Yemen's Water Sector Reform Program – A Poverty and Social Impact Analysis (PSIA)

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Ministry of Water and Environment | Ministry of Agriculture and Irrigation

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In the name of Allah, the Beneficent, the Merciful

“Say: Have ye thought: If (all) your water were to disappear into the earth, who then could bring you gushing water?”

Su’rah LXVII – Al-Mulk (the Sovereignty) Verse XXX

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Acronyms

AFPPF	Agriculture and Fisheries Production Promotion Fund
AREA	Agricultural Research and Extension Authority
CWRAS	Country Water Resource Assistance Strategy
DIA	NGO involved in rural water supply and sanitation programs
EPA	Environmental Protection Agency
FAO	Food and Agriculture Organization of the United Nations
GARWSP	General Authority for Rural Water Supply Projects
GSCP	Groundwater and Soil Conservation Project
GTZ	Deutsche Gesellschaft fuer Technische Zusammenarbeit (GTZ) (German Technical Cooperation)
HBS	Household Budget Survey
IIP	Irrigation Improvement Project
IWRM	Integrated Water Resource Management
JSDF	Japanese Social Development Fund
KfW	Kreditanstalt fuer Wiederaufbau (German Development Bank)
LC	Local Corporation
LWCP	Land and Water Conservation Project
MAI	Ministry of Agriculture and Irrigation
MDG	Millennium Development Goal
MoLA	Ministry of Local Administration
MoPIC	Ministry of Planning and International Cooperation
MWE	Ministry of Water and Environment
NWRA	National Water Resources Authority
NWSA	National Water and Sanitation Authority
NGO	Non-governmental organization
NPS	National Poverty Survey
PAWS	Programme Aid to the Water Sector (Dutch financing)
PPP	Private Public Partnership
PIP	Public Investment Program
PRA	Participatory Rapid Appraisal
PWP	Public Works Project
SBWMP	Sana'a Basin Water Management Project
SFD	Social Fund for Development
SURWAS	Support to Rural Water Supply and Sanitation (closed Dutch project)
WTO	World Trade Organization
WUA	Water User Association
WUG	Water User Group

Executive Summary

Six Key PSIA Messages

1. Decentralized water management, a stakeholder partnership approach and secure water rights may gradually reduce the rate of groundwater overdraft. However, the pace of change at the local level is extremely slow. ***Institutional reforms in water resources management and irrigated agriculture should be pursued and accelerated. More resources and a long term commitment to reducing groundwater overdraft are essential***.

2. Farmers should be able to reduce water use whilst at least maintaining their incomes, but getting more farm income per drop will plainly require considerable effort beyond what is currently being done. ***The most emphasis has to be given to the range of measures in NWSSIP designed to promote water productivity in agriculture, particularly for poorer farmers***.

3. The top priorities in rural water supply and sanitation have to be mobilizing all concerned behind a single reform program in preparation for a sector wide program, and improving GARWSP's institutional performance by completing decentralization and paying attention to the neglected but important poverty focus and social aspects. ***Implementation of reforms in rural water and sanitation needs to be seriously speeded up*** if Yemen is to have hope for increasing access of the rural poor to affordable and sustainable safe water on a scale large enough to attain its NWSSIP and MDG targets.

4. The key to success of NWSSIP implementation overall will be constant and equitable application of both regulation and incentives. More broadly, ***ownership of NWSSIP needs to be strengthened so that the nation supports a water sector reform seen as both beneficial and fair.***

5. The sequencing and dosage of reforms and support are important. Prices have gone up, some water is being saved, but so far, reform has not been pro-poor, and corrective action is required if pro-poor outcomes are to be achieved. ***The water sector reforms are best implemented as a reform package***.

6. ***There is the need for (massive) support to improving productivity to restore incomes, particularly for the poor***. This is the most important message of this PSIA.

Source: Authors' compilation

This paper presents the findings of a Poverty and Social Impact Analysis (PSIA) of Yemen's water sector reform program. PSIA is the analysis of the distributional impacts of policy reforms on the well-being or welfare of different stakeholder groups, with a particular focus on the poor and vulnerable. PSIA also examines vested interests to assess issues of sustainability and risk in policy reform. Among other analyses, the study builds on the Yemen Country Water Resource Assistance Strategy (CWRAS, World Bank 2005a) and the Country Social Analysis (CSA, World Bank 2006a). The CWRAS had identified the political economy as main constraint to water sector reform. The CSA assessed livelihoods and power relations in Yemeni society, and called specifically for a poverty and social impact analysis in the water sector. The PSIA recommendations, which address the above key messages, will be implemented through the NWSSIP Update and operations.

Reforming Yemen's water sector

Water and poverty. Yemen is a poor country and most of its people are poor or very poor. Water problems are an important component of poverty. There is an anti-poor disparity between better off and poorer Yemenis in terms of both access to safe water and sanitation, and the price paid for it. The vulnerability of poorer people is greater, and the share of their income directed to getting adequate water is higher. In agriculture, ownership of a water source is correlated with higher income, and development of groundwater resources in recent years has contributed to growing income disparities as the better off have been able to capture the lion's share of the resource.. The health consequences for the Yemeni population are severe – for instance, mortality of children under the age of 5 years is twice that of other countries in the MENA region, and half of these deaths of children are due to diarrhea. The gender and educational enrolment impacts are also considerable, with women and girls spending large parts of each day fetching water.

The water sector and its institutions. Yemen has no permanent rivers and depends on rainfall, floodwater diversion and groundwater extraction as its water sources. Over 90% of water is used in agriculture and the rapid development of irrigation in recent years has led to over-extraction of groundwater and a rapid fall of aquifer levels in many areas. Yemen has set up a complex structure of institutions to manage the sector. The recently created Ministry of Water and Environment (MWE) supervises resource management through the National Water Resources Authority (NWRA) within the 2003 Water Law. It also oversees water supply and sanitation service delivery through the National Water and Sanitation Authority (NWSA), local water supply companies and the General Authority for Rural Water Supply Projects (GARWSP). The Ministry of Agriculture and Irrigation (MAI) has responsibility for irrigation, dams and watershed management. Donors, who contribute largely to capital investment in the sector, exert considerable influence over policy making. However, despite the impressive array of public agencies, it is *private agriculture* which exerts almost complete control over water resources. At present, irrigated agriculture is depleting the resource, with negative impacts on equity, sustainability and availability of water for transfer to domestic and industrial use.

This institutional structure has four critical implications for policy. First, ***the behavior of irrigating farmers is the key to the success of reforms in water resources and irrigated agriculture***. Management approaches have to be cooperative rather than controlling, particularly in the context of Yemen's weak formal governance structures. Second, the ***overlap between the public sector and private water use is limited***, confined to some public investment which has affected few irrigated farmers to date. The challenge of scaling up public involvement is thus enormous, especially given weak implementation capacity in most parts of the sector. Third, ***the most powerful influence on use of water in agriculture is the incentive structure***, which at least until recently notably promoted expansion rather than efficiency and intensification. Reforming the incentive structure is the single most effective way to improve water resources management. However, unless price reform is accompanied by investment, especially in efficient irrigation and low-cost rural water supply, there is a risk of negative impacts on rural incomes and their distribution. Fourth, ***poor coverage and low sustainability of safe water and sanitation schemes in rural areas have negative impacts on economic productivity and well-being***. More investments are needed in low cost rural water supply and capacity building for community or private schemes to supplement public efforts, especially in remote, mountainous areas.

Political economy of water and vectors of change. After decades of promoting rapid water development, government attitudes began to change in the 1990s, driven by water shortages and fiscal crisis. In the same period, the state began playing a more catalytic role in development generally, adopting a poverty alleviation mandate. Other stakeholders also began to be motivated by conservation or by desire for better services. By the late 1990s, these factors had combined to move Yemen's water policy

from its "unregulated development and expansion phase" to its "management phase". Awareness and the consequent impulse for reform have proved uneven and slow maturing, but have been helped along by "decisive moments" like the Ta'iz water crisis of the mid-1990s, when the city literally ran out of water for a month or more. There have been constraints to reform; in particular, vested interests which had benefited from the earlier fast development of water emerged as potential losers from the changes. Dealing with the "political economy of reform" has required time, dialogue, opportunism, incentives, and leadership.

The NWSSIP reform program. In 2005, the Government of Yemen adopted a National Water Sector Strategy and Investment Program (NWSSIP) intended to address the three main problems in the water sector: (1) the problem of low water resource availability, groundwater overdraft, and the vulnerability of irrigated agriculture; (2) inefficient service, inadequate coverage and high fiscal subsidy of water supply and sanitation in urban areas; and (3) low coverage and poor sustainability of water supply and sanitation in rural areas.

The need for PSIA. NWSSIP is now being put into action but implementation remains hesitant, in part because of the political economy constraints. Government and donors are keen to accelerate NWSSIP implementation and to use the NWSSIP process as the basis for program lending. Hence, government and donors agreed that some of the major reforms should be the subject of PSIA analysis in order to learn as much as possible about their impacts, particularly on the poor, and to assess how to improve implementation and address the political economy of reform constraints. Stakeholders agreed that PSIA should cover only reforms in water resources and irrigated agriculture, and in rural water supply and sanitation. Urban water and sanitation issues were thus not covered, as implementation is ongoing for several years, and stakeholders have a good grasp of the reform's economic and social impacts and how to deal with them.

The PSIA process. The PSIA process for Yemen's water sector reform program was initiated in 2005 as a joint exercise between Yemen and its external partners. It builds on the findings of the Yemen Country Social Analysis. The study took a *multi-sectoral and spatial perspective*. It purposively selected sites for in-depth study by a multi-disciplinary team that combined perspectives of integrated water resource management, socio-institutional development, political economy of reform, and local context. The team conducted analysis and policy dialogue in parallel. An interim report was produced in June 2006. A main mission was undertaken in November and December 2006 to conduct stakeholder consultations, a design workshop, and fieldwork. A draft report was circulated in English and Arabic to a wide audience in Yemen. A second workshop and consultations were held in March and April 2007 to discuss preliminary findings. Stakeholders welcomed the study as an important tool for evidence-based decision-making for the reform. They validated the findings and most of the recommendations, and helped develop the PSIA Matrix (see Annex 4). The team incorporated stakeholder feedback and finalized the report that was peer reviewed by Bank and GTZ staff. In September 2007, the team held a third stakeholder workshop and consultations to discuss the PSIA Matrix implementation. All stakeholders stressed the need to operationalize the study to overcome the identified constraints and enhance NWSSIP's equity focus. They identified specific PSIA priority actions for implementation through operations and the NWSSIP Update in order to implement the NWSSIP messages and achieve the MDGs.

Main findings on NWSSIP impacts

NWSSIP is a detailed and dense program. Complex impacts were anticipated, both in terms of water resources conservation and of distributional impacts on the population. Although it is too early for a full evaluation, the PSIA process (i.e. parallel analysis and policy dialogue) provided some preliminary indications regarding the assumptions that underlie NWSSIP and its expected impacts.

First, it was anticipated that the measures provided in NWSSIP for decentralized water management, a stakeholder partnership approach and secure water rights would gradually reduce the rate of groundwater overdraft. This impact will clearly be felt only in the long term and it is not yet proven. There are, however, indications that where the approach is being implemented on any scale, there is an improvement in water governance. The signs include increased awareness and cooperation of the population, fledgling basin committees and plans, the beginning of regulation, and a growing water user association movement - all of which are promising signs. However, **the pace of change at the local level is extremely slow, and more resources and a long term commitment are essential**.

A second expectation was that farmers will be able to reduce water use whilst at least maintaining their incomes. So far, there is little empirical evidence available. The evidence that exists, however, suggests that farmers with market access can reduce water use and maintain their incomes, if they invest in water saving technology. There are, however, huge barriers to realizing this potential (e.g. barriers to increasing yields, upgrading cropping patterns, reducing costs, expanding markets) and a major effort is needed to improve productivity on a broad front. Other countries have successfully followed this path of *more income for less water*, and there is no reason why Yemen should be an exception. However, **getting more farm income per drop will require considerable effort beyond what is currently being done**.

Third, it was expected that changing the incentive structure will promote efficiency and intensification of water use. The doubling of the diesel price in 2005 is certainly the boldest policy change that has been made, but response has been mixed. Those who can afford it – or who can access subsidized programs – are certainly investing in water-saving productivity improvements. Others are simply reducing the level of their activity, saving water but losing income. In addition, higher diesel prices have also driven up the cost of domestic water. This has little impact on resource conservation, but a negative impact on incomes and welfare, particularly for the poor. Thus rural people have reacted to the price rises by reducing water use, but whether this will be compensated by improved productivity and access depends on the phasing of the reforms: efficiency and welfare gains will only be broadly attained if changes in the incentive structure are accompanied by programs that promote investment in efficient irrigation and low cost rural water supply. The lesson is that **NWSSIP is best implemented as a reform package, as piecemeal implementation of individual reform actions – particularly putting up the diesel price - can have some uncompensated negative impacts**.

The fourth expectation was that a harmonized rural water sector strategy and coordinated institutional approaches would bring sustainable access to rural water, particularly for the poor. Reforms are certainly underway, with decentralization, "demand responsive approaches", community associations and self financing. Remarkable growth in coverage has been reported - an extra 2 million rural people with access to safe water during 2003-5 –these extraordinary figures still need to be verified. Some of the new investments are clearly more pro-poor and sustainable, than those being made a decade ago. However, some of the old constraints to access still persist, and efficiency needs to be greatly improved. Essentially, **implementation of the reforms needs to be seriously speeded up if Yemen is to have hope of increasing access of the rural poor to affordable and sustainable safe water on a scale large enough to attain its NWSSIP and MDG targets**.

A final expectation was, that the results of NWSSIP overall, will be pro-poor: here so far the evidence points the other way (consolidation of existing wealth and income patterns, unequal access to rents and subsidies, and negative impacts on employment and incomes of the poor). **Corrective action is required if pro-poor outcomes are to be achieved.**

The program for water resources management and irrigated agriculture

NWSSIP provides for institutional changes to improve water sector governance, including the setting up of basin committees and plans, establishment of water user committees, and enforcement of regulation. **There is some progress on these institutional reforms, which should clearly be pursued and accelerated**. As various initiatives progress, lessons should be drawn and best practice recommendations prepared and applied nationwide. A top priority has to be finalizing the by-laws, so that the regulatory measures foreseen in the Water Law can be enforced. In support of improved water resources management, the NWRA decentralization process needs to be strengthened and speeded up.

Given the main study findings, **the most emphasis has to be given to the range of measures in NWSSIP designed to promote water productivity in agriculture**. There needs to be strengthened implementation and more resources for programs that help farmers to invest in water saving technology and husbandry practices. Access of the poor to these programs needs to be enhanced, and employment intensive crops and related markets need to be explored. A focused irrigation strategy and investment plan to complement NWSSIP should be prepared, and the AFPPF should be reformed to focus on water productivity and poverty reduction.

The program for rural water supply and sanitation

Reform of the rural water supply and sanitation sector is clearly underway, with a demand responsive approach generally practiced and a more pro-poor stance evident. GARWSP is decentralizing and improving its implementation performance. However, some aspects are unclear or lagging. Coordination of sector agencies is still weak, and harmonization and alignment of donor involvement needs to be considerably improved. In GARWSP implementation, weaker points are in capacity for social assessment and community organization and in weak attention to gender and health aspects. Little progress is evident on partnerships with NGOs.

Record results in expanded coverage are reported, but confidence in sector institutions has not yet been won, and will not be until results are patent on the ground. **The top priorities in rural water supply and sanitation have to be mobilizing all stakeholders concerned behind a single reform program in preparation for a sector-wide approach, and improving GARWSP's institutional performance by completing decentralization and paying attention to the neglected but important poverty focus and social aspects.**

The political economy of NWSSIP

The PSIA analysis suggests that there is general support for the NWSSIP reform program. Some reforms may be resisted by certain segments, particularly the regulatory regime for controlling groundwater extraction. Here NWSSIP contains a balance of negative and positive incentives – regulation and price rises compensated by measures to enable well owners to reduce abstraction whilst maintaining their incomes. **The key to success will be constant and equitable application of both regulation and incentives**. More broadly, **ownership of NWSSIP could be strengthened** so that not only the highest leaders are convinced and are prepared to champion reform implementation, but stakeholders at all levels from decision makers down to poor rural people are persuaded that water sector reform is beneficial and fair.

Main message of the PSIA

All in all, the overall expectation of Yemeni people from NWSSIP is that, if all reforms are implemented effectively, aquifers should stabilize in the long term (albeit at a lower level than at present), returns to agricultural water should increase, farm incomes should stabilize, rural people will have access to safe water, and the incomes and employment of the poor will be protected. Although it is early in the reform program, the conclusions of the PSIA – based on measures so far, particularly the increases in diesel price and the implementation of reforms for agricultural water productivity and rural water supply programs – are, that this expectation is reasonable in theory. In practice, however, the results will be uneven over time, and the impacts are likely to vary across different social groups and geographical locations.

The effects already observed tend to confirm that positive impacts can be maximized and negative impacts minimized where the full range of reforms is applied. By contrast, leading with the reform of the incentive structure carries the risk of having a negative effect on the poor, if the diesel price rise is not accompanied by implementation of other reforms at the same time. This is exactly what has happened over the last two years – prices have gone up but most people have had no available response that could compensate. As a result, the NWSSIP reforms so far may be saving water but at the risk of depressing the rural economy and with a particular risk to the employment and incomes of the poor. Clearly, **NWSSIP is best implemented as a reform package**.

The sequencing and dosage of reforms and support are important. Prices have gone up, some water is being saved. **Now there is the need for (massive) support to productivity to restore incomes.** This is the most important message of the PSIA.

Next Steps

Throughout the PSIA study, partners emphasized the value of the process and there was enthusiasm for continuing, especially on the need to take the messages to the very top. *If the highest leaders are convinced and are prepared to champion reform implementation*, many partners insisted, *then much can change*.

The PSIA offers a modest entry point to that process of conviction. It is, one commentator observed, "an elevator. It can identify issues on the ground and raise them to a higher level in a transparent way." Put another way, the same commentator said that PSIA should be able to carry "small but devastating news to the highest level". The need now is to engage the Yemeni nation in studies and debate. This process began with the 'restitution workshop' in March 2007. It continued with the September 2007 consultations, where stakeholders discussed the implementation of the PSIA Matrix and identified priority actions for implementation through the NWSSIP Update and the planned Water Sector Support.

More generally, a strategy like NWSSIP can only be effective if there is broad understanding and ownership of its objectives and means. It is recommended that **a NWSSIP "stakeholder involvement plan" be developed**, with a particular focus on taking targeted messages to the top (the most senior decision makers, parliamentary committees, the shura council, senior clerics), to key stakeholders at governorate and district level and below, and to the entire population.

It is also recommended that **PSIA findings be supplemented with further analysis** as stakeholders see necessary, particularly by extending the poverty impact analysis. It is also recommended that an **outreach effort be launched by MWE to engage other bilateral and multilateral aid agencies** not currently involved in NWSSIP, particularly those from the Arabian Gulf. Finally, it is recommended that **progress on the PSIA recommendations be monitored periodically**.

Part A. Background to the Water Sector Reform Program

This paper presents the findings of a Poverty and Social Impact Analysis (PSIA) of Yemen's water sector reform program. The study covered linked reforms in water resources and irrigated agriculture, and the reform program in rural water supply and sanitation. A third part of the reform program – reforms in urban water and sanitation was not covered, as the program is well underway and stakeholders already have a good grasp of its economic and social impacts and how to deal with them. This paper explains how PSIA was applied to the chosen reform programs, reviews the findings, and makes suggestions about policy design and implementation. The PSIA was done as part of the program of implementation assistance to Yemen's National Water Sector Strategy and Investment Program (NWSSIP), and was financed by the World Bank and GTZ.

The study further builds on the Yemen Country Social Analysis (CSA) that assessed livelihoods and power relations in Yemeni society, and called specifically for a PSIA in the water sector[1]. The CSA identified two major trends in Yemeni society since re-unification in 1990. First, there was an economic shift towards a market economy from subsistence agriculture of the North and command economy of the South. Second, a new system of governance emerged after the creation of the modern unified state in 1990. The CSA found that as the role of the state expands into new areas, such as social services and roads, formal and informal institutions are changed. This contributes to the weakening of the traditional systems of conflict resolution, while the formal legal system is not yet fully implemented. It also contributes to an inequitable distribution of assets, such as land and water. For instance, there is increasing land concentration, private appropriation of communal land, and limited access to endowment land. This privatization of land, however, restricts access to water and weakens community systems for water management. The individualization of water use increases through deep well irrigation, and the current incentive structure favors the more affluent farmers. The CSA further underlines the findings of the Country Water Resource Sector Strategy (CWRSS)[2] that identified vested interests and the political economy in the water sector as the largest constraint to reform. The PSIA was designed to further investigate these distributional impacts and political economy issues in Yemen's water sector.

Part A of this paper presents the background to the PSIA and gives an outline of water and poverty issues in Yemen. Part B describes the PSIA assessment of the chosen reform programs and the findings and implications for policy. Part C asks how pro-poor the reform program is, and makes proposals on possible improvements to the policy measures and their implementation.

1. The Yemen water sector PSIA

Poverty and Social Impact Analysis (PSIA) is the analysis of the distributional impacts of policy reforms on the well-being or welfare of different stakeholder groups, with a particular focus on the poor and vulnerable. PSIA also examines vested interests to assess issues of sustainability and risk in policy reform.

The Government of Yemen has developed a National Water Sector Strategy and Investment Program (NWSSIP) intended to address three main problems in the water sector: (1) the problem of low water resource availability, groundwater overdraft, and the vulnerability of irrigated agriculture; (2) inefficient service, inadequate coverage and high fiscal subsidy of water supply and sanitation in urban areas; and (3) low coverage and poor sustainability of water supply and sanitation in rural areas.

[1] World Bank, 2006a
[2] World Bank, 2005a

NWSSIP has been approved by government. It is supported by donor commitments and analysis, including the March 2005 Country Water Resources Assistance Strategy (CWRAS)[3]. A monitoring and evaluation system for NWSSIP has been set up, and two Joint Annual Reviews of progress were held in June 2006 and June 2007.

As implementation of NWSSIP is starting, it was agreed between government and donors that some of the major reforms should be the subject of PSIA study in order to: (i) assess the expected distributional impacts; and (ii) analyze the political economy issues, constraints and possible incentives for decision-making and implementation. The study was carried out as a joint analysis and policy dialogue between all stakeholders. On the government side, the Shura Council, the Water and Agriculture Committees of Parliament, and the Ministry of Planning and International Cooperation (MoPIC), the Ministry of Water Resources and Environment (MWE), and the Ministry of Agriculture and Irrigation (MAI) were the principal partners. Civil society in Yemen was represented by nongovernmental organizations, water user associations and stakeholder representatives on basin committees. Donors involved, in addition to the World Bank and the German implementing agencies GTZ and KfW, included the Netherlands, FAO, and UNDP. The objective of the Yemen Water PSIA is to help government and other stakeholders to revise and improve the reforms as need be, and to move effectively to decision-making and implementation.

The Yemen Water PSIA process was initiated through first discussions in 2005. It follows and builds on the Yemen Country Social Analysis that identified the need for further analysis of the water sector reform[4]. In July 2006, a preliminary note was circulated for comment. In November and December 2006, stakeholder consultations were conducted and a stakeholder workshop was held in Sana'a. At the workshop, the study was explained. Participants selected the two sets of reforms to be analyzed, agreed on the analytical approach, and helped to decide the scope, nature, location and timetable of the data gathering activities required[5]. Immediately following the workshop, fieldwork was undertaken and completed during December 2006. A draft report was prepared and circulated in English and Arabic to a wide audience in Yemen, and a second workshop was held in March 2007 to discuss the findings. The report was then finalized, based on the feedback received from in-country stakeholders. During the third round of stakeholder consultations and workshop to discuss the implementation of the PSIA Matrix in September 2007, stakeholders identified priority actions for implementation through operations and NWSSIP Update to implement the NWSSIP messages and achieve the MDGs.

The study took a multi-sectoral and spatial perspective. It purposively selected sites for in-depth study by a multi-disciplinary team that combined integrated water resource management, socio-institutional development, political economy of reform, and local context. The team conducted parallel analysis and policy dialogue.

The analytical steps followed for the PSIA were: (1) *policy analysis*, to identify what are the objectives of the reforms and what are the reform steps proposed; (2) *institutional analysis,* to understand the institutional mechanisms through which the reforms are being carried out; (3) *stakeholder analysis*, to identify key stakeholder characteristics, interests, incentives and degree of influence (this includes both stakeholders likely to be affected *by* the reforms and stakeholders with significant influence *over* the reforms); (4) *social impact assessment* to determine the channels by which impacts are transmitted and

[3] World Bank, 2005a
[4] World Bank, 2006a
[5] It was essential to prioritize the study focus from the broad range of NWSSIP reform areas. Applying the PSIA approach, stakeholders agreed on the following selection criteria: (i) the urgency of reforms; (ii) size and magnitude of impacts; (iii) level and prominence of debate within Yemen; (iv) the likelihood that new knowledge would make a difference to the content or implementation of the reform; and (v) the prospects that the reform actually can be implemented (World Bank, 2003).

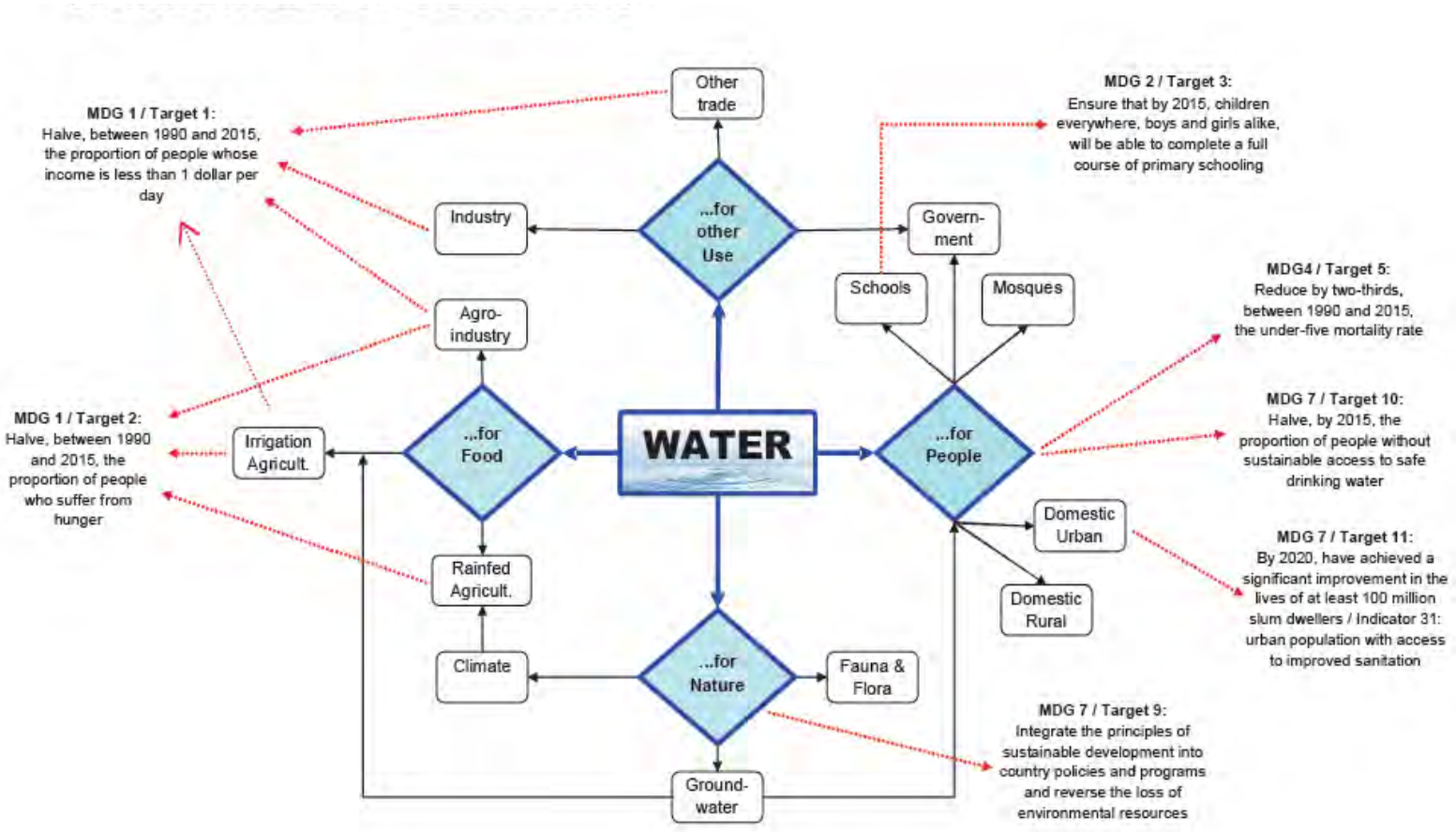
the expected impacts and order of magnitude for different stakeholders, including both, short and long term, and direct and indirect impacts; and (5) a *social risk assessment* to examine the main risks *to* and *from* the reform. The analysis informs the policy dialogue through NWSSIP Update, and Bank operations.

Data gathering was through three mechanisms: (a) literature review, and secondary data analysis; (b) two stakeholder workshops – the first during design, the second to discuss preliminary findings and recommendations; and (c) fieldwork, using key informant interviews, focus group discussions and community profiling. For details on methodology, see Annex 1. The findings cover: (1) the anticipated distributional impacts of the reforms analyzed and lessons, particularly regarding "winners and losers"; (2) vested interests in support of, or opposition to reform, including visual maps of the flow of funds and information in Annex 2, and of power relations in Annex 3, and (3) options and alternatives that could address vested interests, and negative and positive impacts on different social groups. For an overview of key recommendations and stakeholder responses, see Annex 4. The audience of the report is the government, other key stakeholders within Yemen, and donors involved in Yemen's water sector.

