, scarcity of water and economic crisis are forcing changes. The thinking on change began within Government in the early 1990's, driven by the emerging shortage of water and growing fiscal crisis.

Other stakeholders too are now more likely to be motivated by conservation or by desire for better services

5.39 Attitudes of other stakeholders have been changing too. Where farmers previously looked on groundwater as a limitless bounty, they see now that further development of groundwater is a negative sum game. A typical user would wish to limit further extraction – provided that his own existing rights were assured. A keen constituency for groundwater recharge has emerged, driving the contentious small dams program. In potable water, consumers are starting to consider that paying more for better levels of service may be preferable to poor quality subsidized options. The powerful donor community, after two decades of financing expansion, is now promoting financial and resource sustainability.

The state is now playing a more catalytic role, adopting a poverty alleviation mandate

5.40 Important changes have occurred in the way in which the state's role in development is understood. There is no unanimity or homogeneity in this understanding, but the evidence shows that Yemen is moving away from planned subsidized regimes towards a revised model of development with more emphasis on partnership, user involvement, greater cost recovery, local initiative and sustainability. In both urban and rural supply and in irrigation, this is contributing to a more business-like approach to the financing and running of water projects. At the same time, the state's role in steering development for the benefit of the poor is clearer and non-market interventions have an increasingly pro-poor cast.

Table 15: Water Sector Stakeholders - Their Interests and Attitude to Reform

The stakeholders	Vested interest	General reform stance	What is required of them?	What would make them more reform-minded?
Political leaders	Patronage Risk aversion	Generally anti	Initiate and champion change.	Sustained top level contacts, adjustment dialogue, EDI programs.
Central government	Pro-poor development mandate	Generally pro	Commitment, decisions, actions.	Sector analysis, workshops, projects, adjustment operations, EDI programs.
Parliament	Pro-poor development mandate Patronage Populism	Generally anti	Commitment, leadership, laws.	Seminars, discussions, EDI programs.
Sheikhs and 'ulama	Authority derived from status quo	Anti	Adaptive capacity, reconciliation of old and new .	Informal sessions.
Local government	Local development mandate	Generally pro	Implementation, working with the grass roots, education.	Projects.
NGOs	Public interest Ethical motivations	Pro	Advocacy, grass roots mobilization and implementation.	Seminars, projects.
Private sector	Profit motive	Pro	Management, capital, entrepreneurship.	Seminars, WBI program, projects.
Press and media	None	Pro	Public awareness, education, opinion forming.	Briefings, involvement in public awareness campaigns, EDI.
Large farmers	Water rights (to lose)	Anti	Adoption of difficult adjustments, change of water use behavior.	Public awareness, changes in incentives, support projects and programs, water user associations.
Small farmers	Water rights (to gain)	Pro	Adoption of difficult adjustments, change of water use behavior.	Public awareness, changes in incentives, support projects and programs, water user associations.
Domestic users	Subsidized tap water	Generally pro	Acceptance of higher tariffs for better service.	Public awareness, improved service, pro-poor tariff structure.

These factors are focusing Yemen's water policy equally on management and development

5.41 The natural resource constraint, the crisis in the public sector and the change in the view of the role of the state together are combining to move Yemen's water policy from its "unregulated development and expansion phase" to its "management phase" and from a preoccupation with supply alone to increased awareness of the need for demand management.

Awareness and reform are slow maturing

5.42 This readiness to consider change has been slow to come in water management. Generally, this is consistent with experience in many countries where two to three decades have elapsed from the first sign of a problem in natural resource management to a final stage of effective and decisive action to deal with it. The slow and reluctant development of awareness in Yemen fits this global experience.

...but can be helped along by “decisive moments”

5.43 Reform has, however, been helped along by certain “decisive moments”. The “shock” of the Ta’iz water shortages in 1995 is one such decisive moment that accelerated Yemen along the policy curve, in that case acting as a driver of the urban water reform program.

Those who benefited from the earlier fast development of water may now stand to lose

5.44 In agriculture, the politically powerful, the tribal leaders and a large number of farmers with access to capital have gained, and will seek to consolidate those gains. By contrast, poorer townfolk and smaller farmers have suffered. In water supply and sanitation, urban dwellers have done better than rural, and are likely to continue to do so. Government and politicians were definitive “winners” in the “development period” as the allocation and development of water were sources of power and patronage. The “management period” is much less attractive, as it involves price rises and restraints on use and the poverty objective transfers resources from the politically stronger to the politically weak. Demand management and pro-poor programs are not first choices for an unconstrained political establishment; hence the role of education, catalysts and leadership is vital.