2. Setting the stage: water and poverty

Water is critical to life. It is key to poverty reduction and the attainment of the Millennium Development Goals (MDGs). It is the essential input to food production. Clean water and safe sanitation are indispensable to human well being. The basic minimum need is 7.5 liters per person per day, and 20 liters of clean water are needed daily for a fully healthy life to be possible. The relevance of both water resources management and of water and sanitation to poverty reduction and the MDGs is well illustrated by the following chart.

Graph 1: Water Users and MDG Relevance



Source: GTZ - KFW (2005). Poverty Relevance of Urban Interventions

Yemen is a poor country and most of its people are poor or very poor. The 1998 Household Budget Survey (HBS) indicated that about two thirds of the Yemeni population were poor, with expenditures less than $1.50 a day (70% rural, 58% urban). According to the 1999 National Poverty Survey (NPS), more than 50% of the population considered themselves poor or extremely poor. Recent participatory rapid appraisal (PRA) surveys (e.g. that for the Energy PSIA[6]) confirm this self-assessment. Although the trend in poverty is thought to be improving, it is likely that some recent macro adjustments may have exacerbated the problems of the poor in the short term (e.g. price adjustments).

Table 1: Urban, rural and total water supply and sanitation coverage

	Urban population (million)	%	Rural population (million)	%	Total population (million)	%
Water supply coverage	3.4	59%	5.5	38%	8.9	44%
Sanitation coverage	1.8	31%	2.8	20%	4.6	23%
Total population	5.8	100%	14.5	57.5%	20.3	100%

(Source 2006 JAR for water supply, 2005 CWRAS for sanitation)

Water problems are an important component of poverty in Yemen. In agriculture, ownership of a water source is correlated with higher income, and the poor typically either share an agricultural water source, or buy water, or have no access other than to rainwater. Development of groundwater resources in recent years has contributed to growing income disparities as the better off have been able to capture the lion's share of the resource. For domestic water (Table 1), overall access to safe water in rural areas is only 38%, and to sanitation 20%. In urban areas, only 59% have access to safe water, and only 31% to sanitation.[7] In general, the poor have less access to safe water and sanitation and face higher costs than the better off (see below). The health consequences for the Yemeni population are notorious – for instance, mortality of children under the age of 5 years is twice that of other countries in the MENA region; 50% of deaths of children under the age of 5 are attributable to diarrhea. The gender and educational enrollment impacts are also considerable, with women and girls spending large parts of each day fetching water.

Table 2: Rural population access to water

	Well-off	Poor	Very poor
Rural			
Water source for **agriculture**	Tubewell; Spring; Terraces; Spate head end	Shared tubewell; Spring; Terraces; Spate tail end; Water purchase	No access
Use of diesel	Yes	Limited	No
Water source for **domestic use**	Tubewell; Spring; Household connection	Communal spring or well; Standpipe; Purchase from vendors	Communal spring or well; Standpipe; Purchase from vendors; Charity
Average daily consumption	> 40 liters per day	10-40 liters per day[8]	Limited
Time spent fetching water	Nil	- -	Several hours each day for women and girls
Cost of water per m3 (if purchased)	- -	Network prices reported in 2006 JAR: Rls 120-180/m3 ($0.60-0.90/m3). Vendor prices Rls 400-700/m3 ($2.00-3.45/m3).[9]	Very high, if purchased

Source: Authors' own compilation

[6] World Bank, 2004a

[7] The figures for water supply coverage reported to the 2006 JAR and shown in Table 1 represent a considerable increase over the NWSSIP 2002 baseline figures of 2.4 million (urban) and 3.4 million (rural). Further verification of these figures, particularly for rural coverage, is needed.

[8] Based on experience in the RWSS pilot project. Source: RWSS Project Final Report. IWACO/Ghayth Aquatech November 1999

[9] Ibid. Donkey cart price reported as Rls 690/m3, i.e. 30 times higher than the price paid by residents of the capital city.

In urban areas, water is mainly used for domestic consumption. The well-off use 60 liters and more per day[10], and the poor about 30-35 liters per day[11]. Both groups have access through household connection and purchase from vendors. The very poor pay a high cost if they purchase water.

From Tables 1 and 2, two central observations on real relationships between water and poverty can be made. The first is that there is clearly an anti-poor disparity between better off and poorer Yemenis (both rural and urban) in terms of both access to water and the price paid for it. The vulnerability of poorer people is clearly greater, and the share of their income directed to getting adequate water is higher. The second observation is that rural areas in general face more difficult access to potable water and higher costs. These two central observations condition both the shape of the water sector reform program and – as the study reveals – the actual impact of reforms on the poor.

3. The water sector: organization, political economy of reform, NWSSIP

This chapter discusses water sector organization, briefly characterizes the reality of control over water resources in Yemen, sketches the overall political economy forces, and outlines the reform program.

3.1 Stakeholder organizations in the water sector

(a) Public organizations

Ministry of Water and Environment and its agencies: within government, responsibility for water resources management and for overseeing water supply and sanitation service provision is vested in the *Ministry of Water and Environment (MWE)*, which was established in 2003. MWE directly fulfils the functions of policy, strategy, planning and resource allocation. Four public agencies report to MWE: the *National Water Resources Authority* (*NWRA*: planning, monitoring and regulation of water resources); the *National Water and Sanitation Authority* (*NWSA*: oversight of urban water supply and sanitation and responsibility for service delivery in secondary towns); the *General Authority for Rural Water Supply Projects* (*GARWSP*: oversight of rural water supply and sanitation and implementation of a large share of public investment in rural water); and the *Environmental Protection Authority*: (*EPA*: environmental oversight and proposing environmental regulation). Urban water in major towns is the responsibility of quasi-autonomous utilities, the *Local Corporations (LCs)*.

Ministry of Agriculture and Irrigation: within government, significant responsibility for water also rests with the *Ministry of Agriculture and Irrigation (MAI)*, which has planning and investment responsibility for irrigation, dams and watershed management. MAI also has direct managerial responsibility for large spate irrigation schemes in the west and south of the country. The *Agricultural Research and Extension Authority* (*AREA*), reporting to MAI, is responsible for research and technology transfer in irrigated agriculture. In addition, MAI executes the program of the *Agriculture and Fisheries Production Promotion Fund (AFPPF)*, a public off-budget fund financed by a cess on diesel prices and charged with investing in sustainable pro-poor agriculture and fisheries.

Other ministries: four other ministries have a key involvement in the water sector: *Ministry of Planning and International Cooperation (MOPIC)* is the institution responsible for sustainable development and poverty reduction and for investment planning and programming; *Ministry of Finance (MoF)* is the

[10] Based on household consumption of at least 10 m3 a month. Source: World Bank, 2006b.
[11] Based on household consumption of 5-10 m3 a month. Source: ibid

ministry responsible for investment resource allocation, subsidies and trade policy, and for setting the diesel price; *Ministry of Local Administration (MoLA*) is responsible for decentralization and for oversight of local authorities, as well as for supporting implementation of the Water Law at the local level. Finally, *Ministry of Interior* is responsible for law enforcement, including the Water Law.

(b) Private organizations

In the agricultural sector, control over surface resources is typically communally managed (springs, spate, run off) and ownership is proportional to land ownership. Control over groundwater is typically individual (vested in the owners of the 50-100,000 agricultural wells in the country). Ownership (or, more properly, right of use) of groundwater is based on individual ownership of land located over productive aquifers and on access to capital to develop the resource.

Private water suppliers exist in both urban and rural areas. Farmers (or ex-farmers) frequently sell water from wells for both agricultural and potable use. In some cities, such as Sana'a, there are private networks, and an extensive tanker and retail water trade exists in all cities. In all rural areas, communities frequently supply drinking water through self-run schemes.

Public and private organizations also interact as formal and informal institutions become integrated in the new governance system. For instance in the northern highlands, where the tribal system still dominates social organization, sheikhs hold public office and also act as private agents, e.g. tube well farmers, drillers, etc. The mix between public and private functions can create a conflict of interest. The multiple roles of traditional leaders as heads of their tribal groupings, capitalist investors, and members of the new ruling class change power relations in Yemeni society. Inequitable distribution of assets and decision-making based on patronage systems increase and thus impact on Yemen's water sector reform.[12]

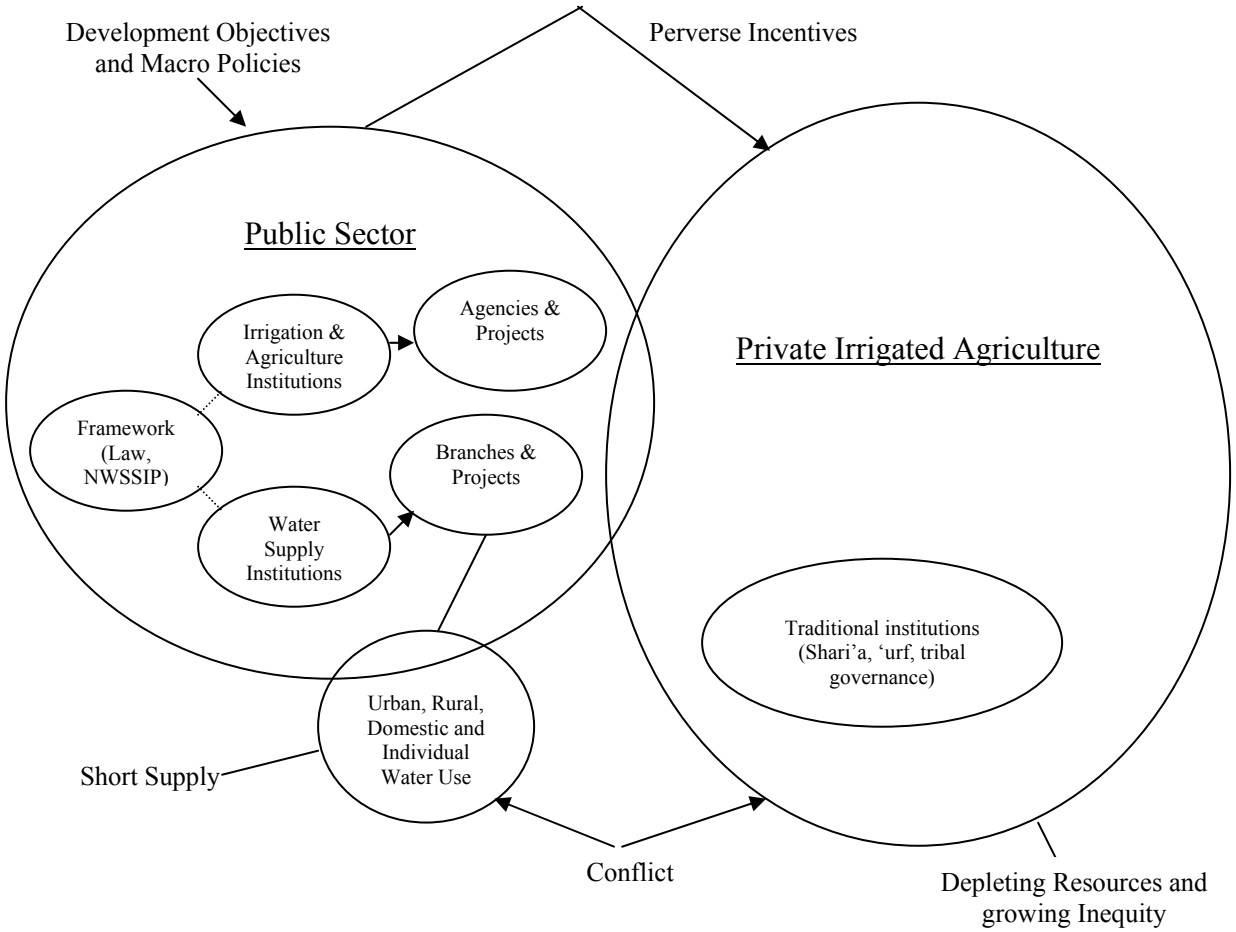
3.2 The reality of control over water resources in Yemen

Water resources originate almost entirely in rural areas. At least 93% of water use is in irrigated agriculture in rural areas. Therefore, understanding who controls water, and how it is controlled and used in rural areas is key to understanding vested interests, constraints, and incentives to reform.

A stylized model of governance of Yemen's water resources is shown in the graph below. It depicts a *public sector* characterized by the notable array of institutions discussed above but exercising scant actual control over water resources; it shows *private agriculture* which exerts almost complete control over the water resource.

[12] Further details on the impacts that the changes in power relations have on the water sector can be found in Chapters 4 and 5, and specifically in Tables 3-4 and 6-7, under the "transmission channel" of "authority", and Annex 3.

Graph 2: Stylized model of Yemen's Water Sector



Note: The possible impact of the Water Law and NWRA's recent interventions in water resources management have not been included in the graph, as they are too recent to assess results.

The graph also depicts the main water resource management problems arising from this structure: an irrigated agriculture that is depleting the resource, with negative impacts on equity, sustainability and availability of water for transfer to domestic and industrial use. The lessons from this model are:

- ***Irrigating farmers control Yemen's water resources***. The behavior of these farmers is therefore critical to the success of the reform program in water resources and irrigated agriculture. Management approaches have to be cooperative rather than controlling, particularly in the context of Yemen's weak formal governance structures.
- ***The overlap between the public sector and private water use is limited***, confined to (1) public investment in urban and rural water supply schemes (although the bulk of water supply and sanitation services are still privately provided); and (2) the initiatives in irrigation improvement, dam construction, agricultural extension etc., which have affected few irrigated farmers to date. The challenge of scaling up public involvement is thus enormous, especially given weak implementation capacity in most parts of the sector.
- ***The most powerful influence on use of water in agriculture is the incentive structure***, which, at least until recently, notably promoted expansion rather than efficiency and intensification. These "perverse incentives" included both financial incentives (trade policy, energy pricing, subsidies, *laissez faire* on *qat*) and the promoted institutional model (individualistic market driven development). economic and social implications are considerable: reforming the incentive structure is the single most effective way to improve water resources management. However, unless it is

accompanied by investment, there is a risk of negative impacts on rural incomes and their distribution.

3.3 Background to Yemen's political economy of water: vectors of change

Analysis of the political economy of the water sector carried out at the time when NWSSIP was being designed revealed a wide range of actors and interests.[13] The analysis also revealed a dynamic situation, with a number of factors driving changes in attitudes to the sector and its development and management. The following paragraphs summarize and update that analysis.

There are many stakeholders in the water sector in Yemen. Stakeholders include political leaders and parliamentarians, central and local government, traditional leaders, NGOs, the private sector, the media, farmers and domestic water users. As Yemen remains dependent on external support, donors are also stakeholders. They are, in fact, powerful agents for change because of their investment resources and the accompanying ability to influence what the Government does. The analysis found a dynamic situation in which the political economy forces were readjusting, with stakeholders repositioning themselves in the light of changing ideas and perceptions, and of new economic realities.

Government attitudes have changed, driven by water shortages and fiscal crisis. Until the mid-1990s, Government policies had promoted the rapid development of water resources and use.[14] Although there were inevitably divergent views within government (see below), overall government policy became more and more driven by considerations of water conservation, efficient use and sustainable service provision.

Also during the 1990s, the state began playing a more catalytic role, adopting a poverty alleviation mandate. There was no unanimity or homogeneity in this understanding, but the evidence shows that Yemen moved definitively away from planned subsidized regimes towards a revised model of development with more emphasis on decentralization, partnership, user involvement, cost recovery, local initiative and sustainability. In both urban and rural supply and in irrigation, this change in thinking contributed 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 became more strongly defined, and non-market interventions took on, in principle at least, an increasingly pro-poor cast.

Other stakeholders too became more likely to be motivated by conservation or by desire for better services. Where farmers previously looked on groundwater as a limitless bounty, it became clear for many during the 1990s that further development of groundwater was a negative sum game. Users began to see the merit of limiting further extraction – provided that existing rights were assured and incomes

[13] This section is based on Chapter 5 of the World Bank's March 2005 Country Water Resources Assistance Strategy (CWRAS, World Bank 2005a). Throughout this report the political economy of reform is assessed using the PSIA approach (World Bank 2003; 2005b). This approach recognizes the need to understand the likely impacts of policy adjustments on both poor and non-poor groups, especially those with significant influence to support or oppose the reform and/or capture benefits. PSIA identifies stakeholder interests and influence, incentives, institutions, impacts and risks. Finally, the study follows the current common understanding of political economy, as referring to interdisciplinary studies that draw upon social and political theory in addition to economic principles in order to understand how political actors, institutions and economic processes influence each other. See also World Bank 2007.

[14] Examples of these past policies included: public investment in water resources development; subsidies to private investment in water development and use; cheap energy; development of an unregulated market economy; a legal framework allowing individual appropriation of the groundwater resource; and donor support directed to increasing water supply and use

were protected. A keen constituency for groundwater recharge emerged, driving the contentious small dams program. In potable water, consumers started to consider that paying more for better levels of service could be preferable to poor quality subsidized options. The powerful donor community, after two decades of financing expansion, began promoting financial and water resource sustainability.

By the late 1990s, the combined factors appeared to have moved Yemen's water policy from its "unregulated development and expansion phase" to its "management phase". The natural resource constraint, the crisis in the public sector and the change in the view of the role of the state together moved the focus from a preoccupation with supply alone to increased awareness of the need for demand management.

Awareness and reform have proved slow maturing, but was helped along by "decisive moments". This readiness to consider change took many years, and is still far from complete. Generally, this is consistent with experience in other countries where two to three decades have elapsed from the first sign of a problem in water 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. The "shock" of the Ta'iz water shortages in 1995, when the city went without public supply for forty days, was one such decisive moment that accelerated Yemen along the policy curve, in that case acting as a driver of the urban water reform program. The water shortages in rural areas and the dwindling availability of water resources for urban supply also emerged as powerful drivers of acceptance of the need for reform.

Vested interests who benefited from the earlier fast development of water emerged as potential losers from the changes. The introduction of tubewell technology and the availability of capital from government credit banks, as well as remittances of migrant workers allowed the very rapid development of groundwater from the 1970s up to the 1990s. A massive process of 'resource capture' resulted. The politically powerful, the tribal leaders and a large number of farmers with access to capital gained from this. They have further consolidated those gains with profits incurred through the low diesel price and protected markets. By contrast, poorer farmers and the rural landless did not benefit. Government and politicians were also definitive "winners" in this "development and expansion phase" as the allocation and development of water were sources of power and patronage. The subsequent "management phase" has proved politically much less attractive, as it has involved price rises and restraints on use applied to those who had captured the resource. In addition, where government actually began to implement pro-poor programs, such as the Social Fund (SFD) and Public Works Project (PWP), this reduced the scope for patronage of the old and powerful clientele, as the poverty objective transfers resources from the better off to the poor. Demand management and pro-poor programs were not first choices for an unconstrained political establishment in Yemen. However, the constraints, outlined above, were there, and the government did begin to adopt demand management policies and to surrender some of its mechanisms of patronage.

Dealing with the "political economy of reform" requires time, dialogue, opportunism, incentives, leadership. Clearly, an understanding of 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[15]. The 2005 CWRAS highlighted the following key political economy factors that need to be factored into decision and implementation of the reform program:

- Reform requires support from stakeholders, and *support requires both a learning process and time*; education and patience are indicated.
- *The role of catalysts and educators is important*. Donors can contribute materially in this role.

[15] For a diagnostic framework and operational implications see World Bank 2007.

- *The twin parents of change are necessity and opportunity*.
- There is a certain "adaptive capacity" in every community, more or less pronounced and powerful. *Understanding the adaptive capacity, that exists in every community, is the key to predicting and promoting change*.
- No one will act against their will, and *the correct incentive structure is essential*.
- *Leadership is imperative*.

Considerable analysis of the political economy of water sector reform has already been done, which for instance, informed the development of CWRAS. The PSIA exercise took this analysis as a starting point, testing and verifying it and adapting it to new realities.

3.4 NWSSIP and the selection of reforms for PSIA

As discussed above (Chapter 1), the PSIA study was designed to help improve the design and to support the implementation of Yemen's National Water Sector Strategy and Investment Program (NWSSIP). This section briefly summarizes the process that produced NWSSIP and describes the main reforms that are envisaged.

After a year long preparation process that included five working groups mobilizing over a hundred stakeholders from various parts of Yemeni society, and after a number of workshops, NWSSIP was adopted by Yemen's Council of Ministers and published in 2005. Aiming at sector-wide policy adjustment, institutional reform and investment, NWSSIP is a broad and dense program. Its fundamental objectives are sustainable water resource management, maintaining or enhancing agricultural incomes, and sustainable and affordable water and sanitation services. The NWSSIP document asserts a 'focus on equity, the MDGs and poverty reduction', and there is an underlying assumption throughout that NWSSIP outcomes will be pro-poor. Box 1 below summarizes the reform policies and steps.

Selecting reforms for PSIA

At the stakeholder workshop held in December 2006, participants applied the selection criteria to the various reforms[16]. Almost unanimously, participants chose the reforms dealing with water resources management and irrigated agriculture, as well as the reform program for rural water supply and sanitation. The scoring of the participants varied, but essentially these reforms were selected because of their economic and social importance in the future development of Yemen, and because of doubts about the impact – and even the feasibility – of some of the measures. Would the reforms have the effect intended, or would there be perverse outcomes particularly for the poor? Could these reforms actually be correctly sequenced and implemented in the Yemeni context?

[16] The PSIA selection criteria were: (i) urgency of reforms; (ii) size and magnitude of impacts; (iii) level and prominence of debate within Yemen; (iv) likelihood that new knowledge would make a difference to the content or implementation of the reform; and (v) prospects that the reform actually can be implemented (World Bank, 2003).

Box 1: The NWSSIP Reform Policies at a Glance

Groundwater resources and the challenge of irrigated agriculture

Decentralized management and stakeholder partnership approach

(i) decentralizing to basin water committees within basin plans
(ii) implementing basin plans on an integrated water resource management basis
(iii) promoting water user associations and self management at the local catchment level

Recognizing existing rights and controlling expansion

(i) recognition of farmer use rights
(ii) implementation of the licensing, regulation and other provisions of the Water Law
(iii) national water well census and water resources assessment.

Revision of the economic incentive structure for groundwater use

(i) raising the diesel price and freeing up agricultural trade, including for *qat*
(ii) possible recognition of tradable water rights (pilot project in Ta'iz)
(iii) improving water productivity through research, extension and subsidies to investment

Urban water supply and sanitation

Creating efficient and accountable utilities

(i) completing the decentralization and corporatization process
(ii) establishing a regulatory function
(iii) phasing in PPP through management contracts and "Utility Support Programs"
(iv) developing outsourcing to reduce over-staffing.

Investing in increasing coverage, with priority to the poor

(i) maintaining levels of government and donor resource allocation
(ii) developing criteria to prioritize investments that target the poor
(iii) introducing lower cost technology.

Making water and sanitation services affordable

(i) water charges based on cost recovery, gov't pays for new schemes, replacements etc.
(ii) revising the block tariff system with a pro-poor objective
(iii) the poorest of the poor to be dealt with by charity and social safety net

Rural water supply and sanitation

Rapid expansion of coverage with a pro-poor emphasis

(i) establishing a sector strategy and planning for rapid expansion of coverage
(ii) increased resource allocation to rural water supply and sanitation
(iii) transparent investment application process and decentralized approval system
(iv) NGOs to be encouraged to participate.

Making services inclusive, affordable and sustainable

(i) priority to low cost technology
(ii) demand responsive approach and community based self-management
(iii) initial capital subsidy, user associations to be self-sustaining financially thereafter
(iv) gender to be mainstreamed
(v) sanitation to be obligatory
(vi) water to be sourced with NWRA support and clearance

Improving implementation

(i) setting up a "central office for sector reform"
(ii) decentralization of GARWSP to governorate branches
(iii) agreement on common approaches to be followed by all entities operating in the sector
(iv) community contracting, wherever possible

Part B. Main Findings – Assessment of the Main Reforms

This part presents the study findings on the two reform programs selected. Chapter 4 discusses reforms in water resources and irrigated agriculture, and Chapter 5 deals with the reforms in rural water supply and sanitation. The analysis covers the objectives and components of the reforms, implementation, the impacts of the reforms, institutional and political economy aspects, and risks associated with the reforms. In the final part of the report, Part C, key findings and recommendations are presented.

4. Analysis of reforms in water resources and irrigated agriculture

4.1 Objectives and major components of the reforms

The problem of water resources and irrigated agriculture

As discussed above (3.3), the particular political economy of water in Yemen allowed groundwater resources to be captured by larger farmers. This was done through (1) a *de facto* privatization of groundwater resources as, although undeveloped water is in Islamic jurisprudence *res nullius*, landowners have had - until the recent Water Law - unrestricted right to develop and use groundwater beneath their land; and (2) the ability to drill deeper, pump harder and run more intensive farming operations. Because the vast bulk of Yemen's water resources lie outside government control (see 3.2 above), regulation was left to traditional governance systems that had no mechanism for controlling groundwater pumping, with resulting resource depletion affecting not only groundwater but also springs. The distorted incentive system (particularly the low diesel price, see 3.2) for long encouraged water over-use, with the rent going largely to the better off. Governance systems have not adapted to the changing resource situation, or where they have, it has been largely to consolidate the pattern of resource capture by the better off. These days, sheikhs are no longer mediators but interested parties, and may no longer be *primus inter pares* but part of the governing patronage system.

To be clear, this rapid development of groundwater resources has brought considerable benefits to the national and rural economy. Yemeni irrigated agriculture has developed enormously in the last thirty years – the area irrigated from wells has gone from 37,000 ha in 1970 to 368,000 ha (from 3% of the cropped area to over one third). Much of this area is under higher value crops, particularly fruit, vegetables and *qat*. Largely as a result of this "groundwater revolution", Yemen's rural economy has remained relatively buoyant, with agricultural employment increasing by 25% during 1970-1996 and agricultural value added quadrupling. This rapid growth characterized both northern and southern parts of the country up to unification in 1990, with a fast-growing market economy driving growth in the north, and state-led investment rapidly developing irrigated agriculture in the south. Subsequent performance has continued to be buoyant, particularly with the spectacular growth in demand for *qat* but also for horticultural products. Now, however, these achievements are being threatened by the declining quality and quantity of groundwater and its increasing cost. Many rural areas are faced with the prospect of decline in incomes and employment unless water use can be reined in equitably and unless technical and economic measures can be applied to improve the presently relatively low returns to water in agriculture i.e. to produce "more income per drop".

Ongoing and proposed NWSSIP reforms dealing with the water resource and irrigated agriculture problem

NWSSIP[17] brings three linked sets of reforms to bear on these problems. Each set of reforms is based on a series of underlying assumptions or hypotheses about how people will react.

Decentralized management and stakeholder partnership approach. Steps include: (i) decentralizing to basin water committees within basin plans; (ii) implementing Ta'iz and Sa'ada basin plans on an integrated water resources management (IWRM) basis, monitoring and scaling up lessons; and (iii) promoting water user associations and self management at the local catchment level and in larger spate schemes currently under public management. The underlying hypothesis is that decentralizing and promoting community self-management will improve governance and help reduce resource capture and groundwater overdraft.

Recognizing existing rights and controlling expansion. Steps include: (i) recognition of farmer use rights; (ii) implementation of licensing, regulation and other provisions of the water law (by NWRA in coordination with local authorities); and (iii) national water well census and water resources assessment. The underlying hypothesis is that securing and regulating water rights will also help reduce resource capture and groundwater overdraft.

Box 2: Institutional mechanisms of reform in water resources and irrigated agriculture

Reforms in water resources and irrigated agriculture are being carried out through a mix of legal and regulatory, market, resource planning and allocation, and organizational mechanisms.

Legal and regulatory mechanisms: Legal and regulatory mechanisms comprise the application of the *water law* to recognize farmers' use rights, *regulation* of further groundwater development, and water resources *assessment*.

Market mechanisms: Market mechanisms comprise *changes in prices* which are either controlled by government (diesel) or influenced by government policies (fruit and vegetables, *qat*).

Organizational mechanisms: organizational mechanisms on the resource management side include: (1) *NWRA*, which has been set up to apply the water law and to develop basin planning; (2) *basin committees*, which are being established as a joint government/water user forum to advise on water resources management and basin water plans; and (3) *community level organizations* such as user associations or groundwater sub-basin associations, which are to be encouraged. A coordination role is to be played by (4) *governors* and their district level representatives; support is to be provided by (5) the *local councils* at governorate and district levels; and law enforcement is the responsibility of (6) the *security forces* and of the local branch of (7) the *Attorney General's Office*. Organizational mechanisms on the agricultural water productivity side (see Section 3.1) include: (8) *MAI*, its branches and projects at governorate and district levels; (9) *AREA* for research and for coordination of extension; and (10) *AFPPF* for investment.