Dealing with the “political economy of reform” requires time, dialogue, opportunism, incentives, leadership ...

5.45 Clearly, understanding the political economy of reform has considerable explanatory power about what will work and what will not. It also indicates ways to increase the chances of reform passing successfully. First, reform requires support from stakeholders, and support requires both a learning process and time; education and patience are indicated. Second, the role of catalysts and educators is important. Donors can contribute materially in this role. Third, the twin motors of change are necessity and opportunity. The greatest change will happen when the problem is most pressing – as with groundwater overdraft – and when the time is right – as with a politically favorable conjuncture occasioned by a decisive moment. Opportunism can push difficult reforms through. Fourth, there is a certain “adaptive capacity” in every community, more or less pronounced and powerful. Understanding this adaptive capacity is the key to predicting and promoting change. At the local level, for example, this is the basis for the proposed community self-management of water to be tested under the Japanese-financed CWMP (see Box 10). Fifth, no one will act against their will, and the correct incentive structure is essential. Negative incentives like price rises must be matched by positive incentives like better service levels, more ownership and control, subsidies targeted to produce socially optimal outcomes, etc. Finally, leadership is imperative. The creation of MWE, urged by donors, justified by the pervasive institutional clutter, and made possible by vacancies, was a wise decision from the top.

6. THE PROPOSED BANK PROGRAM

6.1 The preceding chapter set out the lessons learned from Bank experience in Yemen's water sector, the Bank's comparative strengths and weaknesses in supporting Yemen's water sector, and the political economy context within which Bank must work. This final chapter proposes ways of working for the Bank, highlights key areas of intervention, and outlines a Bank program in water for the next ten years.

A. PRINCIPLES FOR BANK INTERVENTION

6.2 This section sets out the "rules of engagement" that are proposed to guide the Bank's work in the water sector in Yemen. They are based on current practice and on the lessons of experience.

The approach should be strategic

6.3 Clear intervention criteria are needed for deciding which subsectors the Bank should be involved in. The subsector must:

- Offer the chance of high impact interventions.
- Have clear links to CAS and PRSP priorities.
- Evidently contribute substantially to reducing poverty sustainably.

...with tactical prioritization

6.4 Water in Yemen is a vast problem in a poor country and each subsector is complex, so there is need for focus on which actions to support and how to support them. The following checklist shows characteristics of what are likely to be best practice interventions. In general, the Bank should:

- Invest only in an agenda that is doable and a policy that is practical.
- Use projects to carry through advice and reform.
- Appraise the "political economy" of any particular reform and ensure that constituencies have adequate incentives to change.
- Prioritize "hot spots" where there is a key need.
- Start with an operation that is likely to succeed, so that later operations can build on success.
- Use pilot projects to test innovations – but only if they are high return, not just high risk.

...and inclusion of some "triggers" for (a) continuation and (b) expansion of Bank activities in water

6.5 The Bank has a portfolio of five ongoing water sector projects: UWSS, Sana'a Basin, RWSSP, Irrigation Improvement (IIP) and GSCP. Of these five project, two – RWSSP and IIP – are currently rated as problem projects. If implementation problems continue their ultimate development effectiveness – including their ability to move forward the sector reform agenda – could be jeopardized. Therefore, returning these projects to satisfactory implementation status has to be a precondition for continuation not only of the project but also of Bank action in the

relevant sub-sector. Efforts must therefore be concentrated on achieving timely implementation – with restructuring if need be – and successful implementation and the achievement of project development objectives should be the triggers for continuation and expansion of Bank activities in the relevant sub-sector. Alternatively, if implementation performance cannot improve, there has to be agreement to cancel projects if they are jointly agreed to be no longer useful. In addition, new operations would be dependent on achieving APC triggers for a second phase or on achieving agreed benchmark performance under NWSSIP. The proposed triggers are set out in Table 16 below.