Source: Authors' compilation

Revision of the economic incentive structure for agricultural water use and increase in income per drop. Steps include: (i) raising the diesel price and freeing up agricultural trade, including for *qat*; (ii) possible recognition of tradable water rights (pilot project in Ta'iz); (iii) improving water productivity through research, extension and subsidies to investment in sustainable water management (e.g. impounding water through economically viable development or improvement of dams and terraces) and to irrigation efficiency (e.g. piped groundwater distribution, drip irrigation etc.), with AFPPF funds increasingly

[17] The full range of NWSSIP reforms was sketched out in Chapter 3 (Section 3.4). The present section analyses the reform program for water resources and irrigated agriculture in more detail.

channeled to water use efficiency investments; and (iv) treating *qat* as a crop. The underlying hypothesis is that these measures will reduce incentives to over-pumping, and that they will enable farmers to reduce water use whilst maintaining or even improving their incomes.[18]

These NWSSIP reforms aim at improved water management and irrigation water services. NWSSIP is not very explicit about expected social development and livelihood outcomes. However, there are some implicit assumptions about possible impacts on the population and the distribution of these impacts. For example, that decentralization and stakeholder partnership will create inclusive and accountable institutions, and reinforce social cohesion, where outcomes will be pro-poor. There is also an assumption that slowing groundwater overdraft will be pro-poor. However, there is no risk analysis in NWSSIP about these social development and livelihood outcomes. The reform program is being carried out through a mix of mechanisms (see Box 2).

4.2 Implementation of the reforms and results to date

4.2.1 Decentralized management and stakeholder partnership approach

Basin committees have to date been formally established for Sana'a and Sa'ada, and a cognate coordinating structure has been set up for Ta'iz (Supervisory Committee chaired by the Governor, Technical Committee chaired by NWRA). In Lahej, the old Irrigation Council has been revived. A basin committee is now proposed for Amran. Heterogeneity marks the experience to date (see Box 3). In Sana'a the committee is chaired by the governor and dominated by representatives of governmental agencies, with virtually no user representation. In Sa'ada, the committee, also chaired by the governor, contains some very vocal community representatives, including women. In Ta'iz, the structure is basally a coordinating committee for the public agencies involved in the sector. In Wadi Tuban in Lahej, some of the functions of a basin committee are carried out by the Irrigation Council, revived "from the days of the Sultan". The Council is chaired by the Governor and has 28 members, including all 16 water user associations (WUAs) in Wadi Tuban, local councilors, parliamentarians and technicians. Financed by a levy of Rls 200/feddan, the Irrigation Council is responsible for water allocation and for dispute resolution. NWRA is now working with UNDP on a proposal for a Tuban Basin Committee. The NWRA Chairman told the March 2007 mission that the ultimate objective is "fourteen basin committees, matched by fourteen technical committees comprising the public sector agencies".

Basin plans, also quite heterogeneous in their form, have been prepared for Ta'iz, Sa'ada and Hadramawt – the latter will be finalized shortly. Ta'iz plan preparation began in 1997. The plan was agreed by the Cabinet in 2004, and official implementation began with NWRA in the lead in 2006, although implementation of several components of the plan had started beforehand. Activities are currently suspended due to problems with Dutch financing. Sa'ada plan is more a loose framework, whilst the Hadramawt plan has been prepared simply as a technical study by consultants. The management program, that is most integrated in practice, however, is in the Sana'a basin, where no formal plan exists yet: the *Sana'a Basin Water Management Project* (SBWMP) is working to a plan implicit in project design. A formal plan is only now being prepared.[19] In Amran, a Basin Water Resources Management Action Plan is to be prepared during 2007-8 by the Sana'a/Amran branch of NWRA with the input and agreement of local stakeholders and the assistance and technical support of the GTZ-financed IWRM project.[20]

[18] As the impacts of the diesel price increase are subject to a separate analysis (World Bank 2004a), the PSIA did not include this in its analysis.
[19] By NWRA Sana'a Branch with support from JICA. The plan is expected to be ready by the second half of 2007.
[20] Local stakeholders are defined as: the Amran Basin Committee, the local authority at district level, water user associations, and other community based associations and organizations, together with local NWRA staff supported by the GTZ IWRM project.

Box 3: The Sana'a and Sa'ada Basin Committees – equal commitment, contrasting styles

The committees present striking contrasts. The Sana'a Committee is very official, men in suits, top officials from the Ministry of Finance, the Chairman of the Farmers Union, the Director of the Sana'a Local Corporation (for water supply and sanitation), a very high ranking officer from National Security; no water user association is a member of the Committee. The Sa'ada Committee is very informal, lower level officials, several women from NGOs.

The Sana'a Committee has been very active. They have issued over thirty 'decisions'. They expected that these decisions would be implemented with the force of law, as the whole of the Sana'a Basin has been declared a protected zone. However, this has not been the case. One decision was to try to limit expansion of Sana'a city, but unlicensed construction continues apace. They also have tried to limit drilling. They say that water user associations in the Basin are not yet strong enough to help with regulation, so they try to work with the District Councils. The National Security officer says frankly: "We have made so many circulars to the Districts. But security authorities at District level only move if they are paid." Another member says: "We are not confident that we can prevent the drilling of wells in Sana'a". (A short drive through the city and its environs confirmed the truth of this observation).

They have the advantage that the Sana'a Basin Water Management Project (SBWMP) is supporting them financially, and some of their decisions can be executed through the Project. They have been researching future sources for city water supply, and have found over 200 well owners who are prepared to sell water in bulk to the city. The Water Law, they say, does not forbid the Local Corporation from buying water. For the moment, however, the idea has been set aside, as there is no network to hook up the wells.

By contrast, the Sa'ada Committee includes a range of stakeholders. They are just starting, full of energy and commitment. They are keen on promoting water user associations, and to improve irrigation. They have "set up committees in schools and women's associations." But they say they lack resources and good connections to the implementing agencies. "We do a lot of meetings," one lady representative says, "but we don't implement anything on the ground."

Next steps would seem to be including more user representatives in the Sana'a Committee, and linking the Sa'ada Committee better to implementation.

Source: Authors' compilation, and focus groups discussion, Sana'a December 5, 2006

The heterogeneity of the committees and plans need not matter in an initial pilot stage, especially if it responds to a dynamic created by local ownership, which seems to be the case in Ta'iz and Sa'ada. In the circumstances, the most important thing is to monitor and evaluate the experience and to draw conclusions that can be applied both among existing structures and future ones.[21] In considering the future of basin committees and plans, the following factors should be taken into account:

- The role of the committees needs to be a practical one, with clear terms of reference and linkages to implementation. Otherwise, it will become just a talking shop and end in frustration.
- The role of NWRA is clearly critical, as a basin committee and a management plan validate NWRA's integrating role and activities.
- Water user representation is a key element, as the reform is designed to build ownership and commitment to responsible (self-) management of water resources at the local level. There is scope for increasing user representation on the basin committees. There is also scope for developing the plans in a more participatory way, involving all agencies and stakeholders, and for speeding up the process.

[21] This is a possible topic for the *IWRM Group*, the recently set up forum and network that fosters free policy debate amongst water sector professionals.

Water user associations (WUAs) are being promoted by NWRA and MAI, particularly under donor financed projects, including the *Irrigation Improvement Project* (IIP), the *Groundwater and Soil Conservation Project* (GSCP), and SBWMP. There is also a small pilot project being implemented by the Water and Environment Centre at Sana'a University (WEC). These WUAs are of many types, differing in their roles and in the type of the water resource they look after including:

- *Water management WUAs* being piloted by NWRA under the Ta'iz basin plan in al Haima District. Registered as NGOs, 24 "water user groups" (WUGs) are federated into one WUA and are being trained to carry out local level water management tasks, including awareness, water monitoring, and preparation for water conservation programs such as GSCP.
- *Irrigation WUAs* being promoted under IIP, GSCP and SBWMP for both surface and groundwater.[22] Registered as NGOs, the WUAs set up under IIP are responsible for operation and maintenance at tertiary canal level (and possibly soon at secondary canal level). Under GSCP and SBWMP, water user groups (WUGs) are formed where investments are around a common well. In addition, a WUA is formed of WUGs or among individual beneficiaries in each area for common purposes, largely training (see Box 4 below).
- *Full service WUAs* to be piloted under the Japanese grant-financed Community Water Management Project being implemented by WEC. Irrigation farmers in a discrete water management area will be responsible for sustainable management of the water resource.
- *Rural water supply WUAs*, which have long existed to manage community-based schemes, and which are now actively promoted under public projects (GARWSP, RWSSP) or by NGO (e.g. CARE) projects.[23]

Box 4: WUAs in Beit 'Ithrib

At Beit 'Ithrib in the Sana'a Basin, 72 farmers got together in five Water User Groups and federated into a single Water User Association with the help of SBWMP. Only a few members have yet got subsidized water saving investments under the project, but those who have done so already report excellent results: lower costs, higher productivity and a 50% saving in water. One farmer says he has reduced his pumping hours per *libna* from 20 to 4.5.

At first, some of the farmers are not very clear what the WUA is for, once they have got the subsidized equipment. But then the head of one WUG (*jamaiyya al-mahjal*) speaks up. "The first idea is awareness," he says, "awareness and monitoring. We shall watch each other. Expansion of the cropped area will not be allowed. We are all aware of the problem." Then another farmer speaks up. "Our objective," he announces, "is water conservation…not expanding…we want modern irrigation, lower costs, higher income…."

When asked if they would all reduce pumping together, they say 'yes' – but only when they have the modern irrigation equipment. And that, sadly, is more than a year late in being delivered to them.

Source: authors' compilation, focus group discussion, Sana'a Basin, November 30, 2006

Experience to date shows that WUAs can help farmers, particularly smaller farmers, in several ways:

1. as a means of accessing public programs for subsidized investments, training etc. (as at Falej in Wadi Kabir, see Box 5 below)
2. as a solidarity mechanism, allowing water users to take collective action against more powerful interests – see the example in Box 5 of the Falej WUA acting against resource capture

[22] IIP P062714, 2000. GSCP P074413, 2004. SBWMP P064981, 2003
[23] See Section 5.2.2 below for a discussion of rural water supply WUAs

(unsuccessfully as it happened, neatly demonstrating the need for a better functioning governance and regulatory system, on which see 4.4 below)

3. as embryonic 'water management agencies', beginning to set their own rules, e.g. about well drilling and deepening, the number of pumping hours etc. (see Box 4). In Wadi Warazan, a WUA official mentioned "We impose a fine of 5,000 Rials on anyone taking water illegally."[24]

However, there are risks – as with WUA programs in many countries – of going too fast and of overloading these organizations. Close attention is needed to the purpose and sustainability of WUAs. If they are to be effective in water management, they have to provide a service that members value, and if they are to be sustained they need ongoing support. Members of the IIP WUAs, for example, consider that the WUAs will only survive if they have some water to manage, and if institutional support continues after project closing, whether through the Irrigation Council, MAI, or the Local Council (see Box 5). The Governor of Abyan, who has enormous experience of irrigation management, said that WUAs had their limits. In spate irrigation, for example, he said they could manage the lower level system, but WUAs managing secondary canals and above would be very risky. "And irrigation management transfer in spate is a fantasy"[25] (see Box 6 below). There is a risk, too, of what the Chairman of the Farmers Union called derisively 'imaginary WUAs', set up under projects to chase benefits. He might have had in mind the type of WUA, that the study saw in Wadi Siham, where the "member" even forgot that it existed until prompted (see Box 10 below)[26].

WUAs would also work better – and stand more chance of becoming 'water managers' if the governance and regulatory environment improves (see again Box 4 and Box 5). In the case of Falej, the WUA would plainly have been strengthened if their attempts to complain had resulted in a positive outcome. The Chairman of the Agriculture Committee of Parliament wisely observed: "WUAs alone cannot control water management. Enforcement and monitoring and supervision are required from NWRA and MWE. The police and attorney general's office need to be involved…solid cooperation is required from Security…and support from the local councils." [27]

Finally, there can be a problem of equity within WUAs: the basis of a WUA is a 'democratic' one, but experience is that large farmers and water resource owners will not join – this was the problem that undermined the WUAs set up in the mid-1990s in Habir and al Haima near to Ta'iz under the Ta'iz Pilot Water Supply Project. The sheikhs who controlled most of the wells were simply not interested in joining. And when larger farmers do join in, as in Wadi Tuban and Wadi Zabid under IIP, the problem is then how to avoid their controlling decision taking.

The heterogeneity in the WUA experience is to be expected during the first phase of WUA development, but there is a need for cross-fertilization, learning and the application of lessons to building best practice approaches. Ultimately this process should lead to some alignment on common practices and perhaps to legislation or by-laws confirming the responsibilities and powers of WUAs.[28]

[24] Focus group meeting, Wadi Warazan, December 10th, 2006
[25] Key-informant interview, Abyan, December 14th, 2006
[26] Focus group discussion, December 16th, 2006
[27] Focus group discussion, Sana'a, December 4, 2006
[28] Again this is a possible topic for the *IWRM group*.

Box 5: Water user associations and water management

In Wadi Kabir in Lahej, the village of Falej is dependent on both spate and on wells sunk in the alluvial aquifer that receives some recharge from the floods each year. A young farmer Yahya Mohammad Ali is taking part in both GSCP and IIP. He has bubbler irrigation on his newly-planted mango trees. He says irrigation that used to take 24 hours or more can now be done in three hours, and the diesel used that used to be 200 liters per irrigation is now only 30 liters. He says that he uses the water he saves for his tomato crop.

He is very concerned about water because the level in his wells is continuing to drop. He blames excessive upstream extraction of groundwater – the groundwater flows down the wadi just like surface water. He also blames excessive upstream spate diversion. He says that he has had no spate water on his land since 1997, and some upstream farmers are "taking twelve irrigations" whilst he gets none. When he went with his WUA to try to talk to the Complaints Committee of the Lahej Irrigation Council, the upstreamers – from Khalaf, Hussein and Habil – "shot at them".

Despite these problems, his WUA, which has thirty members, is part of the IIP program, there have been some works on the secondary and tertiary canals that connect them. He is hopeful that he will get some spate water next season. The structures have recently been completed, and he is waiting to see if the upstreamers "continue to take all the water". He believes that the management of spate needs to be backed up by the police and the courts, but he has little confidence that this will happen.

Source: Authors' compilation, focus group discussions, Wadi Kabir in Lahej, December 13, 2006

4.2.2 Recognizing existing rights and controlling expansion

The Water Law provides that existing water use rights are to be recognized. However, with the exception of a small pilot to register rights in the al Dhabbab District of Ta'iz (see below), no formal program to recognize these rights has been undertaken. Nevertheless, where well inventories have been carried out, this has acted as a *de facto* recognition of rights – and this is understood by farmers, who no longer offer the kind of violent resistance to census teams that characterized earlier inventories (for example, those in the Northern Governorates attempted in the early 1990s under a previous project, the *Land and Water Conservation Project*, LWCP). At the time of the PSIA, a well inventory had just been carried out in Tehama without incident.

Implementation of licensing and regulation is proceeding very unevenly, but NWRA branches are clearly achieving a creditable outcome in some areas. For example, observers mentioned that they consider that in Ta'iz random drilling is "80% under control", and that in Lahej, random drilling has "largely died out"[29]. Other areas, however, report continuing major problems: in Abyan, for example, even the Governor admitted that he could not enforce the law - when someone is arrested "they are released by the Attorney General's Office"[30]. The pretext, he said, is that "the Water Law is inadequate" or "the by-laws have not been issued", but there are common suspicions of corruption in both the security forces and the judicial structures. NWRA has now set up a 'rig tracking unit', beginning with registration and rig tracking by GPS in the Sana'a basin. However, the NWRA Chairman mentioned that only 130 rigs have so far been registered, out of a total of 350 thought to be in the country (in other study meetings, estimates ran as high as 900 rigs in Yemen, but then they come and go across the border with Saudi…..).[31] During the March 2007 mission, the NWRA chairman said that the security deposit required of drillers was being increased and that heavier fines were to be levied for infractions. Two drilling rigs were impounded at the time of the mission.

[29] Key-informant interviews Ta'iz December 10th, 2006 and Lahej December 13th, 2006.
[30] Focus group discussion, Abyan, December 14th, 2006
[31] Key-informant interview, Sana'a, November 29, 2006

Where the NWRA branches are registering some success, this appears to be due to a combination of factors, including the setting up of a "hot line" with a toll free number (the number is 173) for anonymous tip offs, cooperation between NWRA and the governorates, mobilization and training of the local councils, and an awareness campaign to inform local people of the new regulations and procedures. This last action is perhaps the most important, as local rural people are the real custodians of the water resource and have the most direct interest in its sustainability. Throughout the study field visits, it was clear that most rural people seem to know what the rules are supposed to be and where to go to try to get them enforced. For the first time, there seems to be some perception that there is a more or less transparent procedure to be followed. The NWRA Chairman mentioned, the hotline is getting more than 100 calls a month[32]. Overall his assessment is that "it will take five years to get control of the situation".

However, the study also found deep scepticism and some practical disappointments amongst rural people. Few people had any positive experience to relate about the new procedures. The Falej WUA was driven off at gunpoint (Box 5). When a landowner began illegal drilling near to their wells, the Beit 'Ithrib WUA in the Sana'a Basin (Box 4) called the hotline, NWRA came, the drilling stopped for a while – and then proceeded. "*The system is rotten*," the WUA members announced unequivocally. "*We can inform – but what's the point if NWRA can't enforce*?" The Beit 'Ithrib WUA had no confidence in the local council either: "*They don't have authority*".

The principal problems appear to be the continuing institutional weaknesses of NWRA, the problems with the Water Law, and the ambiguous role of the local councils. Regarding the institutional weakness of NWRA, NWRA branches - particularly those in Ta'iz, Aden (covering Tuban and Abyan), and Sana'a/Amran - are performing relatively well, but still remain handicapped by incomplete decentralization, inadequate human capacity, and erratic and inadequate financing. Where there are good managers, the branches have managed to exercise a certain amount of autonomy, but the institutional process of decentralization is incomplete.[33] This constitutes a major handicap: the local budget is very limited and often paid late; personnel decisions are all centralized, and the skill mix is generally poor and rigid, and staff numbers inadequate - half of all NWRA staff, the Chairman mentioned, are contractual, paid by donors. In addition, a first phase of Dutch program financing (under *Program Aid to the Water Sector*, PAWS), which had promised some flexibility at branch level and which certainly provided financing for some key innovative programs, ended in September 2006 and had not re-started at the time of the March 2007 mission. This hiatus is undermining the very decentralization and full financing of branch programs which PAWS had been intended to support. See below (4.4) for a discussion of the underlying causes of these problems.

The Water Law was intended to provide legal clarity on water rights and infractions, but is apparently not doing that consistently. In Ta'iz, for example, NWRA staff said they are having to interpret or even misrepresent the law in order to stop drilling. In Abyan, the Attorney General's office refused to prosecute infractions because the by-laws have not been issued (see Box 6). Amendments were passed in parliament in December 2006. Plainly, the by-laws should now be written as soon as possible, with the collaboration of the Ministry of Justice and the Attorney General's Office. The NWRA chairman informed the March 2007 mission that this process is now underway, with the objective of having the by-laws effective "within a few months".

The role of local councils in Water Law implementation is at present very weak. The elected councilors change every four years, so there is a problem in building vision and knowledge, and councils are anyway prone to politically-driven or local favoritisms that create conflicts of interest (see Box 6 on the banana

[32] Key-informant interview, Sana'a, November 29, 2006

[33] Focus group discussions and interviews with NWRA branches in Ta'iz (December 9), Aden (December 13) and Hodeidah (December 17)

growers of Abyan). In an interview, the representative of one district near Ta'iz mentioned that the council was newly elected and they had no knowledge or capacity for water regulation. There are few technical staff at the governorate and district level to support the councils[34]. No farmer interviewed during the study had a positive experience with his local council. Most found the council remote, and even villagers' own elected member was not responsive. In Wadi Rasyan, for example, the villagers said that "the member is from the next wadi. He only looks after the people there."[35] One farmer, Nabil in al Guneid (Box 10) knows he can complain about water disputes to the council, but he expects no redress.

There are proposals in both Ta'iz and Amran to put a "water sector technical unit" at both governorate and district local council levels. In Ta'iz, this idea has been put on hold as no budget is available for 2007. Ministry of Local Administration (MoLA) officials told the study team that they recognize that "local government is very weak – but should not be written off". Through the creation of the "technical units", MoLA officials said they see the opportunity to enhance the role of the local councils in "acting on behalf of the people in balancing water supply and demand, protecting public goods and enforcing regulation, and providing water services". MoLA may provide financing for the Amran initiative as part of its contribution to the "decentralized water resource governance structure" being promoted under the German-financed integrated water management program. However, during the March 2007 mission, NWRA expressed skepticism about this proposal: as there are over 600 districts in Yemen, posting a "water officer" at district levels would be prohibitively expensive.

Box 6: Implementing NWSSIP in Abyan

The Governor, a former Deputy Minister of Agriculture and well versed in the issues, says that the governorate has benefited from many water projects:

- The World Bank-financed Rural Water Supply and Sanitation Project is finishing now – "it needs to be integrated into the permanent structure."
- Spate improvement has begun in Abyan. The Governorate Local Council instructed the Director General of Agriculture to prepare a local law for an Irrigation Council, on the model of that in Lahej. But the Governor believes "we should think twice before promoting handover of secondary canals to WUAs, as spate is too erratic and farmers are too poor to handle and pay for operation and maintenance above the tertiary level."
- GSCP is successful in the governorate. Demand is above supply.

The biggest concern is water resources management and the Governor feels more needs to be done. He points out that there have been seven years of drought. Only in 2006 were the rains better, yet the governorate is a water exporter. The Bir Hassan well field in the governorate transfers water that meets 30% of Aden's needs. NWRA, he feels, needs to be stronger in the governorate. They have no branch, but "visit once a week". The Governor says neither NWRA nor the governorate authorities can control drilling. "There are seven contractors, each with several rigs". The main problem, he says, is the unwillingness of the police and the judiciary to enforce the law. When someone is arrested, they are then released by the Attorney's Office. The justification given is: inadequacy of the water law, or lack of by-laws. But bribery is suspected. The Governor doubts NWRA's claim to have controlled illegal drilling 100% in neighboring Lahej.

Concerned about the drought, the Governor proposed to the Governorate Local Council to impose restrictions on banana growing, which uses vast quantities of water (20,000 m^3 a hectare or more). This was rejected. There are, apparently, many banana growers amongst the elected members of the Council.

Source: Authors' compilation, key informant interview, December 14, 2006

[34] Key informant interview, Wadi Rasyan, December 11th, 2006
[35] Focus group discussion, Wadi Rasyan, December 11th, 2006

4.2.3 Revision of the economic incentive structure for agricultural water use and increase in income per drop

Government raised the diesel price from Rls 17/lit to Rls 35/lit under pressure from international institutions in mid-2005. This decision produced some protests and 35 demonstrators were killed. The measure, although still inadequate to bring prices to border parity level, had an immediate effect on the cost of water throughout the rural economy. During field visits, the study found that in many areas, particularly in areas of deep groundwater where pumping costs are high, the cost of producing water has doubled. The price of water in local water sales between farmers and to tankers has also gone up sharply. The cost of drinking water in rural areas increased considerably, often doubling. In Ugaila village in the Tehama district, for example, the price per m^3 of water went from Rls 30 to Rls 60 after the diesel price rose (see Box 21 below). For the first time, water seems really expensive to Yemen's rural population, and rural people are increasingly having to take account of that in their decisions.

In response, farmers are adopting various coping strategies to maintain their incomes. Those who can grow *qat* and are not yet doing so, are now more likely to do so: in many areas, *qat* is now the only crop that can pay the cost of water. Box 11 describes the emergence of a *qat* monoculture in low rainfall areas around Ta'iz. A few farmers are investing in piped conveyance and controlled on-farm irrigation, some even in greenhouses, thereby reducing water losses and increasing returns per unit of water – see for example the experience of farmers in Lahej described in Box 8. Some public programs are subsidizing modern irrigation equipment to help farmers get 'more income for less water'. The diesel price rise is driving a strong demand for these programs – see, for example, Box 7 on Sa'ada, where demand is surging. In some cases, this is associated with reduction of water consumption, in other cases, farmers use "saved" water elsewhere – or sell it. Improved irrigation seems to be associated with a decrease in labor use, as shorter irrigation times and automatic conveyance require less manual intervention (see Box 10 for a case in Tehama, but the story was the same at all study sites.)

Rural people generally are reducing their water consumption. Those who used to buy water for farming are now less likely to do so. In very water-stressed areas visited by the study team, even *qat* cannot pay the water bill: see, for example, the case of the farmer in al Guneid near to Ta'iz, whose gross income from *qat* is Rials 1 million – *of which four fifths goes to pay his water bill*. Not surprisingly, he has had to reduce his water purchases and to cut production (Box 11). Poor households are consuming less piped domestic water and less purchased water – at Ugaila village in the Marawea'a District of Tehama, for example, villagers mentioned that consumption of even drinking water has dropped. These changes are having a negative impact on rural livelihoods.

Box 7: The diesel price rise bites in Sa'ada– but stokes demand for help with water saving investment

The Sa'ada Basin Committee is looking for solutions to one of the worst groundwater depletion problems in the world. They said outright "The increase in diesel price helped us a lot. The rate of overdraft has dropped (to two metres a year)." They see the farmers' salvation in modern irrigation, with subsidized equipment under GSCP. The farmers are ready. The problem is that GSCP cannot keep up with demand, which is "five times greater than what the project is doing".

Source: Authors' compilation and focus group discussion, Sana'a December 5, 2006

There has been no change in agricultural trade policy. Yemen is currently negotiating the agricultural chapter for access to the World Trade Organization (WTO) and is likely to make changes in its agricultural trade and subsidy policies in that framework. No move has been made on *qat* imports.

On water rights and water trade, NWRA Ta'iz branch has undertaken preparatory work for a pilot project in the al Dabbab District of Ta'iz. The NWRA Chairman explained that the project was designed in four stages: (1) an awareness phase, with a socio-economic study to assess the situation; (2) a technical study of the water balance; (3) determination and confirmation of individual water rights; and (4) a pilot program to license water sales[36]. However, at the time of data collection, this pilot project was on hold with the Dutch *PAWS* financing of NWRA suspended (see above, Section 4.2.2).

Box 8: The challenge of improving the returns to water in agriculture: farmers in Lahej explain the difficulty of getting more "income per drop"

In Wadi Tuban, the study team visited a demonstration farm for GSCP. The farm is ten hectares irrigated by three wells in the alluvial aquifer. The wells are about 100 meters deep. The GSCP demonstration scheme is irrigated by a well that is 97 meters deep (they deepened it from 70 meters some time ago). The young farmers – Yahya Mohammad Ali and his brother Arafat - share the land and are irrigating mangoes with bubbler. They say that they see the irrigation extensionist from the project every ten days or so, and the agricultural extensionist somewhat less often. The irrigation extensionist, who is from the Irrigation Advisory service of GSCP, is present at our meeting. He says that at GSCP they have some brochures on water management to hand out. Both brothers have no prior knowledge of irrigation intervals or quantities for bubbler on mangoes, and are proceeding by trial and error, gradually reducing the doses. The extensionist does not seem to have access to a soil moisture testing kit, so it is not clear how he is measuring whether the trees are getting the correct dose. When the farmers ask some probing questions about irrigation intervals, the extensionist simply replies that "citrus (*leem*) likes to be kept thirsty". The brothers look doubtful.

The big problem mentioned here is marketing. The brothers think there should be agreement amongst farmers to limit and phase planting. They say they used to grow cauliflower and cabbage under flood irrigation, but now they are afraid not to have enough water. Arafat's suggestions are that the GSCP project should do trials on drip irrigation etc for tomatoes and other horticulture products and then train the extensionists. The pair would be interested in joining a marketing cooperative – they are not against cooperatives despite their chequered history in Lahej – but only if the system could be fair for all: they say "the justice system needs to be cleaned up".

We are joined by their cousin, an energetic and intelligent young farmer who recently graduated in biology. Although he has no well, he buys water for Rls 700/hour ($3.50) since the diesel price increase – previously it was Rls 400 ($2). Until recently he had half a hectare of drip irrigation that he installed himself to irrigate lilies for the flower market. The drip system saved an enormous amount of water – he says he reduced from three days irrigation to three hours (but this is clearly a metaphor for "a lot"). The distribution pipes were locally manufactured by Hail Said: he paid Rls 10,000 ($50) for the pipes to irrigate his half acre plot. He had problems "finding growth hormone for his lilies" – and had to get it specially from Saudi. He has stopped growing lilies now, as the market was too risky. Now he has planted mangoes, as they are slow, but sure – not too demanding water-wise, and with a good market. He is still interested in horticulture.

This bright young farmer's biggest constraint is managing the market risk. He says that tomatoes, that were selling for Rls 3,000 a basket a month ago, are now Rls 700 a basket (and it is true that the local markets up and down the wadi are full of low priced tomatoes).

For these farmers, the rising cost and growing scarcity of water are sending strong signals to try to get more "income per drop". Modern irrigation is certainly proving a big water saver. It is not clear that it is reducing water consumption, but it is certainly increasing farmer incomes. Yet there is much more that could be done. There is a strong need for more technical packages on high value crops (both irrigation management and agriculture). What can research offer? Extension seems to have potential that is underutilized. And what about the market problems (both inputs and outputs)? There is a need for some innovative solutions, perhaps cooperatives.

Source: Authors' compilation, focus group discussion, Wadi Tuban, Lahej, December 13, 2006

[36] Key-informant interview, Sana'a, November 29, 2006

Programs to improve water productivity in agriculture are being implemented by MAI. AREA and some regional development programs are doing research and developing extension for irrigated agriculture, although the study found scant evidence of any results available at field level. See, for example, the difficulties one go-ahead farmer had in sourcing advice and inputs for flower growing (Box 8). There are some demonstration activities – see for example, the greenhouse pilot project in Wadi 'Arafa near Ta'iz described in Box 9. Generally, however, except in the context of specific projects (see below), the study found that water management advice and high value cropping packages that can genuinely produce more income for less water are not available, and extension outreach is very limited. Very uncertain internal and external market conditions also create risk aversion amongst farmers and constrain the development of higher value cropping (again see the experience of Lahej farmers described in Box 8, and that of the greenhouse farmer in Wadi 'Arafa in Box 9).

MAI is, however, devoting very considerable resources to several special programs and projects supporting improved water productivity. Programs include: the Groundwater and Soil Conservation Project (GSCP); the Irrigation Improvement Project (IIP); and the Sana'a Basin Water Management Project (SBWMP), together with programs financed by the Agricultural Cooperative Union (ACU) and the Agriculture and Fisheries Production Promotion Fund (AFPPF).

The *Groundwater and Soil Conservation Project (GSCP)* is a six year program [2004-2009] to provide piped conveyance on 27,000 ha and pressurized on-farm irrigation systems (drip, bubbler) for 1,440 ha[37]. The project is being implemented through 10 field units. In addition to subsidies on studies, equipment and installation, the project also provides farmers with water management advice through its Irrigation Advisory Service, and promotes the formation of WUGs, especially for shared wells. GSCP is proving a popular program, and the implementation teams are energetic and dedicated. Throughout the field visits, the study found both agencies and farmers keen to see the program expanded rapidly: the Sa'ada Basin Committee sees improved irrigation as the essential counterpart to diesel price rises, and estimates demand at "five times" what is available (see Box 7); farmers already in the program ask for more (see the case of Sheikh Abdul Karim in Mawiyya, Box 10); and so on.

Study findings regarding this most useful program concerned equity, productivity impacts, the role of monitoring and evaluation, and the conditions for scaling up:

- *Equity aspects*: as in all subsidized programs, there is a tendency in GSCP for the better off to get the lion's share (see, for example, the case of one rich old man doing well out of the subsidies, Box 10 – and see also the full discussion in 4.4 below on whether subsidies are justified)
- *Productivity impact*: a first round saving of water and of diesel costs is readily achieved, simply by improving the efficiency of conveyance and on-farm distribution. All the GSCP farmers interviewed during the study attested to very large water savings, typically 40-50% or more – see, for example, the case in Wadi 'Arafa described in Box 9. However, the real potential of modern irrigation technology – improved water management, higher value crops, improvements in crop husbandry and post-harvest handling, market development – has scarcely been touched upon by the project. The GSCP farmers interviewed during the study had generally done little or nothing to improve their farming, leaving the impression that, so far at least, GSCP was just about pipes – see for example, the case in Wadi 'Arafa (Box 9) and the case in Hodeidah Governorate (Box 10).[38]

[37] As of November 22, 2006, the improved groundwater conveyance system has been installed for 6,024 ha while survey and designs have been carried out for a further 6,930 ha out of the target of 27,000 ha (Aide Memoire).

[38] In addition, during review of the draft of this report, criticism was raised of some of the drip irrigation investments supported by GSCP: lack of intensive training in maintenance; no supply of chemicals to keep drippers clean; no proof of water savings as meters are not installed soon enough to allow comparison of water usage before and after….

- *Monitoring and evaluation*: more knowledge about the technical and economic potential of irrigated agriculture in Yemen could be gathered from GSCP, but this would require a sharpening of the monitoring and evaluation system.
- *Scaling up*: GSCP project managers told the study team that the project will address the problem on, at most, 7% of Yemen's groundwater irrigated area. Demand is said to be well ahead of GSCP's capacity to meet it, especially after the diesel price increase. Ways of scaling up at least cost need to be found.

Box 9: GSCP and AREA contribute to water saving – but lack of knowledge and high market risk keep productivity below potential

Wadi 'Arafa is a dry area of granite outcrops. The GSCP farm is just beside the road. It is a demonstration farm, and the farmer has received pipes and drip irrigation on half his farm. The well dates from 1990, and has been deepened from 80 m to 120 m. There is, the farmer tells the study team, some depletion in the summer time. He is keen on GSCP: he reckons that he has reduced his water pumping by 40%, and the irrigation time that used to be 12 hours is now 6 hours. He has saved on labor costs, too: where he employed ten laborers before, now he employs only five. Yields have gone up as well: in the season, he is harvesting 100 baskets of tomatoes every three days compared to 70 before. However, he has changed nothing in his cropping pattern, nor in his production practices, and he has learned how to handle drip irrigation by trial and error.

Over the road, another farmer has a greenhouse. This has been paid for by French aid as part of an AREA project. The researcher, Dr Taher, comes from AREA in Ta'iz once every ten days. This is a wide awake farmer in his fifties, and his crop husbandry seems excellent. He is raising cucumbers, using drip irrigation, plastic mulch and fertigation, and selling for good prices. But he says he would not invest his own money in a greenhouse as the cost is high (Rls 400-500,000), it is a lot of work, and the market is too erratic. He fears he could not compete with the "one thousand plastic houses of Sa'ada". In addition, he has had some technical and farming problems: hail and wind have ripped at the plastic house, there are nematodes in the soil, and the leaves have had fungal diseases.

Source: Authors' compilation, Wadi 'Arafa, December 10, 2006

The *Irrigation Improvement Project (IIP)* is a five year program (2001-6), currently being extended. The objective is to improve water management in two major spate schemes and thereby increase productivity and smallholder incomes. The schemes are rehabilitated. An agricultural demonstration program under farmer management on 5,000 ha has been set up, and water user associations to take responsibility for managing tertiary canals (and perhaps ultimately secondary canals) have been established.

The *Sana'a Basin Water Management Project (SBWMP)* is a five year program (2004-8), that supports the formation of WUAs and investment in modern irrigation on 3,600 ha[39], within an overall basin management framework and under the guidance of the basin committee. It is thus the only project integrating water resources management and irrigated agriculture. Considerable development has taken place on the institutional side, particularly setting up of the Sana'a Basin Committee and the development of WUAs (see 4.2.1 above). However, despite the promising design and institutional achievements, at mid-term review in late 2006 the SBWMP showed less than satisfactory implementation performance, with particularly slow progress in the irrigation modernization component. Management improvements were agreed, notably a slimming of staff and transfer of responsibility for the project to the NWRA Sana'a Branch, and the project is now expected to achieve its targets and objectives.

[39] This includes open channel conversion to piped conveyance systems (about 1,440 ha); upgrading of existing piped delivery systems (about 150 ha); introduction of modern on-farm pressurized irrigation systems (fields served by piped systems- about 1,968 ha); plastic tunnels/covers for technology demonstration purposes in localized irrigation system areas, 10 ha. In addition, social mobilization is a key component with 35 WUAs, 498 Water User Groups and 4,770 member farmers (*Source*: mission aide memoire December, 2006).

Agricultural Cooperative Union (ACU) programs partially use funding from the AFPPF to sell subsidized irrigation water conservation equipment – largely pipes for conveyance – to cooperative members. The major concern with the program is that the cooperative movement is limited in its membership and dominated by large farmer interests.

The *Agriculture and Fisheries Production Promotion Fund (AFPPF)* is an extra-budgetary fund. It is set up to recycle some of the proceeds of successive diesel price rises back into the agricultural sector in support of productive investments. AFPPF provides most of the financing for the MAI's much-criticized small dams investment program. Changes to the AFPPF under NWSSIP and the proposed further reform agenda for AFPPF are discussed in the institutional and political economy analysis in Section 4.4 below.

Box 10: The rich get richer…..

In the downstream area of Wadi Siham, water is plentiful at present, but over pumping has led to sea water intrusion. Salinity is going up (about 1,800 mmol), not yet critical but deteriorating and a threat for the future. We visit the farm of Sheikh Abdul Karim. He has invited some of the neighboring farmers, and also workers from his own farm. The farm is about thirty hectares, irrigated by wells. The crops include tobacco, sesame, cotton, okra, hot peppers, water melon. He sells largely to traders who come to the farm and collect the produce in their own transport. He is philosophical rather than provident about the market: "sometimes it is good, sometimes not." He says he employs up to 50 people in the season.

He has GSCP conveyance pipes on 10 hectares around one well. The well is 100 m deep and was last deepened about twenty years ago. He says he has no problems of quantity or quality. Factors which impelled him to seek GSCP aid are the rising costs of diesel and – he says – of labor. He pays women about Rls 200 a day, and men Rls 300. He is very satisfied with the pipes because they cost only one third of what equivalent pipes retail for locally – Rls 800 from the project against Rls 2,800 from the local stockist. He is also happy because he is saving on fuel: where he was buying 400 litters a week he is now buying only 200 liters. He says that water which used to take three hours to reach a field; here he points to a field about a hundred meters away - is now there immediately.

The service he got from GSCP was good, he says. He applied, was told to form a water user group, a surveyor visited his farm, he signed the papers and made his deposit, and then he got the pipes. He says the whole process took only two weeks, but the GSCP staff say this cannot be right. He has no problems or suggestions for the project, except to request more pipes for the other twenty hectares. He mentions this repeatedly throughout the discussion. However, he says he would not just buy the pipes from the market. He claims he has no money left after his own contribution to the project (Rls 200,000, $1,000). He says he has had no advice from the project about water management or irrigation scheduling, and no advice about cropping – he learned long ago and does it all in the same old way, he says.

When we ask about his water user group, the sheikh at first does not recall it. But when prompted, he remembers that to get the pipes they formed a group called *Majma' Suleimaniyya*. Recollecting, he says vaguely that they will have some training activities soon.

Here the pipes certainly save water, and are reducing consumption. He is pumping with less diesel. The project, however, is quite limited: really just a survey and some pipes. The sheikh has not adopted any different irrigation methods or changed his cropping pattern. There is clearly no poverty reduction impact, as he is the biggest farmer around and comfortably off. He may in fact be reducing employment with his water saving, and his laborers are certainly poor. It is not clear whether such a farmer should really be the priority for a large public subsidy.

Source: Authors' compilation, key informant interviews and focus group discussions with farmers in Alyowmain, in Marawea'a in Hodeidah Governorate, December 16, 2006.

Although *qat* continues to generate considerable debate, no specific action has been taken to treat *qat* as a crop. In fact, the previous attempt to set up a research and extension activity on *qat* has died away. Recent discussions in cabinet and parliament have focused instead on a possible regulatory agenda – for example, it was reported to the March 2007 mission that 67 members of parliament have signed a motion calling

for *qat* production to be eliminated within ten years, and that a Cabinet decree has been issued to "prohibit *qat* planting in the plains, and to confine production to hill slopes. Meanwhile, NWRA specifically excludes *qat* from its licensing program. Yet *qat* is far and away Yemen's principal crop, and much could be done to improve its water productivity (see Box 11).

Box 11: Qat as a crop

We pass through Mawiyya, a very low rainfall area – about 300 mm a year on average, at the very margins of agricultural feasibility. In the fields a farmer is rooting out *qat*, which he will sell as planting material. He has never seen an extension worker since he was a child. He says: "In our valley, wells are legal, but in Wadi Kai'dan (next valley) they are illegal." His water is dwindling fast: now he pumps for two hours every 20 days. "Without *qat*," he says, "we would be dead". There is a tanker carrying water for *qat* parked on the road next to his farm.

We carry on through Sueda, a rackety market town that has sprung up from nothing in the past five years, thriving on the *qat* business, and arrive at the village of Qarya al Guneid. This is a granite area with pockets of water in fissures only. The main crop here is *qat*. It is the low bush variety, which produces three harvests a year. The first, *al muharra*, is the best quality: it requires up to twelve irrigations; the second, *qatl*, soon follows: it produces only small pieces and requires only one or two irrigations. The third, *jumum*, requires six irrigations.

The first farmer we meet grows some *qat* himself. He also leases part of his land and water to a '*qat* contractor' and gets in return three quarters of the crop. He is one of nine brothers who own wells and land: they supply water to a total of forty farmers, and are farmers themselves. He has never heard of GSCP or of WUAs, but would consider "joining a qat WUA". He has a well that is 50 m deep – it used to be 22 m. Deep drilling, now up to 350 m, is needed in some parts of the area. He started planting *qat* 20 years ago on a pilot basis, and has extended it progressively. He has never seen an extension worker, but learned farming from his grandfather, and has learned *qat* farming by trial and error. He buys his chemicals – Saudi fertilizer and German pesticides – from Ta'iz, and uses a lot because they "make the leaves a nice shape". There is also a green larva that he sprays against. Before, he grew other crops – maize, corn, mangoes, papaya, potatoes, tomatoes – but *qat* is the most profitable.

A second farmer, Nabil, is young and unmarried. He says, "I studied in Ta'iz, but I couldn't find a job, so I had to start on *qat*." Until two years ago, he says, anybody could drill. "It was good to stop it, but now it is anyway too expensive - around YR 8-9 million to get to the depth needed. If there is a dispute…well, there is a small department at the Local Council to complain to." But he doesn't look convinced. *Qat* is profitable for him, but margins are not always so big in this water short area. He may clear Rls 300-400,000 ($1,500-2,000) from his *qat*, with expenses of Rls 250,000 ($1,250). But if he can sell to Saudi, then he can get Rls 700,000 ($3,500). There are some landless in the village. Some can find opportunities as sharecroppers on *qat*. But labor opportunities are limited as most farmers try to do all their own *qat* work, except for picking, which is often done by women or children because they are cheaper.

A third farmer has 80 rows of *qat* about 50 meters in length, and estimated his land at half a hectare. Last season, he grossed Rls 600,000 ($3,000) from *al muharra*, Rls 100,000 ($500) from *qatl*, and Rls 300,000 ($1,500) from *jumum*, a total of Rls 1 million ($5,000). But since water became so scarce and the diesel price went up, he has had to abandon some of the land that he was previously contracting on. Now he is paying Rls 2,800 ($14) an hour for water and each irrigation is 15 hours, so that his water cost alone is (2800 x 15 x 20) = Rls 840,000 ($4,200) a year, leaving him a net of only Rls 160,000 ($800).

All of these farmers were soaking the earth with furrow irrigation. None of them had considered or even heard of drip irrigation. Plainly these farmers are coping as best they can. For them, *qat* is a survival strategy and they get no help of any kind. There seems to be a case to treat *qat* as a crop here: to do some research and extension, to help particularly on water management, even include *qat* in water saving programs like GSCP.

Source: Authors' compilation, interviews and focus groups amongst the qat fields of Ta'iz, December 9, 2006

4.3 Distribution of livelihoods impacts

Ample empirical evidence is available to show the impacts of increasing water scarcity on agricultural livelihoods in the absence of reform (see for example, Ward, Christopher, 2005). Farmers using groundwater are already experiencing over the short to long term a decline in water availability, a rise in pumping costs and a decline in farm income. Conflict and out-migration are on the increase. For instance, the CSA highlights that the local systems for solving water-related disputes have weakened as tribal leaders, who have the traditional conflict resolution functions over water, increasingly become one of the largest consumers of groundwater. This is particularly the case in the northern highlands, where the tribal system still dominates social organization. With patronage as the main means of redistribution, tribal customs for mediating and preventing conflict are not always respected. [40]

But what are the expected and actual impacts of the NWSSIP reforms in water resources and irrigated agriculture on different stakeholders, and what are the orders of magnitude? What are the short-term versus long-term impacts? What are the direct and indirect impacts? This section provides some indications on these questions, based on the preliminary findings where reforms have been visible.

Assessing the impact of reforms: (a) on different segments of the farming community

Tables 3 and 4 provide a synoptic view of how the impacts of the reform program can be transmitted through six "transmission channels" to different segments of the population.[41] Each of these six transmission channels – authority, labor markets, prices, access, assets, and transfers and taxes – is discussed in the following paragraphs. The analysis is based on a combination of PSIA fieldwork and literature review. Table 3 summarizes likely impacts on the different segments of the farming community. In summary, these are likely to be:

- ***Farmers in areas of better groundwater recharge or availability and those with good access to urban or export markets*** should be able to improve their incomes. Agricultural employment should increase in these farming systems. Positive impacts will increase where the state provides support for "increasing incomes per drop" through capital subsidies, technology development and transfer, market development, and integrated water resources management. Some evidence of this impact is already discernible: see, for example, the satisfaction of the GSCP-aided farmers documented in Boxes 9 and 10.

- ***Farmers in very water scarce areas, particularly those far from markets, may see their incomes drop and local employment in farming will decline***. Negative impacts can be mitigated by the same package of measures, provided that the results provide sufficient incentives to farmers. There is already evidence that where farmers face very high water costs, they reduce their activity: see the case in Mawiyya, for example (Box 11).

- ***The harshest negative impacts will be on farmers who do not own water resources and on landless laborers*****,** as the cost of purchased water will continue to increase, and agricultural employment will diminish in many areas. The study found evidence already of decline in demand for labor.[42] These impacts could possibly be mitigated by public intervention focused on promoting development of

[40] World Bank 2006a

[41] Poverty and social impact transmission channels consist of authority, price, access to goods and services, assets, employment, and transfers and taxes (World Bank, 2003, A User's Guide to Poverty and Social Impact Analysis)

[42] Sheikh Abdul Karim has laid off workers (Box 10), and in Wadi 'Arafa, the GSCP farmer had cut his labor force from ten to just five workers.

markets for high-value, labor-intensive cropping, such as high value horticulture. However, the market risks of horticulture are considerable – see for example the case of greenhouse farming described in Box 9 – and Yemen faces many problems in developing horticulture for the domestic and export markets (see Box 12 in particular).

Assessing the impact of reforms: (b) on the rural population as a whole

Table 4 assesses expected impacts on the rural population as a whole of the reform program, both by subset of reforms and the whole program taken together. These impacts are discussed in the following paragraphs, analyzed by each of the six transmission channels.

The "authority" transmission channel

In the water reform program, there are three important changes in authority[43] likely to have an influence on the impact of reforms: (i) decentralization to local government; (ii) the decentralized approach to water management through WUAs; and (iii) the application of the Water Law and a regulatory framework.

(i) *Decentralization to local government*, with power and responsibility to intervene in water resources management, should in principle increase the responsiveness and transparency of the system. In practice, however, two parallel risks may undermine these outcomes, at least in the short term: (1) the District Councils will remain extremely weak in implementation capacity in the water sector (see 4.2.2 above for a discussion of this issue and of the attempts to overcome it); (2) in the Yemeni context, a process of elite capture is almost inevitable, with the domination of councils by the local sheikhs, a pattern found in several districts during the study field work (for example, in Hajdah District, Ta'iz Governorate, and at the governorate level in Abyan (see Box 6).

(ii) *Decentralization to WUAs* should increase equity of decision taking, but time will be needed for institutional capacity to develop. In addition, experience with user associations has been that larger farmers and asset owners may either refuse to join, or may join and dominate: either case undermines the basic rule of a WUA which is equitable water management for mutual benefit (see 4.2.1 above for a discussion of the development of WUA capacity to date).

(iii) The *Water Law* is intended to make water entitlements and their regulation transparent. However, until regulatory capacity increases, the influential are likely to continue to increase their entitlements. The study witnessed several unlicensed drilling activities (in the Sana'a Basin, and in Amran Governorate). In some areas the authorities freely admit that the Water Law is currently very hard to implement (see for example, the case of Abyan described in Box 6). [44]

Labor markets

Labor market impacts will be felt predominantly by the poor (agricultural laborers). In the short term, there are already signs that labor demand is declining as land owners invest in labor-saving irrigation technology (see above, and Boxes 9 and 10). In the longer term, there should be positive impacts in some

[43] Authority is defined as rules, powers and entitlements on decision-making behavior and livelihood strategies (World Bank, 2005b)

[44] See also the discussion on Water Law implementation to date above (4.2.2).

areas as more intensive high value agriculture develops. The size and distribution of these impacts should be monitored.[45]

Prices

Direct price impacts are being experienced by farmers purchasing diesel, while indirect price impacts are important particularly for the poor and landless. *Direct price impacts* affect farmers who purchase diesel (14% of rural households), spending an average of Rls 2,633 monthly before the diesel price rise. However, in deep groundwater areas such as Sa'ada and Sana'a, a much higher proportion of farmers purchase diesel (33%), spending an average of Rls 2,762 monthly before the price rise. Agricultural use of diesel predominates (68%). The effect of the price rises has been to double the cost of diesel for these households. First round distributional impacts are predominantly on the better off (35% of the top decile use diesel, only 3% of the bottom decile)[46].

If government were to allow competition from lower priced imports, direct price impacts would also be experienced by *qat* and fruit and vegetable farmers. These impacts would be felt primarily by the better off farmers, and they could represent a significant loss of income to Yemen's growing horticultural industry. Horticultural development has, in any case, been dogged by uncertainties and false starts. If progressive conversion to higher value crops is to be the mechanism by which Yemeni irrigated agriculture is to survive and to maintain incomes and employment, there is clearly a long way to go.

Indirect price impacts are very important, particularly for the poor and landless: (1) the price of water sold to farmers or to the potable tanker trade has increased; (2) the price of domestic water in rural areas served by pumped systems has increased; and (3) the price of transport has increased and with it the cost of all traded goods. In the participatory rapid appraisal carried out for the Energy PSIA[47], it was this last indirect price impact that led *all* respondents to oppose diesel price rises.

Although the size and distribution of these impacts have not yet been tracked systematically, it is clear from the study field visits that the reverberations of the diesel price rise have been felt throughout the rural economy and that the immediate results have been a strengthening of the "rush to *qat*", a decline in other agricultural activity, a drop in agricultural employment, and a rise in the cost of domestic water (see Boxes 8-11). Larger farmers have the best access to means of buffering this shock, for example by accessing often subsidized investments in water productivity improvements (see 4.2.3 above).

Are subsidies justified?

The question of whether subsidies are justified (and how to manage to achieve policy objectives) is one of the most difficult issues for water saving in agriculture (and the same applies in different ways for rural water supply, see Chapter 5 below). It is clear that reducing the implicit diesel subsidy is having a negative impact on incomes and a compensating subsidy on water efficient technology through GSCP, SBWMP and other programs seems a natural policy response. However, there are problems here of the better off collaring the largest share (see the several examples given above, particularly that of the sheikh in Box 10). "*Subsidy in Yemen*," the Minister of Water said at the December 2006 PSIA workshop – speaking 'as a citizen and not as a minister' – "*is a form of corruption that does not reach the deserving people. There is a budget of $600 million for subsidies, which do not benefit the poor."* In fact, a subsidy

[45] This study did not quantify labor market impacts as this analysis was beyond the PSIA scope. However, future research, and in particular the upcoming "*Study on Options for Changing the Economic Incentive Structure for Water Use*", should provide more representative empirical data on these impacts.
[46] Source: Household Energy Survey (World Bank 2005c)
[47] World Bank (2004a)

on water efficient technology would never go to the poorest, who have no water resource to manage, but who still face higher prices consequent on the diesel price rise. Clearly, any subsidized program needs to be carefully thought out and transparently implemented, difficult conditions to satisfy in Yemen's political economy.

Access

Impacts regarding access are likely to be mixed. On the one hand, effective regulation of well drilling and deepening combined with recognition of *status quo* rights would create barriers to entry, limiting opportunity for new entrants e.g. poorer farmers wishing to develop their farms, with potentially negative distributional impacts. On the other hand, where community self-regulation operates optimally – for example, where the resource can be characterized and a sustainable management strategy implemented, access may become more equitable, with positive distributional impacts. Thus the distributional impacts of changing access are likely to be context specific. These expected distributional impacts would take some time to emerge, and will need to be confirmed by more evidence from field study. In the short term, evidence from the field suggests that the reform is restricting access more for the poor than for the better off as: (1) the better off have more clout in getting licenses or in evading regulation – see, for example, the case of Wadi Tuban in Box 8, and the discussion on regulation in 4.2.2; and (2) the better off have disproportionate access to subsidized government programs (see 4.2.3 and below).

Assets

Scarcity and regulated access would normally increase the value of land and water assets. Empirical evidence so far suggests that this is the case, with those lucky enough to own a water source being able to sell water at ever rising prices. In some areas, a class of "qat sheikhs" has arisen – farmers with irrigated land who let their farms out to "qat contractors" in return for a two thirds to three quarters share of the crop (see the examples in Box 11 above).

Transfers and taxes

Impact of the change in *transfers* affects all rural people. The reduction of the implicit subsidy on diesel affects all rural people, but particularly the poor, through the price channel (see above). Attempts to compensate for this reduction in implicit subsidies by making capital transfers for spate improvement (IIP), for irrigation efficiency equipment (GSCP), or for dams and terraces (AFPPF) also are likely to have a regressive pro-rich impact as they favor the upstream farmers and the well owners, who are already better off. For example, the distributional impact can be gauged from the fact that only 4% of families in the poorest decile irrigate land by pumping, whereas 20% in the top decile do (Table 10 in van der Walle). Even within these programs, there is an inevitable tendency to favor better off and more influential individuals or groups – see the discussion in 4.2.3 and the example in Box 10 above. The only impact of *taxes* will be on well drillers who have to pay either fees or fines (or bribes). These, however, are only a small part of the very high cost of well drilling in many parts of Yemen.

Table 3: Differential impacts of reforms in water resources and irrigated agriculture on members of farming communities

	Channels through which the rural population is affected					
	Authority	**Labor market**	**Prices**	**Access to water**	**Assets**	**Transfers and taxes**
Farmers with good access to water and markets	The rules have become more equitable, even pro-poor, but in the Yemen context, the more powerful often *qat* farming sheikhs, who control cash cropping, and who are close to markets, e.g. Sana'a) are likely to dominate new decision-making structures and continue to capture most water and rent at expense of less powerful, mainly fruit farmers. Most farmers, however, have mixed production systems.	- -	Higher diesel prices should be compensated by (possibly subsidized) investments in water efficient technology and a move to higher value crops. High qat prices and local demand currently crowd out other, traditional production systems.	Access is likely to remain good as better off farmers are more able to invest in water efficient technology – and also to maintain or expand their water rights, either by legal or illegal capture or by purchase. To ensure reliable access, farmers use tube wells and/or purchase tanker water for qat and irrigate other crops with water not used for qat.	Owners of land and water rights will get windfall gains as asset prices rise with water scarcity and regulation.	Better off farmers face higher diesel prices, and fees and fines for drilling activity, but have better access to the benefits of subsidized water use efficiency programs.
Farmers in very water scarce areas (e.g. Amran basin)	Idem	Increased use of family labor is likely, with consequent decline in use of hired labor. Qat dominates production system.	(Self) regulation and water sharing within WUAs may mitigate price rises, but overall impact on incomes is likely to be negative.	Access to agricultural water is likely to dwindle, and opportunities to mitigate shortages through water use efficiency are limited due to lack of money or fair access to subsidized water saving programs.	Asset values will rise, so that those existing farms may have higher residual values to sell.	Farmers will face higher water prices and more difficult access to subsidized water use efficiency programs. WUAs can help improve access, e.g. donor programs support non-qat farmers with WUAs, demo farms and new irrigation technology (e.g. SBWMP).
Very poor farmers, not owning water resources, and landless laborers	Idem	Labor opportunities in agriculture are likely to decline, except in high potential areas (e.g. vicinity of Sana'a, Ta'iz) where in the longer run production of high value labor intensive crops may expand.	Cost of water for all uses will go up without prospect of increases in incomes, with consequent negative impact on livelihoods.	Access to purchased agricultural water will dwindle as prices rise. In the long run, improved regulation and/or self-management should at least maintain access to domestic water supplies.	- -	The reduction in diesel subsidy translates for the poor into higher prices for both water and other products, without any compensating subsidy. Farmers in remote areas (e.g. North) face harshest impacts.

Source: Authors' compilation

Table 4: The impacts of different reform components in water resources and irrigated agriculture on the rural population

	Channels through which the rural population is affected					
	Authority	**Labor market**	**Prices**	**Access to water**	**Assets**	**Transfers and taxes**
All reforms together	Decentralization to local government may result in increased capture of power by the traditional elite.	Initial negative impacts on the poor may be reversed in the longer term.	Initial direct negative impacts on all water users, mitigated to the extent that farmers have access to the means to control resource capture and to improve water productivity and expand production of high value labor intensive crops.	Site specific, with generally neutral or negative impacts on the poor in the short term. All rural people should benefit from improved sustainability of access in the longer term.	Site specific, but possible negative impacts on the poor that will be mitigated if groundwater overdraft is reduced equitably.	Negative impacts primarily on the poor.
Decentralized management and stakeholder partnership approach	Decentralization to WUAs should increase equity of decision taking, but time will be needed for institutional capacity to develop.	No impact by itself	No short term impact likely, but if communities can over time regulate their own water use, in partnership with the authorities, resource capture should diminish and equitable water sharing increase, with positive price impacts.	Over time, decentralized management and community self-regulation should result in reduced resource capture and more equitable access to the resource, and also (through WUAs) better access to government programs.	Scarcity will drive up asset values, with negative distributional impacts on the poor. If WUAs can reduce groundwater overdraft equitably and access government programs, negative impacts will be mitigated.	No impact short term, but in the longer term WUAs should help poorer people access subsidized government programs.
Recognizing existing rights and controlling expansion	The Water Law should make water entitlements and their regulation transparent, but until regulatory capacity increases, the influential will continue to increase their entitlements.	Taken alone, this reform will reduce the demand for labor into the medium term, when more labor-intensive, higher value cropping patterns may come in.	Regulating water use will directly drive up its cost with negative impacts for all rural people. However, over time equity should improve – or at least not deteriorate, with positive distributional impacts.	At present, the better off have more leverage in getting licenses or evading regulation. Longer term, regulation and conservation combined with community self-management should sustain access of all rural people, with positive distributional effects *for communities that manage their water resources sustainable.*	Regulation will similarly drive up asset values, and also reduce access. Idem for mitigation.	Fees and fines levied on well drillers will negatively affect the better off.
Incentive structure and increasing income per drop	Water sector subsidies are being rebalanced to promote water saving. Whether these subsides are allocated in a transparent and equitable way depends on the rules and institutional capacity of public programs like GSCP and AFPPF.	Idem	In the short term, diesel price increases are driving up the cost of water with direct negative impacts for all rural people. Larger farmers face the biggest negative impacts, but also can buffer the shock by accessing subsidized investments in water productivity improvements. Trade reform impacts would be felt also by better off farmers. Indirect price impacts through fuel cost embedded in all goods is felt by all, with regressive effects on the poorest.	The more influential have better access to subsidized government water saving programs.	Diesel price increase has driven up the value of water-related assets considerably, and this is enhanced where the better off have access to water conserving subsidy programs. The anti-poor effect could be mitigated by a more pro-poor use of subsidized programs.	The better off, although losing on diesel subsidy have greater access to subsidized water saving programs. The poor, particularly affected by the diesel price increase, have less access to subsidized programs.