Table 16: Ongoing Bank’s Water Sector Projects and Ratings

Project	Current IP rating	Trigger for (a) continuation and (b) expansion or second phase
UWSS (APC)	S	(a) none (b) APC triggers and NWSSIP benchmarks
Sana’a Basin (APC)	S	(a) None (b) APC triggers
RWSSP	U	(a) RWSSP satisfactory on IP and DO (b) RWSSP satisfactory on completion, sector strategy in place, NWSSIP benchmarks
IIP (APC)	U	(a) IIP satisfactory on IP and DO (b) APC triggers
GSCP	S	(a) None (b) GSCP satisfactory on completion, CWMP satisfactory on completion.

Long-term-commitment is required

6.6 Water reform can take 25 years and the Bank needs to make a long-term commitment on its side, whilst expecting the same from Yemen. The Bank needs to:

- Build ownership and leadership on the Yemeni side.
- Sustain commitment from Bank staff and management.
- Make a long term commitment of resources for both investment and for dialogue and economic and sector work.
- Use APCs (as now) to support a sequence of piloting, reform and investment in economic and sector work (ESW), use a multi-annual “programmatic” approach in line with the MENA strategy.
- Maintain a strategic vision with long term consistency and flexibility, with monitoring updated with Government from time to time.

Programs should work to Government's strengths – and around its weaknesses

6.7 Government and governance in Yemen are extraordinarily weak. The Bank needs to:

- Create a partnership with Government but focus the dialogue on what Government can or must do – essentially the economic and incentive framework, setting sector policy and allocating public expenditures.
- Provide structured capacity building support to key public sector functions (working with WBI).
- Work around Government as far as possible on other aspects, working with civil society, the private sector, community based organizations, universities, water user associations, NGOs, grant aided projects.
- Promote the transfer of Government's remaining service delivery functions to decentralized, locally accountable and financially autonomous entities like WUAs and LCs.

The Bank should work closely with donors

6.8 The weakness of Government and the strong interest of donors in working together on water show that Bank needs to:

- Form stable partnerships with donors, in which the comparative advantage and area of intervention of each is clear.
- Identify grant donors that can carry through key pilot projects or take on the complexities of multi-institutional and multi-functional investments..
- Agree cofinancing arrangements for areas of common interest and varying comparative advantage – for example, in capacity building.

...and ensure that internally it has a coordinated and integrated approach

6.9 Working well together across sectors and with the Country Department is vital to a coordinated and integrated approach to water. The Bank needs to:

- Maintain constant exchange of information and meet regularly to coordinate.
- Develop an integrated “matrix” approach to work on water, so that within programs (CAS, Business Plan, annual budgets etc) the whole water program is in view, not just a sub-sector or a particular departmental work plan.

B. AREAS OF BANK INTERVENTION: WHAT WILL THE BANK NOW DO DIFFERENTLY?

6.10 This section, based on the preceding analysis, proposes a near term (2006-2008) program for the Bank in water, to coincide with the next CAS period; and a longer term (2008 -2015) **indicative** program to show what long term issues the Bank should be working on. Table 13 summarizes the proposals in matrix form, linking them to sector objectives and proposing criteria for judging success.

On Sector Policy and Governance

Bank actions in the water sector should be in the framework of a long term strategic partnership

6.11 The Bank should work with Government to agree on the water component of the upcoming CAS, together with a long term (ten year) program of interventions, consistent with a strategic approach and with the principle of long term (mutual) commitment in the water sector. This approach has begun: the Bank has signed a joint donor memorandum of support for NWSSIP and Government has confirmed its agreement to CWRAS and its proposals. The next step is to agree on implementation triggers for continuation of on-going projects and initiation of new projects, then a process of debate and adoption, agreement on the CAS and on the longer term program, then implementation.

- Start with an operation that is likely to succeed, so that later operations can build on success.
- Use pilot projects to test innovations – but only if they are high return, not just high risk.

...with multi-annual programmatic economic and sector work

6.12 As part of discussions on CWRAS, the Bank and Government have agreed on a multi-annual agenda of “programmatic economic and sector work” (PESW) linked to key sector problems and objectives. Specific topics (for details see following paragraphs) include: improving sector governance; getting the incentive structure right; improving financial resource allocation; developing a workable model for sustainable groundwater management; developing options for market-based rural/urban water transfers; and fine-tuning the water supply and sanitation reform agenda (urban and rural) with a pro-poor focus. The Bank has also agreed to take part in semi-annual reviews of NWSSIP purposes, and help (under PESW) establish a system for monitoring progress on NWSSIP, and to participate actively in donor coordination.

The Bank should assess the scope for capacity building and institutional development for the water sector

6.13 In order to help improve sector governance, the Bank should assess the scope for capacity building and institutional reform for the water sector. There are two relatively strong candidates for support: (i) capacity building of MWE, which is a completely new agency with strong management but few staff or procedures – a well targeted input could pay high returns and a WBI mission in February 2005 has already begun to explore options; and (ii) support to implementation of A21A, which has been “ready to implement” for some time, and where an FAO-supported pilot phase has already started. Support to A21A could possibly be provided under the upcoming agricultural Rainfed Areas Project. However, past experience reveals both poor results from capacity building support and no strong Bank comparative advantage (see Chapter 5 above), so care is needed: such programs are high risk. Other donors have had more success: the Bank should go forward on capacity building but with the involvement of WBI and with the participation with other donors.

...and help to resolve the institutional location of irrigation and watershed management

6.14 Another area where the Bank may be able to contribute to sector governance is on the question of two key water management functions currently located in MAI: irrigation and watershed management. NWSSIP proposes some coordination mechanisms, but Yemeni experience is that coordination is a very weak instrument where institutional mandates are concerned. The Bank will, therefore, pursue the dialogue with Government about alternative configurations. This could include the option of bringing irrigation and watershed management under MWE, but experience of transfer of MAI responsibility to NWRA in the past has not been encouraging, and a broader range of options may need to be considered. If needed, the Bank could finance a study under PESW.

The Bank should conduct public expenditure reviews specifically for the water sector

6.15 Resource allocation is an area of policy where the Bank has both expertise and experience. In future, public expenditure reviews the Bank should take water as a sector for separate analysis. The Bank should also follow up with Government on how to resolve the problems of AFPPF and the related dams programs, and should consider the possibility of working through AFPPF in a future operation such as the Rainfed Areas Project.¹³

...and advance the dialogue on incentives to agreement and implementation of broad-based reform of the incentive structure, considering the possibility of adjustment lending

6.16 The incentive structure is key, and one of the few levers through which Government can have a strong influence on water use. Dialogue on incentives has hitherto been scattered, largely identified with an uphill battle over the diesel price. The incentive structure study proposed under NWSSIP will cover the whole range of economic incentives and allow Yemen to select packages that are coherent in relation to objectives and are viable in terms of balance of “positive” and “negative” incentives. The Bank should help finance this study under PESW, as its conduct and conclusions are critical for sector development. Subsequent dialogue should push the recommendations of the study to decision and implementation, possibly with the help of adjustment lending.

On Water Resources Management

The Bank should support the basin planning approach

6.17 In water resources management, the Bank should work wherever possible within the integrated framework of basin plans, so that investments – whether in water supply, irrigation or watershed management – support integrated development goals. The Bank should also finance the preparation of the Sana’a basin plan, as there are very strong links to two ongoing operations (Sana’a Basin Project and Sana’a Water Supply and Sanitation Project).¹⁴ The Bank should also continue support for the APL first phase for Sana’a Basin, using it as both workshop and showcase. The second phase should be supported if the triggers are met.

¹³ One proposal under NWSSIP is to involve donors in AFPPF financing, even nominally, in order to increase transparency and effective use of AFPPF funds.

¹⁴ Government has requested financing for the Sana’a basin plan from GSCP.

...working with NWRA largely at the local level

6.18 As previously, NWRA is an essential partner in Bank operations, notably in the Sana'a Basin Project. The Bank should continue this style of work with NWRA, especially at the decentralized and branch level. The Bank should not provide direct capacity building support to NWRA headquarters as other donors (UNDP, Netherlands, GTZ) have some comparative advantage for this, and the Bank's record has been poor.

A watershed management project should be prepared

6.19 The Bank should review the scope for an integrated, poverty-focused watershed management operation, with a view to preparing and financing the operation in the future.

A major focus on groundwater should include emphasis on water use efficiency, user associations and community self-management

6.20 The Bank should continue its involvement in the groundwater agenda through GSCP, which focuses on water use efficiency, and through the Japanese-financed CWMP (see Box 10) which adds the dimension of community self-management over a sub-basin.