Source: Authors' compilation

4.4 Institutional and political economy analysis: political will and constraints, and implementation capacity

This section describes stakeholders with significant influence over water resources and irrigated agriculture reforms and assesses their possible support or opposition, including the implications of "visual power maps" which stakeholders produced during the March 2007 workshops (See Annex 3). The section also assesses likely or actual implementation constraints that may be experienced with these stakeholders.

Parliamentarians

Parliamentarians represent, to varying degrees, a constituency that upholds traditional values: individual rights to exploit water in line with custom; the rights of the tribe and the community to arrange affairs without state interference; and the expectation that the state will provide financing for capital projects for water resources development (rather than demand management).

Despite the rather conservative background and mandate of most parliamentarians, parliament has – perhaps surprisingly – consistently supported MWE, and has passed the draft legislation on water reform presented to it. There is inevitably a risk that a popular assembly may oppose effective implementation or resist specific measures seen to touch on the interests of their constituency. They may also be influenced by rent seeking on their own behalf or that of their constituents, for example actions on diesel prices or *qat* or access to subsidized programs. However, study discussions in both the Agriculture Committee and the Water Committee of Parliament (and with the Shura Council)[48] revealed a good understanding of the water problem, including discussion on "water poverty" and "water conflict", and some good insights into the priorities in NWSSIP – especially the need for irrigation improvement, the role of local structures like WUAs, the potential and weaknesses of local councils, the need for public awareness and education, the risk of dams, and the negative impacts on the poor. The Agriculture Committee of Parliament actually traveled to Lahej and Abyan to see the work of NGOs there. They wrote a report which they summarized succinctly: "*Multiply WUAs*!"[49] In summary, despite conservative, populist and potentially rent seeking tendencies, parliamentarians have been by and large a positive force. The likely explanation of this is that the change of attitude about water, that has been taking place in Yemen (see Section 3.3 above), has made its mark on the law makers – their thinking has shifted. One caveat: parliamentarians in Yemen are largely reactive and not very powerful: the parliament will not initiate reform. It seems, however, that it would normally support it.

Tubewell farming sheikhs and other large landowners

Tubewell farming sheikhs and other large landowners have benefited from resource capture under the status quo (see Section 3.3 above), and also from the explosion in the qat market. The integration of this group in the ruling establishment has given them added influence. The *Agricultural Cooperative Union (ACU)* is seen by many as representative of the interests of this group. They are likely to oppose most reforms in protection of their vested interests. In particular, they resist surrendering control under decentralized and community management approaches, and would resist water user associations unless they control them (see 4.2.1 above). They would also seek to manipulate or avoid regulation. They would struggle to replace rent lost through elimination of the diesel subsidy by greater access to subsidized water saving programs (e.g. Box 10). In most cases, this opposition is in discreet ways – in simple non-compliance, or in cornering large shares of publicly subsidized programs. In some cases, however,

[48] Key-informant interviews and Focus Group Discussions, Sana'a, December 3 and 4, 2006
[49] Focus group discussion, Sana'a, December 4th, 2006

opposition has been overt (e.g. Boxes 6 and 12). The armed opposition of upstreamers to the complaint of the Falej WUA about water rights (see Box 5) clearly shows, that "might is still right" in many areas. Ways to overcome this "opposition" include: seeking a lead from the top in support of NWSSIP; for regulation, leadership, transparency, institutional strengthening; for subsidized programs more transparency in decision making; ACU reform; and more pro-poor design of publicly subsidized programs, especially AFPPF.

Box 12: Powerful interests in Abs

In the Abs mango growing area, where many powerful individuals from the top leadership have made substantial investments, a proposal by the local development agency to curb groundwater over-extraction was met by a riposte from the highest level that "water should be transferred from the next wadi". In fact the water in the next wadi is already fully used by small farmers.

Source: Authors' compilation, focus group discussion, Abs, December 13, 2006

Irrigating farmers

The behavior of irrigating farmers crucially affects water resources and implementation of water sector reforms to conserve water under NWSSIP. While large farmers (see above) who benefit from groundwater extraction using tubewells, are keen to retain the status quo, small farmers who are equally water users (contributing to irrigation use of over 90% of Yemen's water), would be just as willing to test modern, water saving irrigation techniques, if given support in start-up.

Ministry of Water and Environment (MWE)

Ministry of Water and Environment (MWE) is the government ministry responsible for designing and implementing the reform. Top management are well-versed in the issues and are committed to reform. MWE receives strong support from MoPIC, but is otherwise somewhat marginalized in power circles, and does not have influence enough to sway decisions on major economic issues, such as diesel price increases or agricultural trade liberalization. Until recently, MWE has been unable to mobilize more than nominal support from MAI for NWSSIP reforms.

The biggest problem with MWE is implementation capacity: although the ministry has several top officials of the highest caliber, they have virtually no staff to support them. As a result, MWE has very limited ability to plan and monitor outcomes in the sector Its top staff spend inordinate energy struggling to get other agencies to cooperate on NWSSIP or dealing with donor requirements.

The National Water Resources Authority (NWRA)

The National Water Resources Authority (NWRA) is responsible for water law implementation, under MWE supervision. Created on donor insistence to implement the new IWRM vision that came out of Dublin, the agency is heroically ready to implement the NWSSIP reforms – but faces enormous challenges with slim resources. Its main problem is lack of implementation capacity. For years, the agency struggled to absorb its legacy staff, each with their own institutional culture – the water resources units from MAI, the General Department of Hydrogeology staff of the Ministry of Oil and Mineral Resources, the Technical Secretariat of the former High Water Council. Despite intensive support, NWRA has only slowly developed capacity and has always been dogged by a top-heavy and rather inert headquarters and lack of management vision or capability.

NWRA's most successful initiative – delegation to branches in the context of basin management plans – has shown that the agency does have potential at the local level, but this initiative is currently being impeded by "incomplete decentralization": too many decisions are still handled centrally, the Ministry of Finance, which provides NWRA's financial controllers, is reticent about delegation of financial authority, the operating budget for branches is very small, and -the cruelest blow- Dutch program financing, which was beginning to really empower branches, ended abruptly in September 2006 and had not restarted at the time of the March 2007 mission. Box 13 below explores the background to this crisis.

Box 13: Why has NWRA's best performing branch ground to a halt?

The Ta'iz branch has been one of NWRA's decentralized 'success stories', characterized by go-ahead management, a good field presence, and donor financing to keep things going. Over the last five years, the branch has worked with consultants to prepare Yemen's first ever 'basin plan' (although in fact the plan covers only the top end of Wadi Rasyan), has carried out well inventories, and has embarked on several interesting pilot projects, like the setting up of water management WUAs in al Haima, and a water rights and water markets pilot at al Dabbab. However, at the time of the study visit, field activities were halted and contract staff had not been paid for four months. In an interview, staff said: "If problems are not solved this month (i.e. December 2006), things will collapse completely. We have initiated everything in our programme, invested in staff, made contacts with the population, made commitments. Our reputation is at stake. *It is a catastrophic situation*." What went wrong?

The immediate cause, of course, is that Netherlands financing has stopped and no commitments can be made for any expenditures after September 2006. So, the first reaction is to 'blame the donor'. But behind that immediate reaction lie layers of problems that have led to this difficult situation.

The first and most obvious is how NWRA is financed – and how it manages its money. The monthly budget of NWRA's whole Ta'iz branch is Rls 200,000, of which 70% is to pay salaries, 10% goes to the accountant, and the balance is for operations. This gives the branch a monthly operating budget of about $200, barely enough to entertain the minister if he comes visiting. Why so little? Because NWRA nationally, like all Yemeni government agencies, gets only a very small operating budget, and the lion's share of that stays in Sana'a. Very little trickles down, despite the decentralization program.

As a result, if NWRA Ta'iz wants to do something, it needs a foreign donor, e.g. UNDP, Netherlands, World Bank. Of course, that is not 'sustainable', although nobody can hazard a guess when exactly NWRA is supposed to be entirely Yemeni-financed. But even settling for aid dependency and with the very generous Dutch PAWS financing, Ta'iz still has no money. And the reason for that is that NWRA headquarters was incapable of preparing a four year program that would satisfy the Dutch Embassy, and so the tap was turned off. NWRA management admit they found the reporting system too complicated: "we don't have enough capacity. It is a 70 page document. And we still have three other donors to deal with." However, the branch has to take responsibility too: the four year program was due to the Dutch in September 2006, but the branch only sent in its plan to headquarters at the end of that month (in December 2006, the branch had still received no feedback).

Evidently budget and information flows are not working[50]. Ta'iz branch sends a quarterly report to Sana'a, but 'the only comment ever received is from the accountant, about budget control'. Information goes up from the branch, but nothing comes down. Branch staff told the study team they had really no idea what happened about the PAWS financing, why it stopped, when it might start again etc. In the meantime, they were preparing for a hungry Eid.

Source: Authors' compilation, key-informant interview, December 10, 2006

What is at the root of the bad situation of NWRA, despite all the support that the organization has received? Without a management audit, the study can only make some educated guesses. The main problems seem to be:

[50] See Annex 2 for visual graphs of the flow of funds and information.

- Management culture is characterized by a hierarchical and traditional ethos. Some call this ethos 'tribal', but many of the features are common to other developing countries that are not tribal. Its features are: decision making based on hierarchy and influence rather than facts; lack of transparency, information flow or participatory approach; very limited delegation of authority; and reactive and unstructured management procedures (for example, meetings without agenda or agreed outcomes).
- Qualifications of managers and staff are quite low, with textbook knowledge and limited operational or management skills and training.
- Incentives are distorted towards complying with superiors rather than taking initiative, and are further limited by lack of information and lack of empowerment. Rewards are not much related to performance or outputs. Change is seen as additional work rather than improving efficiency or producing a better quality product.
- The Ministry of Finance is a reluctant partner in the decentralization process.
- Salaries are very low – a typical net salary is $100 a month for a qualified engineer, not enough to keep a family in any comfort. The chairman emphasized to the March 2007 mission that "incentives and top-ups are no longer being paid".[51]

And the solution? If that were clear, it would have been done long ago. The challenge is to 'modernize' NWRA to comply with minimum norms for an efficient agency. A lot of the problem is deeply embedded in the Yemeni social and management culture and is not amenable to agency-specific reforms. Probably the best approach is for NWRA management to work with consultants to analyze the flow of funds and information. During the March 2007 mission, the NWRA Chairman validated the graphs of budget and information flows produced by the study (see Annex 2). However further analysis is needed to develop a transparent program to remove the blockages to the flows: for example, to agree with the Ministry of Finance on the transfer and management of funds at the decentralized, branch level; to improve the budget preparation process and calendar to be able to meet deadlines; to improve the internal reporting system and institute a regular system of feedback; and to institute an effective performance-based incentive system etc. At the same time, NWRA might select one branch for a full 'management modernization' program in order to work on all the causes of poor performance identified above, including extensive capacity building.[52]

Ministry of Agriculture and Irrigation (MAI)

Ministry of Agriculture and Irrigation (MAI) represents the interests of irrigated agriculture and for long channeled large subsidies to the expansion of irrigated farming. In recent years, in line with the change in government approach (see Section 3.3), the ministry has moved more to promoting resource conservation, water productivity and user associations (see 4.2.3 above for a description of these programs: GSCP, SIIP etc.).

MAI and NWSSIP. MAI participated only marginally in NWSSIP design and has been reluctant to support key provisions such as raising the diesel price or acting on *qat*. Behaviorally, MAI has regarded NWSSIP as a threat rather than as a credible national program in which it should participate. This is probably due in part to institutional rivalry – MAI looks on MWE as a menace to its power. This is put nicely as: "MWE is a son who has forgotten his family", NWSSIP was "not prepared with enough consultation or

[51] Concerned donors, however, consider that the problem is not lack of money for compensating staff, but lack of a performance-based incentive framework. The difficulty of developing such a framework is confirmed by the experience of the 2006 JAR where "of the total of Rls 20 million set up for performance-based incentives, only Rls 6 million was ultimately paid based on performance" (Key informant interview, April 3, 2007).

[52] However, the March 2007 mission learned that a mission by Germany's InWEnt to advise NWRA on how to improve its management had to be aborted due to lack of interest from NWRA management.

involvement of MAI" etc[53]. In reality, MAI sees NWSSIP as 'loss' both at the level of the rural economy – MAI senior officials say that NWSSIP is "all about reducing agricultural water use, but what about farmers' livelihoods?" – and at the level of public and donor resources – "donors are now leaving us for NWSSIP". As one senior official commented to the March 2007 mission, "agriculture has 93% of the water – but only 8% of the NWSSIP investment budget". The result has been a general breakdown in cooperation: the agreement (Section 4.1) that AFPPF governance be improved and its funds increasingly channeled to water use efficiency investments has not really been implemented, and has not produced any change in investment patterns (see below); the contentious small dams program continues; a cooperation agreement between MAI and MWE, that was hammered out at staff and Deputy Minister level through months of negotiation, has gone unsigned for a year. Both ministries have regarded each other with suspicion.

Supporting WUAs, but doubts about IWRM. MAI, as a representative of both, its own and of farmers' interests, takes issue with specific elements of NWSSIP. While it is in principle supportive of decentralized management and stakeholder partnership – and is actively promoting WUAs (see 4.2.1 above) – it is intensely suspicious of the IWRM approach, which it understands as surrendering control over agricultural water to MWE. In PSIA focus group discussions, it was clear that MAI staff often see NWRA, Basin Committees and other institutions as ineffectual and hostile to the interests of farmers. This attitude of MAI has been reinforced by the constant hectoring by MWE and donors that "agriculture has to give up water", and by the comparative lack of support for programs that will provide compensating increases in rural incomes.

MAI and the diesel price. MAI has also not supported the increase in the diesel price – although it has, of course, been powerless to stop it – because it has correctly understood it as a reduction in subsidy to the rural sector without any countervailing means of improving productivity and so restoring rural incomes. This understanding also probably lies behind the fierce resistance to meddling with AFPPF. This fund, however, was set up initially as such a countervailing subsidy mechanism, to recycle a part of the subsidy, that was docked through diesel price rises, back into agricultural sector investment. Following the latest diesel price rises, there has been no proposal to increase the resources transferred to AFPPF. The world may see this as a reflection of the murky goings on and poor quality output of AFPPF (see below), but MAI sees it as just another penalization of the agricultural sector.

Moving from confrontation to cooperation. At an objective level, MAI's mandate is to defend the assets and incomes of farmers, and it sees NWSSIP as a threat to that. This antagonistic situation is not immutable, and in fact is changing. At the local level, cooperation in many governorates is quite good: for example, the study team saw joint IIP training courses in Lahej or joint work on the Tehama well inventory (see 4.2.2 above). At headquarters, both senior MWE and MAI officials mentioned that they recognize that cooperation is essential: the water resources problem cannot be resolved unless the problem of irrigated agriculture and rural incomes can be solved – and vice versa[54].

Preparation of an irrigation strategy. It was clear too during PSIA focus group meetings that MAI has been shocked by the scant attention paid by MoPIC and donors to irrigation at the London Consultative Group meeting in November 2006. The ministry is now keen to develop an irrigation strategy that can have the luster of a NWSSIP. When the study met with top MoPIC officials, the message was even starker: irrigated agriculture is a priority for extra financial resources through the Consultative Group process – but MoPIC "will first insist on a clear reform agenda and a clear related plan for allocation of the extra resources."[55] If a strategy can be prepared with true complementarity to NWSSIP, the two

[53] Key-Informant interview and focus group discussion with representatives of MAI, Sana'a, December 3, 2006
[54] Key informant interviews, Sana'a, November 29, and December 3, 2006
[55] Key informant interview, Sana'a, December 4, 2006

strategies can constitute the basis for the integrated approach that is sorely needed. However, this will require a renewed dialogue between MAI and MWE, assisted by donors, to reassure MAI that NWSSIP is not about transferring water from poor farmers to rich towns. Instead, it is about increasing rural incomes whilst improving the sustainability of irrigated agriculture. Additionally, NWSSIP – which is notoriously short of measures and resources to help agriculture – will itself have to change. During the March 2007 mission, senior MAI officials said that the ministry intends to prepare a new strategy for irrigated agriculture, which will make transparent the future approach to dams and the role of AFPPF financing. During the September 2007 consultation mission, MAI officials confirmed that the irrigation strategy would be developed as part of the NWSSIP update.

MAI's AFPPF

Under MAI supervision, the *Agriculture and Fisheries Production Promotion Fund (AFPPF)* is an extra-budgetary fund set up to recycle some of the proceeds of successive diesel price rises back into the agricultural sector in support of productive investments. In 2006, AFPPF had a budget envelop of Rls 9.6 billion ($ 48.0 million). In line with the NWSSIP commitment to improve the quality of AFPPF water sector investments (see 4.1), the MWE Deputy Minister now sits on the AFPPF board, and a glossy publication "*Steps of the Way*" (Republic of Yemen, 2004) has been issued by MAI, that describes the dams program which is the main object of AFPPF investment. The AFPPF budget for irrigation improvement appears to have increased in 2006 over 2005 - from Rls 360 million ($1.8 million) to Rls 1,150 million ($5.7 million). If actual expenditure followed this budget provision, this level of spending – 12% of total AFPPF budget for 2006 – would bring AFPPF closer to the share of 20% of AFPPF funds for water efficiency investments that were proposed in NWSSIP. However, despite a decision by MAI, there has still been no technical and economic review of the much-criticized dams program. The government audit agency, COCA, has apparently recently issued an adverse report on AFPPF.

The criticism of AFPPF is almost universal and the suspicions about it are deep seated, fuelled by lack of transparency and some high-profile, failed investments. "More than 80% of the dams are failures from technical and social reasons," one very well placed commentator said in a PSIA focus group. "Studies show that modern irrigation saves fifty times more water than a dam. AFPPF is an embarrassment for the ministry." [56]

The main criticisms of AFPPF voiced to the study team were:

- It provides an easy extra-budgetary investment fund that has allowed MAI to escape the normal governmental and donor pressures on standards for policies and public investment.
- Its governance system allows it to respond to political convenience – for example, through the dams program which has effectively been mandated by the President – rather than to criteria of economic efficiency (*Steps of the Way* mentions not one word about economic efficiency).
- Within its procedures, AFPPF generates rent and other benefits that create strong vested interests among the implementing agencies, contractors and beneficiaries.

These criticisms also help to explain how AFPPF has managed to soldier on despite its long failure to deliver on its mandate, and how it has managed to resist reform for so long. It is too convenient and comfortable an instrument for MAI to easily surrender to more transparent governance procedures. There was an expectation that under NWSSIP, MAI would undertake reform of AFPPF: improving its governance, intensifying its pro-poor thrust, and devoting more resources to water management. MAI maintains that improvements are underway: "program leaders claim that the Fund has become more geared to tackling poverty" (van der Walle) and it is asserted that resources are currently allocated to

[56] Focus group discussion, Sana'a, December 19th, 2006.

governorates on the basis of population and poverty indicators. PSIA field visits, however, found little evidence of improvements.

Clearly, AFPPF reform is a key area for action. This reform requires two pre-conditions to be met. The first is an understanding between all partners on how the rural economy is going to be sustained during water sector reform – exactly what investments and support are needed to help improve farmers' incomes and protect the poor. The second is a credible exit strategy and institutional reform road map for AFPPF that will allow MAI to extricate itself from the peculiar combination of failed development program and low level rent seeking that has characterized AFPPF. During the March 2007 mission, senior MAI officials said that the Council of Ministers has now mandated AFPPF reform and announced the intention to seek donor support to recruit an independent consultant to draft terms of reference for a reform study. During the September 2007 PSIA mission, no progress had been made, but MAI officials confirmed their commitment to the AFPPF study and reform.

Donors

Donors, particularly the core group of Germany, the Netherlands and the World Bank, have strongly supported NWSSIP and are financing a number of projects supporting sustainable groundwater management (Ta'iz and other basin plans, SBWMP, GSCP, GTZ-financed Integrated Water Resources Program, the JSDF-financed Community Water Management Project). Donors are tracking progress eagerly, and the stakes are high: donor support will diminish if the reform program falters or if no tangible results are forthcoming.

Within the donor group, there are potential tensions and disagreements as different governance models are being tested. For example, regarding NWRA, the World Bank has adopted an "*instrumental approach*", integrating NWRA into operations to the extent that it can demonstrate performance and expand capacity; an example is SBWMP, where the project was initially entrusted to a PMU under MWE and project management was only transferred to NWRA Sana'a Branch, when the branch had demonstrated capacity. The Netherlands, by contrast, has adopted what it describes as an "*ownership approach*", supporting NWRA capacity-building directly, and insisting, that activities which fall under NWRA's mandate should be entrusted to it, even when the competence was lacking; examples are the conduct of the Groundwater Incentives Study, or more generally the management of Netherlands program financing under PAWS.[57] These differences of approach seem to stem more from institutional rigidities than from "ideological" perspectives, and should be capable of reconciliation through the ample partnership avenues that are open or could be opened.

4.5 Risks that could change the expected impact of the reforms

The main risks were assessed prior to the beginning of reform. All of these risks still exist, and some of them have become reality and require corrective action:

- The **political economy risk** that (a) major economic decisions on diesel, agricultural trade or *qat* may simply prove too difficult or have too many indirect effects throughout the economy as vested interests are keen to retain the status quo. *Government has in fact taken the big decision – on reducing diesel price subsidies. Decisions on trade have been postponed, probably correctly, until they can be put in a broader economic context of the future of Yemeni agriculture in relation to the WTO. Predictably, there has been no action on qat; and (b)* that modern regulatory mechanisms and modern

[57] Other rumbling disagreements persist in rural water supply, particularly in relation to the role of GARWSP (see Section 5.4 below).

user association approaches to self-management will conflict with traditional governance systems involving e.g. sheikhs. Traditional systems may prevail due to local power relations, and traditional systems may continue to be inequitable. *This is a constant risk and needs consistent support and application of NWSSIP measures over a long period.*

- The **institutional risks** that MWE and NWRA – both of which are extremely frail institutions – will be unable to deliver on NWSSIP implementation; and MAI will continue to go its own way. *These risks are very real, and require immediate attention.*

- The **implementation risks** that NWRA will not be able to deliver the regulatory agenda; MAI will not be able to deliver the water productivity improvement package; and MAI and NWRA will not forge an effective working partnership in promoting community-based water management within basin plans. *Although implementation of NWSSIP on all these fronts has got underway, performance is very uneven and these risks will continue to require attention.*

- The **sequencing risk** that reforms that are *easy* (even if unpalatable) to implement, such as diesel price rises, will take place *early* in the reform program but that the support measures to help sustain rural incomes will come too slowly, with negative impacts on the population, particularly on the poor. Quick wins work if they are complemented with sustainable follow-up. *This is the biggest problem at present, and needs priority attention*.

* * * * *

This chapter has analyzed in turn the objectives of reforms in water resources and irrigated agriculture, the implementation of the reforms and the results to date, the distribution of livelihoods impacts, as well as the institutional and political economy constraints and risks. Chapter 6 (6.2) will summarize findings and make recommendations to improve implementation, to enhance positive impacts and to reduce negative ones, and to tackle institutional and political constraints to implementation.

5. PSIA analysis of reforms in rural water supply and sanitation

5.1 Objectives and major components of the reforms

Rural water supply and sanitation problems

The principal problem in rural water supply and sanitation is the poor coverage and low sustainability of safe water and sanitation schemes in rural areas, with consequent impacts on economic productivity and well-being. Health and gender impacts are particularly negative. Distributional impacts of the current situation are particularly marked (see Chapter 2 and Tables 1-2). For instance, the poorest communities experience the worst service and highest costs, often a half day trudge to the spring or well. Some very poor communities have to buy water at prices many times higher than those paid by the urban bourgeoisie, as poor rural consumers have to purchase potable water from private vendors, including tankers, which sell water at high prices, especially in remote areas (see Table 2 in Chapter 2 above).

There is a perceived urban and anti-poor bias in resource allocation as only 48% of public transfers for water and sanitation go to the rural sector, which has three quarters of the population.[58]

[58] Source NWSSIP JAR 2006

Publicly financed schemes have in the past been marked by poor implementation performance and low sustainability. Weak implementation has constrained the absorptive capacity of the sector. Even the implementation of purposely pro-poor projects has had its problems, with poor water quality in water harvesting, and difficulty in identifying sustainable low cost technology for coastal and low rainfall areas. Reasons that relate to the past, but continue into the present, include low technical, financial and human resource capacity; weak institutional set up, particularly a long legacy of centralization and a hesitant process of decentralization accompanied by political economy constraints, particularly patronage; and geography – notably Yemen's difficult terrain, and the consequent difficulty and high costs associated with bringing water service to remote communities.

Sanitation has received limited attention and investment to date, primarily through rural water supply projects. Lengthy debates about technology, cost sharing and modes of promotion have not yet resulted in agreement on a coherent strategic approach.[59]

The institutional set up is marked by several parallel public institutions - a situation which the GARWSP chairman mentioned "has weakened ownership, commitment, coordination and capacity"[60]. At the same time, schemes financed and managed outside the public sector have long existed and are often viable and sustainable, for instance those set up by communities themselves, by private businesses or benefactors, or NGOs. However, these schemes are not linked in to public sector entities and tend to be little known or understood. As a result, their technical and institutional achievements and issues remain unknown, and lessons are not exploited. The study found several examples, including a successful, privately-managed scheme that is supported by a benevolent villager in Al Barakani, Ta'iz governorate. [61] During the September 2007 mission, there was agreement between GARWSP and NWRA on the need to report the location and water resource use of all rural water and sanitation schemes (public and private) to NWRA's monitoring and annual implementation program, The NWRA chairman further stressed that no reservoirs tanks and networks should be constructed before water resource availability has not been secured.

Ongoing and proposed reforms dealing with rural water and sanitation

NWSSIP won acceptance for three reform thrusts in rural water. These have been largely confirmed in a rural water supply and sanitation strategy that has been prepared by GARWSP and which is awaiting official approval. The NWSSIP reform thrusts were as follows:

Rapid expansion of coverage with a pro-poor bias. Steps include: establishing the sector strategy, investment criteria and plan for rapid expansion of coverage; increasing resource allocation to RWSS; investments to be decided by transparent bottom up application process and decentralized approval system; and NGOs to be encouraged to participate.

Making services inclusive, affordable and sustainable. Steps include: priority to low cost technology; a demand responsive approach and community based self-management to be standard; initial capital subsidy, user associations to be self-sustaining financially thereafter; gender to be mainstreamed; sanitation to be obligatory; and water to be sourced with NWRA support and clearance.

Improving implementation. Steps include: setting up a "central office for sector reform"; decentralization of GARWSP to governorate branches; agreement on common approaches to be followed by all entities

[59] A key issue remains the environmentally sustainable management of sewage.
[60] Key informant interview, Sana'a, November 29, 2006
[61] Key-informant interview with rural water supply manager, Al Malika in wadi Al Barakani, Ta'iz, December 10, 2006

operating in the sector; community contracting, wherever possible; and development of technical advice material.

The hypothesis that underlies these reforms is that a harmonized sector strategy and coordinated institutional approaches through decentralization, "demand responsive approaches", community associations, and self financing as a basis for sustainability will bring increased investment to all rural areas, with a focus on poorer districts. This will increase the access of the rural poor to affordable and sustainable safe water. The reform program is implemented via a range of mechanisms (Box 14).

Box 14: Institutional mechanisms of reform in rural water supply and sanitation

Government's *PRSP* and *MDG Five Year Plan* set a general framework for improving rural water supply and sanitation coverage. *NWSSIP* broadly defines the reforms. The *Rural Water Supply and Sanitation Sector Strategy* sets out the strategy for implementing the reforms.

Resource planning and allocation mechanisms: Resource allocation is done by government budget decisions (*Five Year Plan*, *annual budget allocation*) and by donor decisions on projects, or programs. *NWSSIP monitoring and evaluation* and *Joint Annual Reviews* will monitor progress with reforms, expenditures and results.

Organizational mechanisms: *MWE* will oversee reform implementation. *MoPIC* will coordinate planning and financing and the links to the MDGs and the Five Year Plan. *MoF* will make annual budget allocations. In lieu of the 'central office for sector reform' originally proposed, *GARWSP* is now expected to implement sector reform measures. Other public agencies (e.g. *SFD, PWP, RWSS*) are expected to: (i) coordinate planning with GARWSP; and (ii) implement projects with communities in line with the strategy.

Source: Authors' compilation

5.2 Implementation of the reforms and results to date

In an interview, the GARWSP Chairman had some criticisms of government and donors. Overall, however, he was positive about NWSSIP reforms, both implementation and results (see Box 15). The study found that indeed changes were afoot – but inevitably there were constraints, and much remains to be done. This section reviews the reform experiences component by component.