...and support to a "groundwater network"

6.21 The Bank should also push for a broader approach to the problem of groundwater. This is an area where there are many ideas (Chapter 3) and a number of proposals in NWSSIP. Through the PESW program, the Bank should support some form of "groundwater network" that would bring together actions on groundwater and allow monitoring, learning and scaling up (see Box 21).

Box 21: Proposal for a Groundwater Network

Actions to tackle the groundwater problem are scattered. A network of committed professionals could be set up to facilitate a more integrated learning approach. The network could draw its membership from professionals in Government, in the broader community of practice in universities and consulting firms, in NGOs and civil society, and from amongst the donors. Activities could include exchange of information on ongoing projects, seminars with key visiting speakers, a newsletter on emerging best practice, publications etc. Such a network would provide a forum, for example, in which the Japanese-financed Community Water Management Project could be tracked, lessons learned and disseminated, and scaling up facilitated.

The Bank should support studies and pilots for inter-sectoral transfer

6.22 The Bank should push for clarity on inter-sectoral transfer, which is a vital area not well developed in NWSSIP and which would benefit from integration within a monitoring and learning framework. The Bank should support the water market pilot project proposed under NWSSIP and conduct related studies under PESW.

On Irrigation

Once the current project is on track and implementing well, the Bank will continue to support reform in spate irrigation through the Irrigation Improvement APC

6.23 The Bank will pursue its investment in spate irrigation under the Irrigation Improvement Project. Once the project is set back on track, the agenda in water user associations needs to be kept under review in those areas where access to land and water is inequitable. Subject to satisfaction of the triggers, phase two of the APC program should begin.

On Water Supply and Sanitation

In urban water, the reform program should be steered towards the MDG targets but with attention to service levels and financial sustainability

6.24 The Bank will continue its support for the urban water supply and sanitation reform program. Although poverty impacts are less than in rural water, the value of Bank involvement is high in:

- Extending coverage and improving service levels where feasible.
- Ensuring that the corporate model works.
- Promoting innovation in private sector involvement.
- Encouraging financial sustainability through cost recovery.

6.25 The Bank will continue its present support under the Water Supply and Sanitation APC, and follow closely the review of the reform program to be conducted during 2004/2005. A second phase of the APC will follow if the triggers are met. Key reform areas where the Bank will look for further action are on:

- Completion of the decentralization program by 2008.
- Establishment of a regulatory function and reorganization of the residual NWSA.
- Pro-poor tariff reform (PRSP recommendation).
- Demand-driven, low cost investment options.
- Real financial autonomy of the LCs and, ultimately, full self-financing.

In addition, the Bank should also provide support on planning future supply side investments, including supply from underutilized aquifers, desalination and gray water reuse.

Involvement in rural water supply and sanitation should increase

6.26 In line with the Bank's poverty reduction mandate, involvement in rural water supply and sanitation will increase, subject to successful implementation of on-going project and reforms. In the current phase, the Bank is supporting development of best practice through the RWSS project, and (in part through the global Water and Sanitation Program) will support the development, discussion and adoption of a sector strategy, investment plan and institutional restructuring

program, and promote the establishment of a practitioners' forum (see Chapter 3). Two important linked issues that the Bank should push on are: (i) adequate water resources survey and sustainability of water sources; and (ii) development of a range of technological choices, including technologies not dependent on groundwater resources such as improved traditional rainwater harvesting. Once a satisfactory national strategic plan and good practice emerge from the current RWSS Project, the Bank should begin preparation of a full scale APC program to support rural water supply.

C. FACTORS AND RISKS AFFECTING SUCCESS

The chances of the Bank being effective are raised by the strategic and selective nature of the proposed action plan

6.27 There are several factors that reinforce the chances that the proposed Bank program will succeed. First, it is anchored in ten years of experience with water sector reform in Yemen, which has allowed a focus on the main sector problems and on solutions that are more likely to work. Second, it is congruent with Government's own new strategic plan and relies on recent improvements in organization of the water sector. Third, it is long term, and links actions over the next ten years to specific targets and outcomes. Fourth, it assigns to the Bank activities for which the Bank has some comparative advantage. Finally, it has been discussed and agreed with Government; it will thus be a transparent compact in a long-term partnership in the sector.