Box 15: An interview with the GARWSP Chairman

Overall, the GARWSP Chairman considered that "the NWSSIP polices are the right ones, but they need to be implemented faster and better". He particularly felt that government and donors could do more to back the strategy, both in terms of harmonizing sector organizations and their approaches, and in terms of resource allocation. With this reservation, the Chairman gave an upbeat report on GARWSP implementation of the strategy:

- Project costs are down, the number of projects has increased, GARWSP met its 2005 and 2006 program targets, and coverage has expanded quite rapidly.
- Project selection and approval has improved, with attention to populous and poor areas, direct contact with the population, simplification of procedures, objective selection criteria, and obligatory community contribution.
- Project sustainability has improved because of the focus on self-management by communities.
- GARWSP decentralization is underway, with classification of branches into three categories according to the degree of delegation that is possible, and staff specialization and development programs.
- Within GARWSP, there is much more information on what is happening, and transparency has improved, with reports being issued regularly on all subjects.

Source: Authors' compilation, key informant interview, November 29, 2006

5.2.1 Rapid expansion of coverage with a pro-poor bias

After an intensive two year effort, a sector strategy was developed in 2006 and agreed at working level. However, the study learned that this strategy has not yet been approved (there are apparently queries in the cabinet about the strategy proposal that sanitation be an obligatory component of all rural water projects). The key issue of sector coordination is currently being handled through regular meetings in Sana'a of a Rural Water Supply and Sanitation Working Group, bringing together all the public, donor and NGO agencies involved in the sector. Participants mentioned that these meetings allow exchange of information and airing of issues. The GARWSP chairman confirmed that other agencies in the sector do provide information on their programs and results to GARWSP as head of the Working Group. This information provided the basis for the sector progress report to the 2006 JAR (see Table 5). However, coordination at the central level still falls short of joint programming. The GARWSP chairman told the March 2007 mission that the next step should be a move from coordination to partnership, in which programs and budgets would be agreed in advance. He also emphasized the major role to be played by donors in promoting this partnership approach, with the ultimate step envisaged as a harmonized and aligned aid program, possibly through budget support.

Table: 5 Extra population served by newly completed rural water schemes 2003 - 2005 (in thousands of inhabitants)

	2003	2004	2005	Total 2003-5
SFD	121	98	2*	221
PWP	139	124	88	351
UNICEF	29	31	12	72
CARE	0	2	12	
DIA	6	0	9	15
WB RWSSP	40	42	137	220
Total	**336**	**296**	**260**	**892**
GARWSP	427	362	321	1,110
Grand total	**763**	**659**	**581**	**2,003**

Source: JAR 2006 * presumably an error

Coordination at the local level remains very uneven: in Ta'iz, the Governor leads coordination of all water sector agency programming. In some governorates, as the NWRA chairman told the March 2007 mission, there is a partnership approach with joint programming between GARWSP and PWP. In other governorates, agencies see the need for greatly strengthened coordination and progress towards joint programming. In Tehama, for example, GARWSP mentioned that in 2003-6, other agencies constructed 60 water tanks, but GARWSP was able to complete only three of these projects with pumps. The entire GARWSP 2007 program in Tehama will be devoted to completing existing projects, many started by others, and some of which may have to be abandoned because they are not feasible. "The effort is scattered, it needs coordination," was the clear message[62]. In Lahej, GARWSP implemented 22 of the 58 allocated projects, and built 39 tanks of the total 45 that had been budgeted for.[63]

The June 2006 JAR reported an increase in resource allocation for rural water supply and sanitation. In 2006, GARWSP apparently received an initial budget allocation equivalent to $20 million, and a supplementary budget equivalent to $15 million. This seems to have been stimulated by the Netherlands PAWS financing agreement which stipulated that government should increase investment funding by 10% and recurrent funding by 30%. PAWS itself contributed an incremental 20% of the total investment and recurrent budget.

[62] Focus group meeting, Hodeidah, December 17th, 2006
[63] Follow-up key-informant interview, GARWSP, Sana'a, March 12, 2007.

The 2006 JAR also reported an increase in coverage with an extra two million rural people covered by schemes completed between 2003-5, raising the percentage coverage from 26% of the rural population in 2002 to 38% in 2005[64]. GARWSP's Hodeidah branch mentioned "coverage has doubled from 15% to 30% in the last two years". The reasons for this apparent remarkable increase are not clear, and the numbers need to be verified. One reason why coverage may in fact have gone up could be the current GARWSP focus on completing schemes which have been under implementation for a year or more. However, it seems that the basis of measurement may also have changed.[65] A nationwide inventory of rural water coverage is proposed for 2007, to be executed by GARWSP and UNICEF. This inventory will be important for building confidence in the coverage data and also in the reform process.

The switch to more local involvement in applications and approvals has certainly taken place with GARWSP projects. Under the new procedures, requests are initiated by communities and agreed in principle at the district local council level. GARWSP then does a technical study and the proposals are sent up to governorate level and to GARWSP to be considered for inclusion in the program. This project cycle and related flow of funds are discussed in detail in the section below on political economy (5.4), which identifies root causes of continuing poor implementation performance and proposes solutions in more effective decentralization.

NGOs remain active in the rural water sector. The study encountered examples of good NGO work (in Abyan, for example, with the CARE project, see Box 17). Local public agencies consider the approach low cost and good practice, although even with NGO projects, there is certainly room for improvement. However, there is no indication that NGOs are being encouraged to expand their work, nor is there any channeling of public funds to NGO rural water projects. The chairman of GARWSP has confirmed to the September 2007 mission, that a framework partnership agreement with NGOs would be developed as part of the NWSSIP update. NGOs could, for example, carry out the community mobilization and training for GARWSP projects, and develop water supply schemes in poorer areas.

In many communities, there are schemes run by communities themselves, often with support of private benefactors, expatriate groups etc. The community of al Sina in Taiziyya provides an excellent example (see *Towards a Water Strategy*, World Bank 1997). The study also visited a well-run private scheme in al Barakani near Ta'iz. Amin Abdel Dayyem al Shaybani who runs the scheme mentioned that the project was set up after the villagers had twice asked GAREWS (the predecessor of GARWSP) to help, and had got nowhere. Fortunately a private benefactor came forward and the scheme could go ahead. [66]

The rural water supply project cycle and flow of funds

The project cycle, according to NWSSIP principles and the rural water strategy, is based on community demand, and on partnership and cost sharing between community organizations, District Councils, Governorate Councils, GARWSP branches, and GARWSP headquarters. The request is initiated by the community and sent to the District Council. The Council reviews the proposal, and ranks the request against others from the different *'uzla* within the district. If the request is seen as a priority – and each Council is free to set its own criteria – the Council requests a technical study from the GARWSP branch to design and cost the project. Once this is available, there is discussion about how the financing should be shared between the community, the Council, and GARWSP. The Council checks if budget will be available for its own contribution to the project costs. If so, the Council includes the project in its consolidated annual plan for the next year. The annual plan is forwarded to the Governorate Council,

[64] In 2005 alone, GARWSP completed 127 schemes in 13 governorates and 70 districts and 543 components (wells, reservoirs, pipes, and pumps), JAR 2006
[65] Focus group, Hodeidah, December 17th, 2006
[66] Key-informant interview, al Barakani, Taiz Governorate, December 10th, 2006

which reviews it (and may also allocate financing). If approved, the Governorate Council forwards the project to GARWSP headquarters, which includes the project in *its* annual plan and allocates GARWSP's share of the project costs.

The GARWSP branch is informed that the project is planed, and that implementation can start. Implementation arrangements are then usually divided between the cost sharing parties. In a typical example, the community will finance and implement the construction of the pump house, transport the pipes, and perhaps lay out the network (i.e. largely labor and locally available materials). The District Council may finance and implement the drilling of the borehole. GARWSP may finance and implement the purchase and installation of the pump set and the pipes. GARWSP procurement is done centrally by GARWSP headquarters, with the material delivered to the branch for installation when it becomes available.

The strengths of the new system are clear: communities that can get the attention of their local council have a better chance than before of getting their project into the program; and the mobilization of local council decision taking and local fiscal resources gives an element of local ownership and commitment that was lacking before. It is likely that pro-poor impacts have improved through better spread of projects geographically. There should also be more scope in the decentralized system for the voice of poor communities to be heard. The GARWSP chairman told the March 2007 mission that he believes that cost sharing by communities improves ownership: "before they would get a free pump and go off and sell it half price in the market". However, popular confidence in performance of public entities remains for the moment low, as was voiced by rural groups in Sha'ab and Uzla Zarair, village of al Qala, and Ziba village (see Boxes 19 and 20). The risks in the system are evident:

- There is a <u>risk that the poor may not have good access</u>. Eligibility of a community depends on a political process, in which power relations are important. The study found that communities with strong champions did well: villagers in Sha'ab in Tehama, for example, told the study team repeatedly that their success in getting a new project was due to the unremitting efforts of 'The Captain', a well-connected military officer with roots in the village. See also the case of the Ja'ar village described in Box 16. By contrast, weak, poor communities like Dowsa near Ta'iz (see Box 22) may never get a project. In one branch, GARWSP staff felt that "70% of the projects selected were the right ones, from the viewpoint of poverty focus and other criteria…but there is still a bias to the richer villages". The GARWSP chairman emphasized to the March 2007 mission that a pro-poor screening of projects is conducted using such criteria as girls' enrolment in school, health indicators, and "water poverty". "*Even an instruction from the President*," the chairman said, "*can be refused if it does not meet the criteria*."

- The <u>risks of delays and problems in implementation</u> are many. At least three participants have to agree on the project, and to allocate their financing. They also have to coordinate their implementation. The study heard of many schemes that took years to complete: the Marawea'a District project described in Box 19 was first conceived in 1987, studies were done in 1999, and implementation took five years (2000-2004) to complete. The GARWSP Tehama branch expects to allocate its entire 2007 program to completing schemes begun by others. In Ta'iz, the GARWSP branch told the study team that "projects are done in phases…some parts each year. Success depends on the budget of the local council and on GARWSP's ability to synchronize its implementation". In reality, the whole scheme is delayed or even fails if one party does not deliver. GARWSP in 2007 is said to be "working on" over 1,200 schemes but completing only 150 schemes a year. At that rate, *the average scheme would take eight years to complete*.

- <u>The ability of GARWSP's branches to plan</u> is limited, as many decisions on GARWSP financing and procurement are essentially still made at headquarters. Only some civil works and services are

procured locally (see 5.2.3 below). Branch implementation is dependent on headquarters processes of which managers in the governorates have little knowledge.

Box 16: Good management and political influence help a rural water project at Ja'ar to succeed

At a prosperous village just north of Ja'ar in Abyan, there is a big, well-established and successful rural water scheme, covering 429 households. In 2002, GARWSP helped to construct a tank, to pipe water into households and to connect households to a waste water disposal system. The scheme seems very well run. Each subscribing household has a contract to pay a flat Rls 300 a month, although the poor; e.g. widows, and mosques are exempt. If there is a difficulty in collecting from the school and health centre, they ask for GARWSP help to put pressure on the relevant ministries. They employ part time staff for operation and maintenance, and for fee collection. They have over a million rials ($5,000) in the bank (they know the exact figure by heart) which is their reserve for unexpected repairs and for replacements. They attribute their success to 'leadership', tight management, good community representation and empowerment, and cost control.

The association is led by the very active Sheikh Nasser, who is also a judge and head of the Appeals Court in Hajjah. With this kind of leadership, the community has had no problem in accessing projects: e.g. they recently had an SFD project. For the GARWSP project, there was a 'formal' process of applying through the District Council. But essentially Sheikh Nasser had meetings in the Governor's office, and all went ahead quite smoothly.

Source: Authors compilation, focus group discussion, Abyan, December 14, 2006

These problems are to some extent implicit in a demand driven process. During the March 2007 mission, the GARWSP chairman contended that these implementation problems should not be exaggerated: "only 10% of projects have problems". It is clear, in any case, that GARWSP's intention -to progressively decentralize to the governorate level- is the correct solution (see below).

Box 17: An NGO rural water project in Abyan

In the village of Seihan al U'sh in al Dewe, a very lively and colorful group of unveiled ladies are far from shy in telling of their achievements and problems. This is an agricultural village in the middle of the Wadi Bana spate scheme. The women say they are labourers. Some of the husbands have land, most do not. They are all very poor. Before the project they used to bring water by donkey from far away – a corvée of about 2-3 hours a day. CARE has drilled a well to 60 m for water supply, and set up the tank. House connections were done by the community. The committee is all women. Aisha Ammar is the vocal leader, and the collector of the money. She is illiterate but her brother and her children help her, and she is accountable to the board.

With the project, life has improved. Before, a typical woman's day was: 5 a.m.: rise and prepare breakfast; 6 a.m. to 11 a.m.: work in the fields; 11 a.m. to 2 p.m.: fetch water; 2 p.m. to 3 p.m.: prepare lunch; 3 p.m. to 5 p.m.: work in the fields. Now they have more time to rest. But still "some of the daughters don't go to school. It is half an hour's walk away, and in any case they are out herding the goats." There is a water-borne health problem. Mosquitoes and malaria are rife – all the ladies say they have had malaria. CARE "sent a lecturer once six years ago, but nothing has happened since then". The only solution they know is to go to the WHO clinic in Ja'ar to get treated. Other problems related to water are bilharzia and frequent diarrhoea. An old woman shuffles forward and talks about her bouts of malaria. Also in the meeting are some ladies from the next village, Saken Azlaq, which is even poorer. They asked to be included in the CARE project, but it didn't happen. It seems there is some slight friction between the villagers of the first village and those of the second. It may be, that the tank is too small even for the first village, and they loathe sharing it. It may also be that the villagers from the second village are *abed* (ex-slaves), and some exclusion is practiced towards them. In the end, the ladies from the second village go off angry and unsatisfied, tramping through the dust along the canal bank to their village which is dominated by a large electricity pylon. They don't have electricity either.

Source: Authors' compilation, focus group discussion, December 14, 2006

5.2.2 Making services inclusive, affordable and sustainable

There appears to have been little move towards more low cost technology. The Social Fund for Development (SFD) continues to be the pioneer in this area, including both water harvesting projects and manual pump technology (see Box 18). GARWSP has apparently made an effort: they did, for example, a pilot project for manual pumping in Beit al Faqih, but they say it failed because the water was insufficient. "We find that these projects need a lot of effort," GARWSP staff reported. "Then people don't use them. Most such projects are not working." In fact, it is clear that low cost technology approaches are very difficult for GARWSP with its standard pump-based technology model, its limited staff skills, and centralized procurement practices.

Box 18: Why the Social Fund stopped doing pumped water projects

From its creation in 1997 until 1999, the Social Fund for Development (SFD) focused in its rural water supply projects on pumped schemes using tubewells. In 2000, based on experience, they changed their approach entirely to do only water harvesting schemes. Their reasoning, they told the study team, was basically that water depletion was reaching crisis proportions. Only a return to the traditional technologies of water harvesting could guarantee a low cost sustainable supply. Bringing water to Yemen's 40,000 scattered rural communities by 'mechanical' means was impossible. The landscape was already littered with failed schemes of this type.

"At Manakha, in Shalaa Bab al-'Ayn, we had financed a scheme to pump water from below ground at 500 meters up the mountain to 1,100 meters elevation to supply 11 villages. The cost was very high, and the villagers could not afford the O&M. They fought anyway over who was to be employed by the scheme. In the end the sheikh took over the system to irrigate his *qat*."

Now they see themselves as complementary service providers. Where water harvesting is the best solution, the Social Fund will invest. Where pumped schemes are the better solution, GARWSP will invest. This is the view of SFD – but they mentioned that it requires coordination and joint programming with GARWSP and others, and that this kind of coordination does not exist formally, neither at national nor at local level.

The Fund provides only materials not available locally, design and supervision services, and any skilled labor not available locally. The community provides the rest – but not in cash. The Social Fund managers say "everyone in the community has to work together on this, to avoid the culture of dependence." They have developed a GIS system that will help determine the best solution for each village. They are sharing it with other members of the rural water consultative group that GARWSP has set up.

Source: Authors' compilation, key informant interview, December 5, 2006

The demand responsive approach and community self management are certainly now the standard approach. The study found good examples of community organization and ownership – in Ziba, for example, in Wadi Rasyan (Box 22) or in the Tehama schemes described in Box 19 and Box 21. Rural water supply WUAs generally function well, provided that the scheme is sustainable technically and financially. However, for reasons that seem to be budgetary, GARWSP has taken a step backwards by largely dismantling its (admittedly limited) capacity for social mobilization and WUA strengthening. The study learned that the unit inherited from the old Dutch project SURWAS in Tehama has been disbanded, with the trained staff now snapped up by SFD. In the entrance to the GARWSP branch a large sign points to the Community Liaison Office – but it has been closed for years, since the end of the SURWAS project.[67] For the GARWSP schemes financed by the Dutch PAWS, special provision for community

[67] The Dutch SURWAS project operated in Tehama in the 1990s to build capacity in one Yemeni region for publicly implemented, community managed rural water supply and sanitation. The project came to an end because the Netherlands government concluded that the project objective had been achieved. As the end of the SURWAS

mobilization is made, and the GARWSP chairman confirmed to the March 2007 mission that GARWSP is now actively recruiting staff to rebuild its social mobilization capacity.

Other agencies such as SFD, UNICEF, RWSSP and CARE have more skills in these areas. RWSSP was set up with a strong emphasis on "community mobilization" and has developed useful capacity in this area. During the March 2007 workshop, the need for effective capacity building in this area was raised. In follow up discussions during April and September, the GARWSP chairman confirmed his interest in joint capacity building exercises and in cooperating with other agencies in community mobilization.

Involvement of women in community self-management still has a long way to go. With few exceptions, gender appears more neglected than mainstreamed (see Box 19). The GARWSP chairman told the March 2007 mission, that despite his personal conviction that women are better water managers than men, "women only participated in three new WUAs in 2006 (of 200 that were established)." A combination of community reluctance and GARWSP lack of social mobilization capacity appears to be the cause.

Box 19: Gender and health in rural water projects in Tehama

In Marawea'a District, we visit a rural water scheme. The village is poor, with houses of reed, and weedy stands of rainfed sorghum around about. The scheme took a long time to be developed. The villagers first got together to pursue the idea in 1987 – at the time, the women and children were fetching water from various farm wells. A study was finally done in 1999, and the works dragged on between 2000 and 2004, as GARWSP went from crisis to crisis. The villagers financed their share by clubbing together to raise Rls 45,000. The scheme, which finally became operational in 2004, initially served seven villages, and has recently been extended to two more. There are no women involved anywhere, the idea has never occurred to them.

Sha'ab village nearby has had a rural water supply scheme for thirty years. Originally the *'aqil* ran the scheme, then later the villagers elected one villager, Salem, to run it. There is no board or oversight committee, the villagers evidently trust Salem. However, there has been an expensive revamping of the project and GARWSP has been advising them to structure the oversight and management properly. They say they are meeting in two weeks to agree on this. We asked about whether there would be women members in the committee, and what would be their particular responsibility. The response is incredulous: *Women members? Responsible? What??!! Women are not included in society here!* Then after a slightly shamefaced pause, during which we point out that women are responsible for cooking, washing, hygiene and educating the youngsters about water, Salem says: "You see we are all illiterate here. When the young girls, who are now at school, grow up, we will think about it." Meanwhile, the girls in their neat uniforms and veils are peeking around the end of the stockade.

This village has problems of malaria. There is quite a lot of stagnant water around the well and they evacuate waste water and sewage in pits. They may sometimes put sand to prevent the mosquitoes. They ask "Will these pits affect the well?" - to which the answer is "Yes". GARWSP have advised them to dig the pits further away, but this is not really convenient. The issue is left hanging.

Source: Authors' compilation, focus group discussions, Marawea'a District, December 17, 2006

Sanitation and health guidance also appear to have been largely set aside in GARWSP programs: they have, for example, been dropped from GARWSP programs in Tehama after closure of SURWAS. Yet throughout the PSIA field visits it was clear that the problems of water related diseases are intense, probably growing, and the major cause of infant morbidity and mortality (see Box 17 - Abyan, Box 19 – Tehama, and Box 22 – Ta'iz).

project coincided with organizational upheaval in GARWSP's predecessor organization (GAREWS) the capacity building and learning effect of the project was diluted.

There is little evidence that water has been sourced with NWRA support and clearance. In Tehama, where NWRA is particularly weak, GARWSP mentioned, they simply sent NWRA a list of the wells that had been drilled. In other governorates, GARWSP staff feel they are better qualified than NWRA at water resource assessment, as they have a number of hydrogeolgists on their staff.[68] The GARWSP chairman confirmed to the March 2007 mission that the annual plan of intended drilling sites is being sent to NWRA, but "generally they don't do anything". From the NWRA side, the contention is that NWRA should select the sites and supervise the drilling and that no reservoirs tanks and networks should be constructed before water resource availability has not been secured. But the NWRA chairman confirmed to the March 2007 mission, that "there is a problem of capacity and budget". The issue is certainly more than simply a question of "turf": of 200 wells drilled by GARWSP in 2006, about one quarter was dry, and in others, water was not of potable quality. The two chairmen said in March 2007 that they see the need for cooperation as urgent and they will be "meeting soon to sort out an action plan". In September 2007, NWRA and GARWSP agreed to sign cooperation agreements in order to integrate rural water supply and sanitation into water resource management to guarantee sustainable resource allocation for all RWSS projects, that all wells are properly licensed; that site selection is conducted jointly, and that the location and water resource use of all rural water and sanitation schemes (public and private) is recorded in NWRA's monitoring and annual implementation program.

5.2.3 Improving implementation

The idea of a "central office for sector reform" was dropped during the preparation of the sector strategy. Instead, government has decided to focus on a revived and restructured GARWSP as the lead agency in the sector (see 5.4 below for an investigation of the reasons for this change), and on the formulation of a rural water supply and sanitation strategy that brings together and amplifies the NWSSIP policy measures. Thus GARWSP is expected to: (i) set standards for the sector, propose financial resource allocations and coordinate planning and overall implementation; and (ii) decentralize its budget and activities to governorate level branches and to implement projects with communities in line with the strategy.

GARWSP, which in the 1990s was entirely centralized – and did most of its projects around the capital area – has made a considerable effort at decentralization, opening 20 branches in all the Governorates and decentralizing staff and responsibility. [69] This is intended to enable the branches to work with the local council structures and to be closer to the communities they serve. The GARWSP chairman told the March 2007 mission that decentralization is a 'step by step' process in which branches will be initially involved in project selection, design and supervision of implementation. Full decentralization, including procurement, is starting initially with "Category A branches" (see footnote), with decentralization to be completed by 2009 and headquarters "out of implementation by that time", in the words of the chairman. For the moment, although some benefits of the process are evident on the ground, outside observers continue to perceive implementation problems linked to the centralized system (see Box 20).

[68] Key-informant interview, Hodeidah, December 17th, 2006

[69] GARWSP Branches are classified into three (A, B and C) categories in accordance with their capacities in terms of technical, managerial, financial and administrative capabilities as well as availability of human resources, logistics and facilities such as staffing, furniture, equipment, instruments, transportation facilities. *Category A branches* are Sana'a, Taiz, Aden/Lahj, Al Hodeidah, Ibb, Abyan, Dhamar, Hajjah, and Amran. *Category B branches* are: Al Dhalae, Sa'ada, Al Mahweet, Al Baida, Shabwah and Hadramawt Al Sahel (Al Mukalla). *Category C Branches* are: Mareb, Hadramawt Al Wadi, Al Maharah, Raimah and Al Jouf *(Source: JAR, 2006)*.

Box 20: Implementing the new rural water supply and sanitation strategy in Abyan

The Governor of Abyan is enthusiastic about the new strategy for rural water supply projects in his area, but has some criticism of implementation. Decisions on choice of GARWSP projects in Abyan are decentralized to the local level. The local and governorate level councils do contribute to the costs, but the local branch needs more autonomy – "all GARWSP contracting and payments remain centralized, and the resources cannot be used properly – decisions and payments are delayed and not transparent. Contractors are reluctant to bid, because decisions are all taken in Sana'a." Implementation of RWSS projects has been "generally weak. Sometimes studies are of poor quality, and the works never get completed or are staggered over several years."

Source: Authors' compilation, key-informant interview, Abyan, December 14, 2006

One problem is that the extremely low operating budget of all branches. Ta'iz branch, for example receives $60 a quarter for fuel for each of its three cars. The operating budget has "often come six months late". In December 2006, staff in Hodeidah branch had just received their travel allowances for the year 2005.

Clearly, despite its ambitious plans, GARWSP is able to implement decentralization only progressively. It has decentralized procurement of civil works (drilling, pump houses) for Category A branches, but all procurement and payments are still centralized for Category B and C branches. Because all major procurement of goods (pipes, pumps, engines) is still centralized, the bulk of donor financing, including PAWS financing, remains at the centre. During the March 2007 mission, the GARWSP chairman and staff validated the budget flow graph that was produced, but further analysis is needed to assess the implementation constraints and design mechanisms to overcome the current blockages (see Annex 2, graph 5). Personnel decisions are all centralized. Most branches suffer from poor skill mix. At branch level, there is a perception that information flows all one way - upwards. GARWSP correctly identified the need for a management information system (MIS) to track contracts and project progress, and has started to set this up. The Public Works Project (PWP) has, for example, developed an excellent MIS, to which PWP staff attribute "half the success of their project".[70] Completing the decentralization is correctly GARWSP's priority for the coming years. For this, plainly considerable capacity building will be needed. One problem mentioned by the GARWSP chairman to the March 2007 mission was the reluctance of the Ministry of Finance to support decentralization to the branches, presumably because of a perception of a lack of financial management capacity.

GARWSP technical standards remain quite modest. There is a need for management and technical capacity building, both for GARWSP and communities. In some cases, the self-management approach has run into problems that could have been avoided if GARWSP had had better social mobilization capacity. In Abyan, for example, "tribal conflicts" undermined the rural water project for Mahfidh: the conclusion of the Abyan governor (see Box 6) was that "projects are more successful when project size is smaller". Even NGO projects are not exempt from conflict (see Box 17). The study found that the best performing associations were those that had received training, and GARWSP seriously needs to (re)create its capacity to train in organization, mechanics, and book keeping (see Box 21).

[70] The GARWSP chairman told the March 2007 mission that a version of the SFD MIS has been adapted for GARWSP use.

Box 21: Institutional capacity for managing rural water needs to be developed

For the Ugaila scheme in the Tehama, there is a committee representing all ten participating villages. They seem to have no problems in cooperating. They have meters for each household, and the tariff is Rls 60/m³ about twice the Sana'a tariff. They pay Rls 3,000-5,000 a month to the operator, the accountant and the cashier. The villagers feel they are only able to manage the scheme efficiently because they were trained in book keeping and mechanics by the Dutch SURWAS project, which was operating in the Tehama until 2001. The tariff has gone up progressively with the diesel price, from Rls 30 to Rls 40, and now to Rls 60. Few people have problems paying, but consumption is down since the latest price hike. They have a good reserve built up - Rls 600.000-700,000. At the end of 2006 they were intending to bank the money, earmarking it for repairs and replacements, and possibly for building a small office to keep the records in.

Source: Authors' compilation, focus group discussion, Marawea'a, December 17, 2006

5.3 Distribution of livelihoods impacts

As for the water resources and irrigated agriculture reform program, the PSIA exercise analyzed the expected livelihoods impacts and distribution for the program of reforms in rural water supply and sanitation. The assessment looked at the expected impacts through the six transmission channels [71] on different segments of the rural population: women and girls, men, the very poor, and also rural organizations (Table 6). The assessment also looked at the impact of the reform program and its components on the rural population as a whole (Table 7). Some limited empirical evidence of NWSSIP reforms has been added in support of what is essentially a predictive analysis.

Box 22: Water-related health problems in Wadi Rasyan, Ta'iz Governorate

In Ziba village, they have good water supply with house connections. The main problem in the village now is health, and malaria is endemic. The villagers say "there are 20-30 cases of malaria a month" and this in a village of perhaps 500 souls. One problem may be standing water and waste water associated with the water supply scheme, even though they have put latrines and sand filters.

We have lunch further down the wadi, at Dowsa, a very poor village. Lunch is millet and maize bread, a fiery tomato paste, a little goat's cheese, and some honey, followed by sweet red tea. When we sit under the mango tree, it becomes clear that the major problems are water supply, pollution and health. There is a well, where children, largely girls, clustered around, are hauling up water and pouring it into cans. Some donkeys set off laden, knowing their route home. The well serves four neighboring villages. The men and women with us – for here the women are not shy or veiled – say, that the water in the wadi, which is copious and perennial, is very polluted: much if it is in fact the untreated effluent from the Ta'iz sewage ponds, but they blame a Hail Said ghee factory for releasing chemicals into the wadi which they say have "burned the crops and destroyed the fertility of the land". Indeed, the water is very saline (up to 3,000 ppm). The villagers are angry and shouting because "Hail Said sent a team to check, and they promised compensation" in the form of a rural water scheme which never came. In the end, the villagers quieted down and agree to take up the matter again.

The *aqil*, Mohammed Ali Hassan, joins us. The issue is health – the *aqil* produces a boy who looks 12 but is said to be 20 years old. Another boy, who is said to be 15 years old, looks like a child of 9 or 10 years. They feel that this stunting is due to what is happening in the wadi, but no one can be sure. The local doctor, with us, says it is due to internal organ disorder, but could be pollution related. Villagers generally do not look too healthy. Malaria and bilharzia are mentioned as prevalent. One young man in the circle is being treated for elephantiasis.

Source: Authors' compilation, focus group discussion, Wadi Rasyan, Ta'iz Governorate, December 11, 2006

[71] Poverty and social impact transmission channels consist of authority, price, access to goods and services, assets, employment, and transfers and taxes (World Bank, 2003, and 2005b).