Amongst risks the greatest is that political will may fade

6.28 Difficult changes will be required on the incentive framework (for groundwater management), on cost recovery (for water supply and irrigation) and on water rights and markets (for rural/urban transfer). Political robustness, and sheer stamina, will be essential. Failure of political will on these issues will entail continued groundwater overdraft, weakened service delivery, and worsening rural/urban tussles over water. What is needed is sustained dialogue and education at every level, phasing that respects the political economy constraints, and feedback from success, so that politicians have some benefits to show.

The other major risk is weak governance and implementation

6.29 Yemen's public sector shows "institutional weakness" at every level. The risk from weak public sector institutions and the Government's feeble control over events on the ground has been discussed above. The mitigation measures are clear: decentralization, participation, partnerships, all designed to increase the role of civil society and markets as a substitute for the weakness of the public sector. Habits will have to change: the groundwater problem can only be tackled if full responsibility is passed to local communities – regulation simply cannot work in Yemen, at least in the short to medium terms. Similarly, the proposals for restructuring rural water must minimize the public sector role. Otherwise, if an illusory reliance is placed on the public administration, sector performance will not improve. Government and donors will need to be clear in their analysis and firm in their decisions.

Table 17. Yemen CWRAS: The Proposed Bank Program, 2006-2015

Area of intervention and objective	Near term 2006-2008 (next CAS period)	Longer term 2008-2015	Criteria of success
SECTOR GOVERNANCE			
<p>Agree long term <u>strategic partnership</u> with Government</p>	<p>Sign memorandum of support for NWSSIP; deliver CWRAS, agree water component of CAS and longer term water sector program, based on an agreed set of triggers.</p> <p>Agree a program for PESW 2005-2007, including WBI capacity building.</p> <p>Help develop NWSSIP monitoring and evaluation (under PESW), and take part in NSWIP reviews and in donor coordination.</p>	<p>Continue</p>	<p>10-year program agreed with implementation triggers for continuation of on-going projects and initiation of new projects.</p> <p>NWSSIP achieves targeted outputs and impacts.</p>
<p>Improve <u>sector governance</u></p>	<p>Review scope for capacity building and institutional development under PESW (MWE, MAI) and support (with WB1 and in partnership with other donors) if (a) feasible (b) Bank best placed.</p> <p>Pursue dialogue and (if needed) conduct a study under PESW on best placing of institutional mandate for irrigation and watershed management.</p>	<p>Continue</p>	<p>Government's (limited but effective) role clear.</p> <p>Private and decentralized structures managing most tasks.</p> <p>Irrigation and watershed management managed in integrated fashion within overall water resource management.</p>
<p>Get the <u>incentive structure</u> right.</p>	<p>Work with Government on the study of incentives under PESW. Push harder on macro and trade issues, particularly ways to influence private investment and</p>	<p>Consider adjustment lending to support major changes in the incentive structure.</p>	<p>Incentive structure has a demonstrated positive impact on groundwater overdraft and rural/urban transfer without impoverishing the rural</p>

Area of intervention and objective	Near term 2006-2008 (next CAS period)	Longer term 2008-2015	Criteria of success
	groundwater behavior (PESW).		impoverishing the rural economy.
Improve <u>resource allocation</u> .	Conduct “integrated” water PER (under PESW). Participate in review of AFPPF (under PESW).	Continue water PERs. Consider Bank association with AFPPF.	Public resources are targeted at: (a) poverty reduction, especially rural incomes and access to safe water; and (b) sustainability, especially water use efficiency.
WATER RESOURCES MANAGEMENT			
Develop a model for <u>basin management</u> . Develop a model for integrated pro-poor approach to <u>watershed management</u> .	Continue Sana’a Basin Project. Finance Sana’a Basin water management plan (under GSCP). Support NWRA at branch level through SBWMP and GSCP. Identify and prepare a watershed management project.	Finance a watershed management project.	Models for basin management and watershed management developed, tested and scaled up and being applied in other key areas. Demonstrable impact on trends in groundwater overdraft.
Develop a workable, community-based model for sustainable <u>groundwater management</u> .	Implement GSCP. Implement Japanese-financed CWMP. Support a “groundwater network” (under PESW).	Finance a project to support community-based groundwater management on a broad scale.	Model for self-management of groundwater demonstrated and being applied on a wide scale.
Develop a model for equitable, market-based <u>inter-sectoral transfer</u> of water from rural to urban.	Support proposed pilot on water markets and conduct related studies (under PESW).		Urban supply is assured by equitable negotiated transfers.

IRRIGATION			
Develop a model for self-sustaining <u>spate irrigation</u> management.	Continue IIP.	Second phase of IIP based on lessons learned.	Spate schemes are self-sustaining financially. User associations are playing the major role in assuring high service levels.
WATER SUPPLY AND SANITATION			
<u>Urban water supply and sanitation.</u>	Continue urban water APC. Push on review of pro-poor tariff structure under PESW (PRSP recommendation). Take part in review of reform program and follow up on results.	Second phase of APC, with emphasis on increasing coverage and service levels, on PPP, and on self-sustaining management.	Progress towards MDG Urban water supply run as a business (financially self-sustaining corporations, active private sector role).
<u>Rural water supply and sanitation.</u>	Continue RWSS project. Finalize and implement sector strategy and GARWSP reform. Support a “practitioners’ forum” (under PESW).	Continue and expand RWSS financing through an APC with strong pro-poor focus.	Progress towards MDG Human development indicators improve for rural areas.

Table 18: Summary of Proposed Water Sector ESW and Lending in the Medium and Long Terms

Proposed Intervention	Time Frame (FY)
Analytical and Advisory Services (AAA)	
GOVERNANCE <ul style="list-style-type: none"> • Programmatic Sector Work (NWSSIP monitoring and evaluation¹⁵, Incentives Study¹⁶, Study Institutional Mandate for Irrigation and Watershed Management, Study on Sector Wide Approach). • Financial Reform (Water PER, Review of Agriculture and Fisheries Production Promotion Fund). • Learning and Development (Capacity Building in Water and Environment coordinated with WBI). 	2006-2009
URBAN WATER <ul style="list-style-type: none"> • Urban water reform (Review of Pro-Poor Tariff Structure, Review of Urban Water Reform Program, Study on Private Water Providers in Urban Areas, Review of Alternative Water Sources for Urban Supply). 	2006
RURAL WATER <ul style="list-style-type: none"> • Rural water reform (Implementation of RWSS Sector Strategy and GARWSP Reform, Support Practitioners Forum) 	2006-2007
WATER RESOURCES <ul style="list-style-type: none"> • Support to Groundwater Network¹⁷. 	2006
LENDING	
Water Resources/Watershed Management Project	2007
Large-Scale Community-Based Groundwater Management	2007
Second Phase of Sana'a Basin (based on triggers)	2009
Second Phase of IIP (based on triggers)	2008
RWSS /APC (based on performance amount of RWSSP)	2008
Second Phase of Urban Water APC (with emphasis on improved service provision, on PPP, and on increasing LCs and providing support to make them financially sustainable).	2008
Adjustment Lending to Support Incentives Structure	2006

¹⁵Support to design of a NWSSIP M&E system is currently being conducted as part of FY05 ESW.

¹⁶ Under FY05 ESW, support is being provided to Government on drafting TORs for this study.

¹⁷ Support to thinking through options for a groundwater network is currently being provided as part of FY05 ESW.

REPUBLIC OF YEMEN

COUNTRY WATER RESOURCES ASSISTANCE STRATEGY

GENERAL TERMS OF REFERENCE FOR A CWRAS¹⁸

1. Within the Bank, the overall water resources strategy has to be reconciled with the strategies and business plans of the water using sectors. On the whole, the Bank has not handled this integration well. Sectoral strategies have not been coordinated or integrated. At the country level, the CAS/PRSP process has dealt summarily with the complexities of integrated water resource issues, and has tended to focus on selected sectoral issues. To address this, the 2003 Water Resources Strategy identified the need for a cross-sectoral Country Water Resources Assistance Strategy (CWRAS) to integrate the range of Bank programs that have an impact on or are affected by water resources. The core objective of CWRAS is to produce an operational plan for Bank involvement in the water sector. Preparation involves analysis, dialogue, and decisions that:

- (a) pinpoint a country's water challenges and opportunities;
- (b) set those challenges and opportunities within a framework in which long-term objectives, political social and economic constraints, Dublin principles and CAS/PRSP are reconciled in a strategy; and
- (c) set out the action plan that Government and Bank have agreed. The resulting CWRAS is a Bank strategy, but set within the national strategy. CWRAS is a "water CAS, making the Bank/Government water contract explicit and tailored".