Impact on different segments of the community

Women and girls in the community: access to water supply and sanitation services will relieve women and girls of the trudge to the well or spring. In fact, females are especially keen on rural water projects. The Public Works Project mentioned that, "*men will ask for a school, women will ask for a water project*"[72]. Indirect impacts are expected in improved health and hygiene, and more girls in school. However, the health benefits are not automatic. Water supply schemes can even bring their own health hazards - see, for example, the cases of Sha'ab (Box 19) and Ziba (Box 22). Plainly, water supply needs to be accompanied by provision for waste water evacuation, sanitation and health education.

Men in the community: paying for water shifts the cost from women and girls, the typical fetchers of water, to men, the typical cash income earners. Water may go from being a "free" good to one costing 5% or more of household expenditures. The time of women and girls may be more freed up, and that of men more committed. However, despite the experience of the PWP cited above, the study found no example of resistance to rural water supply from men: everywhere it was seen as a first priority.

The very poor: generally in rural water projects -and in all field study sites- provision is made for the poor. Typically widows are exempted from paying, and other households in difficulty find a sympathetic arrangement made for them. At the Ja'ar scheme (Box 16), the PSIA focus group told the mission that widows and the mosque were exempted from paying (but that the WUA sedulously pursued government departments when they delayed paying their bills!). This will represent a very substantial beneficial impact for the poorest.

Rural organizations: rural organizations like schools, mosques and health centers may also benefit from access to safe water and sanitation.

Impact on the rural population as a whole

Table 7 assesses the reform impacts program via the six transmission channels on the rural population.

Authority

Regarding authority in rural water supply reform, the impact of changes in rules, powers and entitlements on decision making behavior and livelihood strategies is likely to be in three main areas: (i) decentralization and demand driven approaches; (ii) self-management of schemes through WUAs; and (iii) a rebalancing of authority at the micro level between men and women.

(i) Regarding *decentralization and demand drive*, three complementary reforms are at stake: the administrative decentralization of GARWSP; the democratic decentralization to elected local councils at governorate and district level; and the change in rules for site selection of rural water supply and sanitations schemes (site, type) from a top-down determination procedure to a (supposedly) bottom-up self-selection procedure. The multiplication of risks and inefficiencies at the conjunction of these three systems – inadequate GARWSP decentralization, inefficient or inequitable local council behavior, and ill-prepared, weak or divided communities - is likely to reduce the beneficial impacts (see discussion in 5.4). Nonetheless, communities probably have a greater chance of making use of their new entitlements today than before the reforms. Given the weak governance structures, the service provision by communities in rural areas is ever more crucial.

[72] Key informant interview, Sana'a, December 5, 2006

(ii) Self management of schemes through WUAs will increase transparency and accountability within the system. Internal rules almost always provide for all community members to share, and for those who cannot pay to be exonerated.

(iii) *Shift of authority between men and women* will occur as water schemes will 'empower' women and girls by reducing menial drudgery. The rules will shift the costs to men, who will have to work harder. The schemes visited in Ugaila, e.g. (Box 22) or Ja'ar (Box 16) seem to confirm these expectations.

Labor markets

Minor labor market impacts occur during construction (manual labor) and through operation and maintenance, for which operating, maintenance and management, and administrative services are required. Where community contracting is introduced, this may lead to good short term employment opportunities – and even to the development of local contracting capacity.

Prices

Price impacts are capital costs and subsequent running and replacement costs. The community share in *capital costs* can range from $30-120/person for water supply and from $20-60 for sanitation, depending on the system. These impacts vary according to the level of subsidy (see below), the physical environment, and technology choices. The distribution of impacts and the share of water in household expenditures depend on location and technology choice - more remote villages in difficult terrain or water scarce areas will have higher costs, and these communities tend to be poorer. In general, poorer villages either have to pay more for their water or accept a lower level of service (see the case of al Qala discussed in Box 23 below). The reform proposals include the introduction of a broader range of technology choices: for example, communities may be able to benefit from a water harvesting scheme of the type currently implemented by some NGOs and the SFD. This would greatly reduce capital and operating costs, to the benefit of the poorest and most water short communities. For example, Dowsa village in Wadi Rasyan (see Box 22) is very poor and also has problems of pollution: a water harvesting scheme looks to be both, the best technically and the most affordable solution.

Subsequently, communities have to bear *running and replacement costs*, reflected in water tariffs. In fact, the cost of water in many pumped schemes has been quite reasonable, until the recent diesel price hike. Households often paid no more than the equivalent of $2-3 a month. Now tariffs are rising steeply.[73] After the recent price increases, some households have reduced their water consumption: that was, for example, how the Marawea'a District scheme in Tehama came to extend the service to more villages: they needed to increase revenues as sales to existing consumers were down after the price went up (Box 19).

Box 23: How the poorest pay more for water: the case of Uzla Zararir, village of Al Qala

In al Qala, a very poor village in Wadi Rasyan near to Ta'iz, GARWSP drilled a well in 2000/1, but the well was on an incline and the pump could not be inserted. GARWSP drilled another well, to about 100 m, but it was dry. The scheme was abandoned, even though all the pipes to the tank and household connections were in place. Fortunately there was no cost to the community. NWRA's opinion is that there are overlays of volcanics and sandstone in the area, and a well would have to go to 500 meters to find sustainable supply. So currently, women and children are fetching small quantities from shallow wells, and some households are buying water from the next village at Rls 800/m³ ($4/m³) delivered, twenty times the cost paid in the affluent suburbs of Sana'a or Ta'iz.

Source: Authors' compilation: key informant interview and focus group discussion, Wadi Rasyan, December 11, 2006

[73] According to the 2006 Joint Annual Review, "increases in the price of diesel have resulted in higher water tariffs in rural areas, which are now Rls 120-180, well above the lifeline tariff in urban areas".

Access

Reforms will affect access to safe water and sanitation services for all community households. The present trend is to nationwide coverage and some prioritization of poorer areas and communities. Hence, there should be a progressive, pro-poor effect resulting from the new demand-driven and decentralized selection procedures. However, local councils will not necessarily always select the most appropriate choice. Influential and powerful groups are likely always to get the best access, like the Ja'ar village in Box 16. Some very poor communities (like Dowsa, Box 22) may be excluded because they do not have clout, the entry price is too high, or because GARWSP does not really offer lower cost technologies. The GARWSP chairman highlighted the pro-poor selection criteria to the March 2007 mission, but the study did not see any evidence of pro-poor investment distribution. The member of parliament for al Dhalia illustrated the particular problems of his area: long distances to water sources, poor water quality, and high cost of schemes. "When the usual cost sharing arrangements are applied, the subsidy is too little," he said. "Our communities cannot afford it - cost sharing keeps out the poorest."[74] The GARWSP chairman mentions that his agency tries to make arrangements for the poorest communities for in-kind contributions and, in exceptional cases, for local councils to pay the community contribution.[75] *Within* communities, the study found in every site, that traditional norms and solidarity provide access to the extreme poor, e.g. typically widows were excused from paying.

Transfers and taxes

Transfer takes place in the form of initial capital subsidy. The distributional impact depends on project selection: if, as was claimed by GARWSP staff, "70% of the projects are the right ones", then it could be assumed that at least that proportion of the transfer goes to the poorest communities.

Longer term impacts

Longer term impacts will be at critical stages when major repairs or replacements require community mobilization on a significant scale, or when the quality or quantity of the water source deteriorates. For past projects, this has been the point of breakdown – an informed observer estimated that 90% of schemes financed by government in the past are not working now[76]. Concrete data is not yet available, but plans to support the completion and rehabilitation of existing rural schemes are being discussed as part of Dutch subsector support (2005-09) and the Five Year Plan (2006-2010). There will also be longer term impacts on social capital. Positive impacts can result from successful community management, and may drive broader community initiatives (for example, the al Sinah user association in Taiziyya has developed education and health facilities for their community (World Bank, 1997)[77]. Negative impacts can result when certain groups remain excluded from service provision (for example, see Saken Azlaq, Box 17). External intervention can also impair existing social capital; for example the traditions of self-help rural water schemes, financed by wealthy benefactors or "clubs" of migrant workers who send remittances, have in the past sometimes been undermined by short-lived public interventions.

[74] Focus group, Sana'a, December 2nd, 2006
[75] Analysis of the pro-poor bias of the rural water program would be a useful component of a follow up study to PSIA.
[76] Key-informant interview, Sana'a, December 18th, 2006
[77] World Bank 1997, Yemen: Towards a Water Strategy

Table 6: Differential impacts of reforms in rural water supply and sanitation on different stakeholders

Stakeholders likely to be affected	Channels through which they will be affected					
	Authority	*Labor market*	*Prices*	*Access to goods and services*	*Assets*	*Transfers and taxes*
Women and girls in the community	A water scheme will 'empower' women and girls by reducing menial drudgery.	Women can sell agricultural produce as their time to fetch water has been reduced.	- -	Positive direct and indirect benefits via access to safe water. Health benefits can be positive and negative.	Real property values will notionally increase if connected to safe water and sanitation.	Where a public project is implemented, all water users will benefit from capital subsidy.
The very poor in the community	Rules typically provide for all to share.	Not applicable	Typically free	Typically open	Not applicable	*idem*
Men in the community	The rules will shift the costs to men.	More need for paid work.	Higher prices are largely borne by men within households.	Positive direct and indirect benefits via access to safe water. Health benefits can be positive and negative.	*Idem.* Also, owners of wells will benefit through water sales.	*idem*
Rural organizations, e.g. Mosques, schools, etc	Not applicable	Not applicable	Rural organizations will pay for access.	Rural organizations benefit from access.	*idem*	*idem*

Source: Authors' compilation

Table 7: Impacts of different reform components in rural water supply and sanitation on stakeholders

Component	Channels through which stakeholders will be affected					
	Authority	*Labor market*	*Prices*	*Access to goods and services*	*Assets*	*Transfers and taxes*
Rapid expansion of coverage with a pro-poor bias	Transparency and decentralized approval system should increase responsiveness and accountability.	Not applicable	Community pays a share of capital costs and all running costs. Some negative impacts from diesel price rise -these may be worse for the poor and for remote communities.	Target is safe water for 47% of the rural population by 2009. The poorest may have less access.	Communities will benefit from enhanced water infrastructure asset, with more open and inclusive "ownership".	Not applicable
Making services inclusive, affordable and sustainable	DRA approach should empower communities. But the efficiency and equity of Local Council mediation is not evident. Self management will increase transparency.	Not applicable	Where low cost technology is used, costs should be lower. Community involvement should reduce capital costs through both choice of technology and close monitoring of implementation. Community self-financing of O&M may result in higher costs than before.	Requirement for communities to share costs may restrict access. Use of low cost technology should greatly increase the number of communities that can be reached.	*Idem*	Capital subsidy will benefit all communities – but may be more accessible for 'politically powerful' communities.
Improving implementation	GARWSP decentralization should improve accountability.	Community contracting will provide employment.	Not applicable	Rural population benefit from improved access to rural water supply and sanitation.	*Idem*	Not applicable

Source: Authors' compilation

5.4 Institutional and political economy analysis: political will and constraints, and implementation capacity

This section describes stakeholders with significant influence over the reform and assesses possible support or opposition, including the implications of "visual power maps" which stakeholders produced during the March 2007 workshop (see Annex 3). The section also assesses likely or actual implementation constraints that may be experienced with these stakeholders.

Parliamentarians, ministers, governors and tribal leaders

Parliamentarians, ministers, governors and tribal leaders have all reaped the reward of patronage in the past by influencing the allocation of financing in rural water towards particular constituencies – see, for example, the activities of Sheikh Nasser described in Box 16. Fearing the loss of the benefits that patronage brings, they may tacitly oppose a transparent and demand driven resource allocation procedure, or at least continue to plead for their own parishes. However, rural water supply has been shown to be an effective way of reducing poverty for many rural people. In general the political establishment is ready to provide strong support to the reform program. This is conditional, nonetheless, on the MWE and GARWSP being able to persuade top decision makers that the reform program is the right one – and the sector strategy is still not approved – and that, with the reforms, sector agencies can at last deliver results. However, even with transparent procedures, it is likely that parallel tracks of influence will continue, although at a lower level.[78]

Tribal and other conflicts within communities

At the local level, many of the problems with rural water schemes are said to be '*tribal*'.[79] However, these problems are often not really tribal but simply the result of friction within and between communities over access to a dwindling resource or support that is not adequately tailored to the local context. In Ta'iz, a spring was shared between two mountains, but the financier (the EU) told the Public Works Project they would only finance one scheme. "The community from the other mountain stopped the project.", resulting in no improved rural water supply for anyone. In another case in Shabwa, "The tribesmen blew up the entire project, well and pump and all"[80]. The study *Coping with water scarcity in Yemen: conflict and adaptation* (Ward 2005) is replete with examples, including the very famous dispute over rural water supply on Jebel Sabr in the late 1990s:

> "Sixteen people have been killed and tens injured since the outbreak of armed clashes between the villagers of Qurada and state troops, who used heavy artillery and rockets to shell the village. Scores of villagers were arrested and hundreds fled their homes. The incident began when Quarada refused to share well water with neighboring villagers…." (*Al Shoura*, June 20, 21, 29 1999)

These are the kinds of power plays within communities that inhibit the formation of social institutions needed for management of a joint project, like water supply. The waning power of traditional dispute resolution mechanisms is a further constraint (see 3.1 above, and World Bank 2006a). The agencies

[78] During review of the draft of this paper, the Royal Netherlands Embassy, which is closely involved in the rural water sector, pointed out, that although bottom up project selection procedures are being implemented progressively, the demand is far in excess of GARWSP capacity to respond. This situation leaves ample scope for the influential to "plead for their parish".

[79] The Governor of Abyan attributed the breakdown of the project at Mafidh to tribal conflict (see 5.2.2 above). The Public Works Project mentioned: "There is always a problem with the sheikh." Key-informant interview, Sana'a December 5, 2006

[80] Key-informant interview, Sana'a December 5, 2006

working in the field learn to identify such tensions early on. If communities cannot resolve them, even with help, projects cannot go ahead. However, GARWSP has for the moment little social assessment capacity – and in this, it is taking a risk.[81] During the September 2007 mission, GARWSP agreed to set up a framework partnership agreement with NGOs as part of the NWSSIP update for SWA, so that NGOs could, for example, carry out the community mobilization and training for GARWSP projects, and develop water supply schemes in poorer areas.

The Ministry of Water and Environment

The Ministry of Water and Environment (MWE) is the government ministry responsible for designing and implementing the rural water reform. MWE is a strong supporter of the reform, but faces political constraints as it is a new ministry headed by technicians rather than politicians. Secondly, it is faced with strong vested interests in the status quo, weak demonstration of success, and intense competition from other sectors for budget and donor resources. Also, MWE lacks the power or the staff resources to effectively control GARWSP or to force sector agencies to work together. Lacking the equivalent of the Technical Secretariat, which has been driving urban sector reform, MWE is obliged *de facto* to be rather hands off in rural water supply. It is effectively GARWSP that is directing the reforms.

GARWSP

GARWSP's predecessor organization, GAREW, was for long a focal point of patronage, disposing of large financial resources and characterized by weak internal control and poor implementation performance. In the 1990s, it was difficult for a visitor to enter the GAREW headquarters, where all decisions and virtually all staff were located: the entrance halls and anterooms were crammed with sheikhs and tribal representatives, most of them carrying guns. Any meeting was likely to be interrupted by some powerful person striding in to lay claim to a scheme. Not surprisingly, resource allocation was skewed, with the vast majority of GAREW schemes in the area around Sana'a.

GAREW was abolished in 2001, and GARWSP arose. Sector reform was needed, and NWSSIP proposed to set up a 'central reform office' (see 5.2.3 above) on the model of the Technical Secretariat for Urban Water Reform. This proposal was abandoned for reasons not completely clear, but probably including the following: (a) the lack of a strong champion of reform with a vision of what needed to be done, and lack of a defined political constituency for any particular type of reform; (b) donors were already backing other visions of reform; and (c) GARWSP, under its forceful and charismatic chairman and with an establishment and staff created over the years as the national agency for rural water, naturally strongly opposed any idea that sector reform could be led from outside its own organization.[82]

Thus, the new strategy recorded a lead role for GARWSP in sector reform – and for reforming itself. The organization is currently trying to adapt to its new role of sector coordination and to a reform vision for

[81] During review of the draft of this paper, the Royal Netherlands Embassy pointed out that GARWSP is aware of the need for social assessment and is taking steps to reinforce this side of its operations. Examples cited include recruitment by the al-Dhalia branch of a sociologist; and a mobile team of trainers at headquarters who, for example, put on a training event in February 2006 for 70 WUA members from five governorates.

[82] The 'technical' proposal for rural water supply and sanitation made by the NWSSIP working group was incorporated into the NWSSIP document, but never spelled out any compelling vision that could have generated support. Donors backed different reform visions, e.g. the World Bank was supporting autonomous regional rural water units in a project framework; the Netherlands was supporting the vision of sector reform led by GARWSP. As the process, that was set up (jointly by the Netherlands and the World Bank) to devise the new sector strategy, was decided to be located within GARWSP, it was virtually a foregone conclusion that GARWSP would be identified as the lead agency in the sector reform.

itself that (in time) is intended to reduce headquarters to a facilitation role and pass authority to the branches to manage a demand driven resource allocation system and to implement projects.

There is a big risk in this kind of reform from within – the risk of vested interests having free play. However, there are also possible advantages, in terms of commitment of management and staff. In fact, the reform program, that is inherent in the new strategy, is essentially what is proposed in NWSSIP, and implementation is proceeding (see the PSIA interview with the Chairman in Box 15). Hence, some worries are allayed. Perhaps the most significant indicator that something has changed was the complete absence of any armed tribesmen in the halls of GARWSP when the study team visited. Clearly the power has shifted somewhere else – or has the system become truly transparent and rule-based?[83] In fact, in the governorates there was no clientele hanging about the offices of the GARWSP branches either – but a fair number of people around the Governor's office. It seems likely that decision taking on rural water has been spread between so many actors now that only the savvy lobbyists know where to go (see below and Box 16 for examples). Reducing the scope for influencing decisions is clearly an achievement. However, it needs to be asked whether this and other aspects of the sector reform process are optimal, or if not, what can be done to improve.

Certainly there are some weaknesses. There are signs that GARWSP headquarters assert a too directive role in the sector, and in particular they have not yet been able to harmonize approaches or agree on joint programming (either centrally or at governorate level) with other agencies like SFD and PWP. In addition, GARWSP staff, who are used to centralized, top-down and capital intensive operations, have difficulty in converting to the reformed approach. There is, too, a major implementation constraint, as most GARWSP branches lack the human and financial resources to do a fully effective job. Branches are not yet sufficiently empowered by the decentralization process. Nonetheless, a number of activities have already been delegated to the branches: drilling contracting and supervision, reservoir construction and supervision. Deliveries of supplies such as pumps and pipes are directly to the branches. Branches have bank accounts and cash payment of staff salaries has drastically diminished. Information flow between HQ and branches has substantially improved.

In fact, it is in the decentralization process where most work remains to be done, particularly in decentralizing decisions over the project cycle and the related way in which funds flow to rural water investments (see 5.2.1 and 5.2.3 above, plus Annex 2 graph 5). This is perhaps the most important area of risk - and one that has its own 'political economy'.[84]

Other rural water supply agencies

Three other public agencies or projects - the Social Fund for Development (SFD), the Public Works Project (PWP), and the World Bank-financed Rural Water Supply and Sanitation Project (RWSSP) – implement rural water schemes. They have thrived on their autonomy and freedom from the constraints of

[83] During review of the draft of this paper, the Royal Netherlands Embassy suggested another highly visible indicator of "openness and transparency": that in the refurbishment of GARWSP headquarters, where walls have been "literally taken down and replaced by modern aluminum framed windows and transparent doors".

[84] Concerning flow of funds, the Royal Netherlands Embassy provided the following very useful comment: "The rural water supply strategy follows here a dual decentralization approach. As long as fiscal decentralization is not yet a fact in Yemen, most investment funds will be spent through GARWSP headquarters and delegated GARWSP branch activities in implementation of water schemes. In the coming years, GARWSP will develop the capacities of its 20 branches. After five years of implementation, the decentralization strategy will be reexamined. If fiscal decentralization is a fact, considerable money will start flowing through the Local Councils, and GARWSP branches role will reduce to advisory and supervisory functions. For larger procurement, e.g. bulk purchase of pipes and pumps, it might still be justified to do procurement in a central way."

the Yemeni administration, and on their own planning and implementation approaches. Approaches hitherto have been polarized, with SFD offering a limited menu of very low tech options, and RWSSP offering more complex mechanized schemes with higher investment costs and more expensive sanitation options. SFD, PWP and RWSSP may oppose the reform attempt to harmonize approaches, technology and financial packages, and so may undermine the reform by their behavior without necessarily opposing it. SFD, for example, mentioned that they are keen to take part in coordination and joint programming, but they were skeptical about GARWSP's ability to organize it – and so possibly SFD's commitment may be rather half-hearted.[85]

The local councils

According to the Local Authorities Law (Law 4/2000), the elected *Local Councils* and their administrations are "responsible for implementing policies and plans in water supply and sanitation". Local Councils have significant resources they can allocate to rural water and play a key role in both project selection and project financing. They should, in principle, support the reforms, as they gain a significant role in decision making and resource allocation. The principal problems, as discussed above, are politicization, favoritism, and weak technical skills. As the parliamentarian from Ibb observed to the study team, "The Local Authority Law is excellent, but capacity and means of work are lacking in the councils….."

Community organizations and NGOs

Yemen has a long tradition of self-help rural water supply schemes, managed by community organizations and often supported by rich people with local connections or by expatriate solidarity groups. These organizations provide a sound popular basis for public support to sustainable rural water supply. In addition, international NGOs, such as CARE and DIA, are active, and local NGOs, particularly women's organizations, are active proponents of more and better rural water and sanitation coverage[86].

Donors

Although donors in the sector are few (Netherlands, Japan, UNICEF, World Bank), they have had difficulty in harmonizing their approaches. Despite considerable discussion and the preparation of the sector strategy, there is still disagreement about the organizational and governance structure, and about what constitute sustainable and pro-poor RWSS management and technical models. Donors may not all subscribe to the entire range of reforms. Two particular issues divide donor opinion at the moment: (1) what should happen to the lessons, methodology and institutional capacity of the RWSSP, soon to close; and (2) when and how will the rural water sector be ready for program support. As in the case of water resources and irrigation (see 4.4 above), ample mechanisms exist for donors to harmonize and align.

[85] Key-informant interview, Sana'a, December 5, 2006

[86] The CSA found that the political will is high to address the current challenges to gender equity and promotion of women's economic inclusion and political voice. With adequate resources, the women's movement can become a agent of change., World Bank 2006a

5.5 Risks that could change the expected impact of the reforms

The main risks were assessed prior to beginning of the reform. All of these risks still exist, and some of them have become reality and require corrective action:

- The **political economy risk** that (a) MWE and GARWSP cannot win agreement on the new strategy, and that previous fragmented approaches to sector investment persist.[87] *This risk requires early action from MWE, as public agencies and donors need to be rallied behind an efficient sector strategy if impetus is not to be lost*; and (b) that GARWSP encounters both practical problems and institutional resistance in decentralizing key functions to branches. For example, the centre may be reluctant to surrender the bulk procurement function (rents may be at play here). More generally, the centre may be reluctant to surrender power over funds and decision making, as headquarters move from managing implementation and the investment budget to a role of policy development, coordination and facilitation. It is the stated vision of GARWSP top management, that headquarters will indeed see its role shrinking. The Chairman mentioned: "the organization might even disappear by 2015" [88]. But the agenda is a difficult one, and few organizations have ever voluntarily "closed up shop" – witness the vigorous resistance put up by NWSA to the shrinking of its role in the urban water and sanitation subsector. *MWE and the donors need to give GARWSP every support in the decentralization process.*

- The complementary **institutional risk** that branches continue to lack the financial and management autonomy they need to carry out a demand driven program. *This risk requires attention to capacity building in the branches, and support to the development of management instruments that permit responsible decentralization of budgetary resources, especially a well-performing management information system (MIS).*

- The **financial resources risk** that donors do not support the reforms and financing is insufficient. *This risk exists, as RWSSP is ending soon, and the Netherlands program financing is quite limited in size.*

- The **implementation risk** that (a) absorptive capacity may not increase sufficiently to achieve the MDG target by 2015. *Completing GARWSP decentralization and capacity building is vital here, as is ensuring an adequate and predictable flow of funds into the medium term.*[89] *and (b)* that the new model approaches do not prove sustainable or really benefit the rural poor. *There are certainly risks that technology may be inappropriate, packages are too high cost, local authorities are weak technical and financial partners, the community is not genuinely empowered in the decision making process, the water resource may prove inadequate etc. Although GARWSP is moving in the right direction, close monitoring of these risks will be needed.*

* * * * *

This chapter has analyzed in turn the objectives of reforms in rural water supply and sanitation, the reform implementation and its results to date, the distribution of livelihoods impacts, and the institutional and political economy constraints and risks. Chapter 6 (6.3) will summarize findings and make recommendations to improve implementation, to enhance positive impacts and to reduce negative ones, and to tackle institutional and political constraints to reform implementation.

[87] During review of the draft of this paper, the Royal Netherlands Embassy made the comment that the problem was perhaps not on agreement on the strategy, on which stakeholders were already aligned, but on how to *implement* it: joint planning, joint funding, looking for synergies.
[88] Key-informant interview, Sana'a, November 29, 2006
[89] During the review of the draft paper, the Royal Netherlands Embassy commented, that if increase in coverage were to continue at the 4% annual rate reported to the 2006 JAR, the NWSSIP target for 2009 could be achieved.

Part C Conclusion

6. Pro-poor water sector reform?

What has the PSIA revealed about the questions "*Is NWSSIP working*? If NWSSIP is *not* working, "What needs to be done and how?" This chapter first examines the hypotheses that underlay the NWSSIP reform program and asks what the actual or likely impacts are (6.1). The chapter continues to summarize key findings and recommendations on the reform program (6.2 and 6.3). A brief final section (6.4) then suggests next steps.

6.1 Main findings on NWSSIP assumptions and impacts

NWSSIP is a detailed and dense program. Complex impacts were anticipated, both in terms of water resources conservation and of distributional impacts on the population. Although it is too early for a full evaluation, the PSIA process, i.e. parallel analysis and policy dialogue, provided some preliminary indications regarding the assumptions that underlie NWSSIP and its expected impacts.

First, it was assumed that the measures provided in NWSSIP for decentralized water management, a stakeholder partnership approach and secure water rights would gradually reduce the rate of groundwater overdraft (Section 4.1). This impact will only be felt in the long term and it is not yet proven. There are, however, indications that where the approach is being implemented on any scale, there is an improvement in water governance. The signs include increased awareness and cooperation of the population, fledgling basin committees and plans, the beginning of regulation, and a growing water user association movement - all of which are promising signs. However, **the pace of change at the local level is extremely slow, and more resources as well as a long term commitment are essential**.

A second assumption was that farmers will be able to reduce water use whilst at least maintaining their incomes (Section 4.1). So far, there is little empirical evidence on this one way or another, but what evidence there is, suggests that farmers with market access can reduce water use and maintain their incomes *if they invest in water saving technology*. There are, however, huge barriers to realizing the potential (e.g. barriers to increasing yields, upgrading cropping patterns, reducing costs, expanding markets) and a major effort is needed to improve productivity on a broad front. Other countries have successfully followed this path of *more income for less water*, and there is no reason why Yemen should be an exception. However, **getting 'more farm income per drop' will clearly require considerable effort beyond what is currently being done**.

Third, it was expected that changing the incentive structure will promote efficiency and intensification of water use (Section 4.1). The doubling of the diesel price in 2005 is certainly the boldest policy change that has been made, but response has been mixed. Those who can afford it – or who can access subsidized programs – are certainly investing in water-saving productivity improvements. Others are simply reducing the level of their activity, saving water but losing income. In addition, higher diesel prices have also driven up the cost of domestic water. This has little impact on resource conservation, but a negative impact on incomes and welfare, particularly for the poor. Thus, rural people have reacted to the price rises by reducing water use, but whether this will be compensated by improved productivity and access depends on the sequencing of the reforms: efficiency and welfare gains will only be broadly attained if changes in the incentive structure are accompanied by programs that promote investment in efficient

irrigation and low cost rural water supply[90]. The lesson is, that **NWSSIP is best implemented as a reform package, as piecemeal implementation of individual reform actions – particularly putting up the diesel price – can have some uncompensated negative impacts**.

The fourth expectation was that a harmonized rural water sector strategy and coordinated institutional approaches would bring sustainable access to rural water, particularly for the poor (Section 5.1). Reforms are certainly underway, with decentralization, "demand responsive approaches", community associations and self financing. Remarkable growth in coverage has been reported – an extra 2 million rural people with access to safe water during 2003-5 – although these surprising figures still need to be verified. Some of the new investments are clearly more pro-poor and sustainable, than those that had been made a decade ago. However, some of the old constraints to access still persist, and efficiency needs to be greatly improved. Essentially, **implementation of the reforms needs to be seriously speeded up if Yemen is to have hope of increasing access of the rural poor to affordable and sustainable safe water on a scale large enough to attain its NWSSIP and MDG targets**.

A final assumption was that the results of NWSSIP overall will be pro-poor (Sections 3.4, 4.1): here so far the evidence points the other way: Consolidation of existing wealth and income patterns, unequal access to rents and subsidies, and negative impacts on employment and incomes of the poor call attention to more focus on equity. **Corrective action is required if pro-poor outcomes are to be achieved**.