2. In January 2003, the Bank's Water Resources Management Group (WRMG) developed interim CWRAS guidelines for practitioners. Describing CWRAS as a "a rolling ten-year plan for the Bank in water, linked to CAS goals", the guidelines set out the recommended content of a CWRAS: (i) analysis of critical water challenges, goals, policies and strategy in the country; (ii) evaluation of the Bank's comparative advantage as a development partner; (iii) assessment of the relevance to the country water situation of the Bank's "overarching" contract through the CAS; (iv) assessment of the impact of Bank water interventions on growth and poverty reduction; (v) a reconciliation of the country situation with the Bank's global water principles; (vi) an assessment of the political economy of reform, and a sequenced prioritized set of Bank activities in support of reform; and (vii) a program of Bank lending and non-lending activities.

¹⁸ Source: Innovation Profile 101: "Agricultural water in the new Country Water Resources Assistance Strategies (CWRAS)" from the Agricultural Water Management Sourcebook (2005).

REPUBLIC OF YEMEN

COUNTRY WATER RESOURCES ASSISTANCE STRATEGY

ON-GOING BANK WATER PROJECTS IN YEMEN

LENDING

1. *Sana'a Basin Water Management Project* – US\$30 million.

This 5-year APL project was signed August 26, 2003 and became effective January 2004. The Project is planned to assist Yemen in (i) increasing the efficiency of agricultural water use within the Sana'a Basin; and (ii) accelerating aquifer recharge to allow for a gradual shift to a less water-based rural economy. The objectives are designed to be attained through demand management and irrigation improvement; supply management and recharge improvement; institutional development/capacity building; information/public awareness; and environmental management.

2. *Urban Water Supply Project* – US\$ 130 million.

This project was approved in FY03, and will improve water supply and sanitation services in urban areas, to support the local corporations to become financially viable and to create opportunities for increase private sector participation. Project implementation is progressing satisfactorily and works contracts for Sana'a, Hodeidah, Taiz (soon Al Mukalla) have been signed. Though no bids were received for the Sana'a lease contract, agreement was reached recently with the Government to proceed with preparation of tenders for a management contract and to plan for broader promotion among major private operators.

3. *Rural Water Supply and Sanitation Project* – US\$20 million

This project was signed on Dec. 22, 2000 and became effective on October 23, 2001. The objective of the 5-year project is to expand sustainable rural water supply and sanitation (RWSS) service coverage to about 400,000 mostly poor rural dwellers in ten governorates. This would be achieved by: (i) introducing to Yemen a worldwide proven demand-responsive, decentralized, community-managed, RWSS development approach; (ii) assisting the Government in building and strengthening local RWSS capacity; and (iii) helping Government to formulate the agreed, demand-responsive approach (DRA) principles in a coherent RWSS strategy, and to prepare a long-term (10-15 years) national RWSS investment program that could be supported by the Bank and other donors in coordination with the Social Fund for Development (SFD) and Public Works.

4. *Irrigation Improvement Project* – US\$21 million

This project was signed on Oct. 23, 2000 and became effective on January 18, 2001. The objective of this APL is to ensure sustainable water resources management in the seven main spate irrigation schemes in Yemen, contributing thereby to improved agriculture productivity and smallholder income in these areas. To achieve this, the schemes would be rehabilitated, intensive agriculture demonstration program implemented, and institutional changes introduced.

5. *Groundwater and Soil Conservation* - US\$40 million

The objective of this project is to assist GOY in promoting groundwater conservation in farming areas and increasing surface and groundwater availability through: (i) improving irrigation water use efficiency; (ii) improving recharge and protection of watersheds; and (iii) supporting the groundwater management and institutions that will have the incentive and capacity to manage local water resources sustainably.

ESW

1. ***Implementation of Country Water Resources Assistance Strategy*** (US\$68,000 (Bank Budget and BNWPP))

The objectives of this task are to: (i) develop a monitoring & evaluation framework for NWSSIP; and (ii) propose establishment of a groundwater task force that will consider strategic options that are feasible for Yemen.

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