Taken together the overall expectation of Yemeni people from NWSSIP is that, if all reforms are implemented effectively, aquifers should stabilize[91] in the long term, returns to agricultural water should increase, farm incomes should stabilize, rural people will have access to safe water, and the incomes and employment of the poor will be protected. Although it is early in the reform program, the conclusions of the PSIA – based on measures so far, particularly the increases in diesel price and the implementation of agricultural water productivity and rural water supply programs – is, that this expectation is reasonable in *theory*, but that in *practice*, the results will be uneven over time, and the impacts are likely to vary across different social groups and geographical locations.

The effects already observed tend to confirm that positive impacts can be maximized and negative impacts minimized where the full range of reforms is applied. By contrast, leading with the reform of the incentive structure tends to distort the positive impacts, with particular negative effect on the poor, if the diesel price rise is not accompanied by implementation of other reforms at the same time. This is exactly what has happened over the last two years – prices have gone up, but most people have had no available response that could compensate for this. As a result, the NWSSIP reforms so far may be saving water, but at the risk of depressing the rural economy and with a particular risk to the employment and incomes of the poor. **NWSSIP is best implemented as a reform package**, as uncoordinated implementation of individual activities produces unbalanced effects with a particular risk for the poor.

In sum, the sequencing and dosage of reforms and support are important. Prices have gone up, some water is being saved. **Now there is the need for (massive) support to productivity to restore incomes.** This is the most important message of the PSIA.

[90] Building on these findings, more detailed quantitative analysis of the differential impact of policy adjustment, particularly of diesel price increases, will be carried out by government in the upcoming "*Study on Options for Changing the Economic Incentive Structure for Water Use*".

[91] This study did not analyze the water balance as this is beyond the scope of PSIA. NWRA is establishing a National Water Resources Monitoring Program under NWSSIP that will update water resources information as an input to the basin management plans (see Section 4.2.1).

6.2 Key findings and recommendations on the reform program on *water resources and irrigated agriculture*

Based on the findings and analysis of Chapter 4, this section summarizes the key lessons and PSIA recommendations on the reform program on water resources and irrigated agriculture. The lessons and recommendations deal in turn with (1) improving NWSSIP implementation, (2) improving impacts of the reforms on different segments of the population, particularly the poor, and (3) assessing and addressing the political economy and institutional constraints. During the September 2007 mission to discuss PSIA implementation, all key stakeholders, namely MWE, MAI, GARWSP, NWRA, RNE, KfW and GTZ, reconfirmed the significance of these recommendations and highlighted the need to implement them as part of the NWSSIP Update and operations.

6.2.1 Improving NWSSIP implementation in water resources and irrigated agriculture

1. Basin committees and plans. The program for setting up basin committees and plans is underway. The heterogeneity that marks the experience to date need not matter in an initial pilot stage, especially if it responds to a dynamic created by local ownership. The most important thing is to monitor and evaluate the experience and to draw conclusions that can be applied to both, existing and future structures. The role of NWRA is clearly critical, as a basin committee and a management plan validate NWRA's integrating role and activities. Water user representation is also a key element, as the reform is designed to build ownership and commitment to responsible (self-management) of water resources at the local level. There is scope for increasing user representation on the basin committees. There is also scope for developing the plans in a more participatory way, involving all agencies and stakeholders, and for speeding up the process. Finally, basin committees offer a first class medium for creating broad understanding at the local level of NWSSIP reforms as both beneficial and fair, and they can coordinate efforts within the basins to disseminate and dialogue on NWSSIP. *It is **recommended** that a process of monitoring and study be set up, with the objective of drawing up best practice approaches. The NWRA chairman told the March 2007 mission that he intends to work with the IWRM Group to convene a workshop and follow-up activities to initiate this process of monitoring and study.*

2. Water user associations. A variety of different user associations is being promoted, ranging from loose groupings for the purposes of project-related training to associations of water users that may have the capacity to become field-level managers of water resources in their area. Heterogeneity of this nature is expected during the first phase of WUA development, but there is a need for cross-fertilization, learning and the application of lessons to build best practice approaches. Ultimately this process should lead to some alignment on common practices and perhaps to legislation or by-laws confirming the responsibilities and powers of WUAs. Close attention is needed to the purpose and sustainability of WUAs: if they are to be effective in water management, they have to provide a service that members value; if they are to be sustained they need ongoing support. *Here too it is **recommended** that a process of monitoring and study be set up. The objective would be to develop a typology of WUAs of different roles and functions for irrigation (groundwater/surface water) and water supply, define conditions for success (learning from experience from technical, institutional, management and capacity building aspects), draw up a methodology for setting them up and supporting them etc. The NWRA chairman told the March 2007 mission that NWRA will work with MWE to set up a review process, beginning with a workshop and possibly following up with a study in due course. The Deputy Minister of Agriculture also told the March 2007 mission that MAI supported the need for a study of irrigation WUAs, which should also review the possible role of cooperatives as WUAs. He also emphasized the links of a study of irrigation WUAs to the proposed irrigation strategy (see below) and raised the possibility of GSCP financing for such a study.*

This was reconfirmed during the September 2007 mission, where MAI stressed that this should all be taken up during the NWSSIP update.

3. Regulation. Several NWRA branches are registering some success with regulation, but progress is very uneven, and implementation is constrained by the problems with the Water Law, and the ambiguous role of the local councils. The Water Law was intended to provide legal clarity on water rights and infractions, but is apparently not doing that, in part because the by-laws have not yet been issued. Local councils' role in Water Law implementation is at present very weak, because elected members change frequently, have diverse interests, and receive little skilled administrative support. There are proposals in Ta'iz and Amran to put a "water sector technical unit" at both governorate and district local council levels. Progress is also constrained by the continuing institutional weaknesses of NWRA. Further, decentralization and community engagement in water resource management can assist in enforcing regulation. *It is **recommended** that the by-laws to the Water Law should be completed as soon as possible, with the collaboration of the Ministry of Justice and the Attorney General's Office, and that support be provided to the "water sector technical units" in the two water management pilot governorates. During the September 2007 mission, NWRA highlighted the need to complete the decentralization process with qualified staff and to evaluate the currently decentralized units to draw lessons and make amendments as necessary.*

4. Agricultural trade policy. As Yemen is currently negotiating the agricultural chapter for WTO access and is likely to make changes in its agricultural trade and subsidy policies in that framework, the changes to the agricultural trade regime, proposed under NWSSIP, have not yet been made. The limited availability of water severely constrains Yemeni's agricultural production. However, as the agricultural sector is still absorbing the shock of the diesel price increases, and as there is no coherent domestic or export market development policy, *it is **recommended** that the trade policy reforms be postponed until the overall framework provided by a WTO agreement is in place*.

5. Water productivity. Water scarcity and diesel price increases are sending powerful signals to farmers. However, except where farmers can extend their *qat* area, most farmers do not have access to solutions that can maintain their livelihoods. They need to reduce water consumption, but have no means to increase returns per unit of water used. So far, they are faced with a decline in their farm incomes. Even where technical solutions are available, poor and risky market prospects may make them economically unattractive. As a result, agriculture and the rural economy are at risk of decline, with particular risk for the most vulnerable. MAI is implementing some good programs to improve water productivity – e.g. GSCP, IIP. These programs are beginning to work, but they are expanding at a very slow pace and the vast majority of Yemen's farmers, particularly poorer and smaller farmers, do not have access. In addition, these programs do not always solve the farmer's problems. The challenge is to increase incomes and employment whilst reducing water use – equitably. Experience shows that this requires a combination of measures, for example investment in water saving; good advice on on-farm water management; agricultural packages that can significantly increase "income per drop" and so raise farmers' incomes; farmer organization in WUAs or cooperatives; market development; and a harmonized approach to managing water resources at the central and governorate level.

*It is **recommended** that*

- *MAI should focus on programs like GSCP and IIP, finding ways to scale up at least cost and with more attention to (a) equity, (b) on-farm water management advice, (c) technical packages to increase incomes, (d) monitoring and evaluation, including the impact of demonstrations farms, and (e) capacity building of extension officers, and training for farmers in modern irrigation techniques,*

including training of farmers by farmers who have experience in modern techniques[92]. MAI programs should be harmonized with ACU and its water saving programs.

- *A large and increasing share of AFPPF financing should be allocated to investments in water saving and modern irrigation, perhaps through the GSCP mechanism. This reallocation of resources should be part of a broader reform of the governance of AFPPF.*
- *WUAs and cooperatives should be consistently promoted, supported and expanded as the lowest level of water management.*
- *The development of domestic and export markets for high value crops requires urgent attention, and a public/private partnership approach is recommended.[93]*
- *A harmonized approach on water resources management and irrigation should be developed between MAI and MWE, particularly (a) governorate level cooperation between all water agencies on planning and programming, regulation etc., (b) joint work with NWRA on basin committees, basin planning etc. and (c) special cooperation arrangements between MAI and NWRA reflecting local comparative advantage (for example, TDA could carry out all or much of NWRA's mandate in Tehama).[94]*
- *A full irrigation strategy and investment plan should be developed jointly with MoPIC and MWE- involving all stakeholders - with a view to large program support. This strategy, should be completed with special studies as needed, for example on dams, AFPPF, WUAs, impact of diesel price increases on farming etc…and be directly linked to NWSSIP. The strategy should be transparent regarding the technical, economic, social and environmental appraisal criteria for dam investments. The investment program should include the AFPPF budget in its financing plan. The strategy should also deal with issues of qat and irrigation (see below).*

During the September 2007 mission, GARWSP and NWRA agreed to sign cooperation agreements for all RWSS projects to integrate rural water supply and sanitation into water resource management for sustainable resource allocation; to license all wells properly, and to conduct joint site selection. Both agencies highlight capacity and financial constraints, but plan to meet to develop a respective action plan.

6. <u>Treat qat as a crop</u>. No progress has been made on this bold proposition, which could see, for example, research and extension on water saving for *qat*, inclusion of *qat* in the water well licensing program, support to water saving on qat farms under GSCP etc. *It is **recommended** that MAI (and AREA) and MWE revive the "qat as a crop" agenda at cabinet level and seek agreement to a coherent approach that will encourage water saving in qat production.*

7. <u>Improving NWSSIP ownership and strengthening implementation.</u> Continued dialogue among stakeholders is imperative to implement NWSSIP. Commitment exists, but implementation progress could be further enhanced. Continued leadership and decision-making from the top are needed to promote further decentralization, especially on the fiscal side. *It is **recommended** that dialogue be sustained at all levels, particularly at the local level, so that NWSSIP reforms are seen as fair and beneficial, and support to their implementation is strengthened. Identified implementation constraints should continue to be openly discussed and monitored to further promote reform progress. This dialogue was promoted through the March 2007 consultations, and continued with the September 2007 consultations mission, where stakeholders identified PSIA priority actions that would be implemented through NWSSIP Update and operations.*

[92] This refers to 'farmer to farmer training', or what is generally considered 'training among peers'.

[93] The Deputy Minister of Agriculture said to the March 2007 mission, that his ministry would welcome support for an integrated program in agricultural market development and export promotion, plus support for the development of off-farm enterprises not dependent on water, for example rural industry and handicrafts with a focus on gender.

[94] The NWRA chairman confirmed to the March 2007 mission his interest in this proposal, provided that proper contractual and supervision arrangements could be made.

6.2.2 Improving the impact on different segments of the NWSSIP reforms in water resources and irrigated agriculture

The PSIA analyzed the impact of NWSSIP reforms on different groups in society by tracking distributional effects through six 'channels' (4.3). This section summarizes the analysis and makes recommendations on how these impacts could be shared more equitably, and in particular on how negative impacts on the poor could be mitigated and positive impacts enhanced.

The analysis of the distributive reform impact suggests, that **farmers with land and water assets are doing better than the landless**, and that **larger and more influential farmers are doing better than poorer and smaller farmers as well as the landless** in terms of coping with negative impacts of reform and in accessing subsidies. In addition, **poorer rural people in general are faced with higher water costs and lower employment opportunities**. The improvements to water productivity suggested above (6.2.1) will help make the rural economy more prosperous, but specific actions are needed to protect the livelihoods of the poor. Stakeholders agreed during the September 2007 mission to enhance NWSSIP's equity focus for groundwater and irrigation, and plan to operationalize this through the forthcoming NWSSIP Update and operations.

*Immediate attention **to improving the equity of the reforms** is **recommended**, particularly:*

- *rapid expansion of public programs to promote agricultural water productivity, including research, extension and investment programs, with focus on employment-intensive cropping packages;*
- *improving the pro-poor design and entry criteria for publicly subsidized programs, particularly GSCP and future ones;*
- *restructuring of AFPPF to provide a much more pro-poor focus;*
- *sequencing of reforms, so that price rises are balanced by increased access to the means of responding, and particularly to programs supporting improved water productivity and access to profitable market opportunities.*

6.2.3 Addressing political economy, overcoming institutional constraints and developing opportunities in water resources and irrigated agriculture

The PSIA process (i.e. parallel analysis and policy dialogue) analyzed vested interests and institutional constraints and opportunities as they are critical to the equitable and sustainable implementation of NWSSIP and to reform outcomes in water resources and irrigated agriculture. (Chapter 3 *passim*, and Section 4.4). The present section summarizes the analysis and makes recommendations for addressing the political economy, for overcoming institutional constraints and for developing opportunities to promote reform implementation and policy change.

The "large farmer constraint". The political economy analysis suggests that large farmers are reluctant to reduce their water consumption, and will tend to use their influence to dilute the regulation and equity provisions of NWSSIP. ACU has been seen as representative of the interests of this group. *It is **recommended** that a lead be sought at the very top (from the President of the Republic down) in support of NWSSIP, particularly its provisions that make for more transparency in decision making, and that the ACU and the cooperative movement be expanded to reach a broader membership.*

NWRA capacity. NWRA lacks implementation capacity. The performance of some of its branches shows that the agency does have potential at the local level, but this initiative is currently being limited by "incomplete decentralization": too many decisions are still handled centrally, finances are still centralized, the operating budget for branches is very small, and -the cruelest blow- Dutch program financing which

was beginning to really empower branches, has ended at the time of data collection. *It is **recommended** that NWRA review its decentralization program and complete it, so as to genuinely empower the branches. Probably the best approach is for NWRA management to work with consultants to analyze in-depth the flow of funds and information*[95]*, and to draw up a transparent program to remove the blockages to the flows: e.g. to improve the budget preparation process and calendar to be able to meet deadlines, to improve the internal reporting system and institute a regular system of feedback etc. Equally, NWRA might select one branch for a full 'management modernization' program, to work on all the causes of poor performance identified above, including extensive capacity building. Government and donors should help to work out a mechanism for providing predictable flows of funds to branches for the implementation of priority programs. Government and donors should also agree on a performance-based incentive framework for NWRA staff. The NWRA Chairman emphasized the need to the September 2007 mission to complete decentralization with qualified staff, and to evaluate the decentralized units in order to draw lessons and make amendments.*

MAI and NWSSIP. MAI participated only marginally in NWSSIP. There has been little cooperation between MWE and MAI: the agreement on AFPPF has not produced any change in investment patterns; the contentious small dams program continues; a cooperation agreement between MAI and MWE has gone unsigned for a year. However, the situation is changing: at the local level, cooperation in many governorates is quite good, and at headquarters, both MWE and MAI recognize that cooperation is essential: the water resources problem cannot be resolved unless the problem of irrigated agriculture and rural incomes can be solved – and vice versa. *It is **recommended** that (1) MAI develops an irrigation strategy complementary to NWSSIP, working with MoPIC, MWE, NWRA and donors, and within an integrated approach; and (2) MAI and MWE sign cooperation agreements at both central and local levels, spelling out the mandate of each agency and the areas of cooperation. MAI confirmed to the September 2007 PSIA mission, that the Irrigation Strategy and Investment Plan will be developed with MoPIC, MWE, NWRA and stakeholders as part of the NWSSIP update. MAI called for technical assistance for GDI to update the PIP.*

AFPPF reform. There was an expectation that under NWSSIP, MAI would undertake reform of AFPPF: improving its governance and pro-poor thrust, and devoting more resources to water management, but this has not yet happened. *It is **recommended** that donors provide support to the proposed study on AFPPF reform, and that the study draw on the successful experiences of the Social Fund and the Public Works Project. The objective would be an AFPPF with transparent procedures and full accountability, supporting water productivity investments, and with a pro-poor emphasis. During the September 2007 mission, MAI reconfirmed to restructure the AFPPF, and selected this as a priority for NWSSIP Update.*

6.3 Key findings and recommendations on the reform program on *rural water supply and sanitation*

Drawing on Chapter 5, this section summarizes the key findings and recommendations of the PSIA on the reform program in rural water supply and sanitation. It deals in turn with improving implementation, improving impacts of the reforms on different segments of the population, particularly the poor, and with addressing the political economy and overcoming institutional constraints.

[95] The NWRA chairman validated the graphs on flow of funds and information (Annex 2). However, more detailed analysis for all NWRA branches is recommended.

6.3.1 Improving NWSSIP implementation for rural water supply and sanitation

1. Sector strategy and coordination. The rural water strategy, developed over the last three years and agreed at working level, has still not yet been officially adopted. The 2006 JAR reported a considerable increase in financial resources allocated. Rural water programs are now being loosely coordinated at central and governorate level, but overall results are very uneven. The continuing dispersion of effort between agencies (public, private, NGOs, donor-supported projects) is harmful to rural people's chances of getting access to affordable safe water. There is also need for donor harmonization and alignment. *It is **recommended** that: (1) a sectoral round table be held to revalidate or amend the sector strategy, and that the strategy be thereafter rapidly adopted and implemented; (2) priority attention be given to strengthened coordination and joint programming at central and governorate level in regard to identifying schemes, supporting their implementation, and monitoring and evaluating performance; and (3) donors find a means of aligning and harmonizing their approaches, preferably through a joint operation.[96] During the September 2007 mission, GARWSP and RNE stressed that the strategy revalidation process should also be used to create a common understanding of terminology, unified implementation mechanisms for demand-responsive approaches, joint programming, and an exchange of data.*

2. Local involvement in applications and approvals. GARWSP has begun decentralization of decision making; communities and local councils are able to express demand and show ownership by participating in financing. These are real improvements. It is likely that pro-poor impacts have improved through better spread of projects geographically, and there is more scope in the decentralized system for the voice of poor communities to be heard. However, projects depend on local community capacity to pay, which inevitably gives priority to better off communities. Secondly, project selection and financing are subject to local political and personal forces implicit in the local council process, which do not necessarily favor the poorest or neediest. Finally, with three tracks for financing and implementation (community investment, local council investment, and GARWSP investment) the risk of fragmentation and delay is high. Too much of GARWSP's program is piecemeal completion of overdue projects. *It is **recommended** that: (1) real mechanisms for hearing the needs of the poorest and for meeting them (e.g. higher subsidy) be worked out and implemented; and (2) attention be given to simplifying and streamlining project implementation.*

3. Encouraging NGOs to participate. There is no indication that NGOs are being encouraged to expand their work in rural water, nor is there any channeling of public funds to NGO rural water projects. *It is **recommended** that a formal policy be adopted for trying to encourage NGOs to intervene, particularly in the poorest communities, and that the NGOs be given access to some public and donor financing. Partnerships between GARWSP and NGOs should be considered. The chairman of GARWSP has confirmed to the September 2007 mission that a framework partnership agreement with NGOs would be developed as part of the NWSSIP update. NGOs could, for example, carry out the community mobilization and training for GARWSP projects, and develop water supply schemes in poorer areas. NWRA stressed that this should be done under the umbrella of existing or planned water resource management plans and Basin Committees.*

4. Supporting community or privately run schemes. Many of Yemen's most successful schemes are financed and run by communities or as private businesses. *It is **recommended** that a mechanism to support start up and capacity building for these community or privately run schemes be developed to supplement public development, especially in remote or mountainous areas. The cooperation of NGOs*

[96] During the March 2007 mission, it was suggested that the round table meeting recommended could help to strengthen the movement from "coordination to partnership" (see 5.2.1 above).

and of the Social Fund for Development should be sought in this regard. GARWSP told the September 2007 missions that a partnership framework for cooperation with NGOs will be created, and NWRA emphasized that community or private schemes need to be integrated with the water resource management plans and Basin Committees.

5. Low cost technology. There appears to have been little move towards more low cost technology, and GARWSP has little advantage in these approaches. *It is therefore **recommended** that GARWSP forge a partnership agreement with SFD and other organizations to program interventions jointly, with SFD and NGOs specializing in the low cost approaches which they do well, and GARWSP continuing with its main product line of tubewell-based schemes.*

6. Demand responsive approaches and community self-management. The demand responsive approach and community self management are certainly now the standard approach. However, GARWSP appears to have largely dismantled its competence in community mobilization and training. Other agencies such as SFD, UNICEF, RWSSP, and CARE have more skills in these areas. *It is **recommended** that GARWSP revive its skills in community mobilization and in managerial, technical and accounting training, and that all agencies work together on capacity building in this area. Particular attention should be paid to learning the lessons from RWSSP, and to integrating its community mobilization staff and approaches into permanent structures once the project ends.*[97]

7. Gender, sanitation and health. With few exceptions, gender appears neglected in current programs. Sanitation and health guidance also appear to have been largely set aside in GARWSP programs. Yet the problems of water related diseases are intense, probably growing, and are the major cause of infant morbidity and mortality. *It is **recommended** that (1) there should be a revived focus on these issues within GARWSP programs, learning together with RWSSP, SFD and others, and that serious consideration be given to how to deal with the waste water and sanitation issues, for instance, building on the experiences of UNICEF, SURWAS; SFD and others; and (2) on the health issues, there be governorate level coordination between the water agencies and health programs*.

9. Water resources sustainability. Although GARWSP and NWRA are developing collaboration, there is little evidence that water has been sourced with NWRA support and clearance, and the number of dry wells is wastefully high. *It is **recommended** that, at governorate level, cooperation agreements should be worked out to integrate rural water supply and sanitation into water resource management in order to guarantee sustainable resource allocation for all RWSS projects and that all wells are properly licensed. During the September 2007 mission, NWRA and GARWSP agreed to draw up cooperation agreements. NWAR emphasized this as crucial to support joint site selection, record the location and water resource use of all existing (public and private) rural water schemes in NWRA's monitoring and annual implementation program, and avoid construction of reservoirs tanks and networks without prior confirmation of water resource availability.*

GARWSP decentralization. GARWSP has moved towards decentralization but there is a long way to go. Decentralization of personnel and procurement decisions is only beginning, a large part of the investment funds is still centralized, information flows primarily upwards, and most branches suffer from poor skill mix. At the same time, GARWSP technical standards remain quite modest. *It is **recommended** that GARWSP: (a) give full attention to completing its decentralization program over the next two years with careful planning and accompanying capacity building; (b) complete the management information system (MIS) to allow real time tracking of project implementation; and (c) exploit further the scope for more community contracting. At the same time, it is recommended that projects financed by NGOs and*

[97] One possibility is that RWSSP staff could set up consultancy partnerships or firms to provide services to the sector on a fee-paying basis.

donors outside GARWSP make provisions to support sector coordination and capacity building, including possible cooperation with or strengthening of GARWSP branches in functions where GARWSP has less capability such as social organization or training. Finally, as for NWRA, it is recommended that government and donors agree a performance-based incentive framework for GARWSP staff.

6.3.2 Improving the impact of the NWSSIP reforms in rural water supply and sanitation on different segments

The analysis of the distributive impact of reforms (Section 5.3) suggests that **poorer communities have more difficulty in getting support, and tend to face higher investment costs or have to settle for a lower level of service.** Although rural water is generally affordable, there is also some evidence that the **recent diesel price rise resulted in a drop in consumption by the poorest.** Access by poorer communities has probably improved to some extent. However, **more could be done to ensure that the voice of the poorest communities is heard and that they get an appropriate technology**. Communities themselves generally make fair provision through informal means for those amongst them who cannot afford to pay. In the longer run, there is a risk to sustainability, particularly when expensive capital replacements are required.

*Attention to **improving the equity impact of the reforms** is therefore **recommended**, particularly:*

- *more focus on pro-poor selection criteria, lower cost technologies and possibly higher levels of subsidy for the poorest*
- *reporting regularly to the JAR process on how the pro-poor bias of the program has been implemented (including details of projects in poor communities and districts)*
- *more involvement of NGOs and improved coordination and joint programming between GARWSP, SFD and NGOs at governorate level*

During the September 2007 mission, stakeholders agreed to the need to enhance NWSSIP's equity focus for rural water supply and sanitation, and to operationalize this through the forthcoming NWSSIP Update and operations.

6.3.3 Addressing the political economy, overcoming institutional constraints and developing opportunities in rural water supply and sanitation

Strengthen project selection based on DRA. There is a political economy risk that project selection might be driven by patronage rather than by pro-poor demand, as powerful interests could lose benefits. There could be still some persistence of parallel tracks of influence. This constraint is best addressed by transparency about criteria and process, by honest application of the announced processes – and ultimately by success in bringing safe water to poor communities. During the September 2007 consultation mission, GARWSP highlighted that this is being addressed. *It is **recommended** that the sector strategy, once adopted (see below), be published and transparently adhered to, and that progress in implementation be the subject of open debate, with appropriate publicity given to achievements – and to failures and their causes.*

Mobilizing the political constituency behind a single reform program. The fact that approval of the sector strategy has been delayed suggests that there are continuing concerns over parts of the approach: this is a constraint but also an opportunity. *It is **recommended** that the process of revalidation proposed above (Section 6.3.1) be used as a means of resolving issues amongst government, agencies (including SFD, PWP and RWSSP) and donors, and to create a common understanding of terminology, unified implementation mechanisms for demand-responsive approaches, joint programming, and an exchange of data.*

Addressing constraints to decentralization and improving the quality and capacity of GARWSP implementation. GARWSP decentralization needs to be completed rapidly and institutional constraints to the process (see Section 5.4 above) need to be overcome. GARWSP could enhance coordination of investment with local government through decentralized procurement and information management. Implementation capacity needs significant improvement, including for community development and WUA training. *It is **recommended** that top priority be given to this process over the next two years. MWE and the donors should give GARWSP every support in the decentralization process. Support should be provided to capacity building in the branches, and to the completion of management instruments that permit responsible decentralization of budgetary resources, especially a well-performing management information system (MIS) that is currently being established.*

6.4 Next Steps

Throughout the study visits in Yemen, partners emphasized the value of the process, and the innovation of assessing both, the reform impacts and the implementation constraints posed by vested interests. There was enthusiasm for continuing the process, especially on the need to take the messages to the very top. *If the highest leaders are convinced and are prepared to champion reform implementation*, many partners insisted, *then much can change*.

The PSIA offers a modest entry point to that process of conviction. It is, one commentator observed, "*an elevator. It can identify issues on the ground and raise them to a higher level in a transparent way*." Put another way, the same commentator said that PSIA should be able to carry "*small but devastating news to the highest level"*, so that policy decisions can be made that, when implemented at the lower level, improve outcomes on the ground. The need now, he said, is to engage the Yemeni nation in studies and debate, "*to get the fire power*". This process began with the 'restitution workshop' in March 2007, at which the main findings and recommendations of this report were discussed and validated, and a very large number of further comments and recommendations made, many of which have been incorporated into this final report. During the September 2007 consultation on PSIA implementation, stakeholders identified priority actions for implementation through the NWSSIP Update and operations. Further public debate, including at sub-national level, and analysis are encouraged to inform the on-going policy dialogue on and implementation of the NWSSIP process.

More generally, a strategy like NWSSIP can only be effective if there is broad understanding and ownership of its objectives and means. NWSSIP needs to be acted on. That requires that it is understood. Essentially, NWSSIP is as much a joint learning process as a strategy. PSIA findings are that there is some knowledge of NWSSIP at the governorate and local level, but there is scope for much more stakeholder involvement. *It is **recommended** that a NWSSIP "stakeholder involvement plan" be developed, with a particular focus on taking targeted messages to the top (the most senior decision makers, parliamentary committees, the shura council, senior clerics) as well as to key stakeholders at governorate and district level and below. The plan should cover: (1) further analysis to identify key stakeholders, their positions and interest, and the factors likely to change their mind or convince them to become champions; (2) selection of targeted messages for each key stakeholder group; (3) a communication strategy, selecting the appropriate media for each stakeholder group; and (4) implementation mechanism, budget and financing plan. Basin committees are one important channel for communicating these messages at the local level.*

*It is also **recommended** that PSIA findings be complemented with further analysis as stakeholders see necessary, particularly by extending the poverty impact analysis, for which questions may be added to existing or proposed surveys, such as the proposed GARWSP/UNICEF inventory of rural water supply*

coverage, the SFD impact assessments, the Amran case study on water use and poverty, and the upcoming "Study on Options for Changing the Economic Incentive Structure for Water Use". It is also ***recommended*** *that an outreach effort be launched by MWE to engage other bilateral and multilateral aid agencies not currently involved in the NWSSIP process, particularly those from the Arabian Gulf.*

During the March 2007 mission, all the above analysis and recommendations were extensively discussed and corrected. All stakeholders agreed on the PSIA Matrix - a "checklist" of recommendations and actions, that can be found in Annex 4 as 'Key PSIA Recommendations and Stakeholder Responses'. During the September 2007 mission on PSIA implementation, stakeholders reiterated the significance of these recommendations. They highlighted the need to implement them through operations and the NWSSIP Update. *It is* ***recommended*** *that this checklist forms the basis for monitoring progress on the recommendations, for example through the JAR process, and that the recommendations are realized through operations and the NWSSIP Update***.**

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Annex 1: Methodology

1. Context

In 2005, the Government of Yemen (Ministry of Water and Environment) has adopted a National Water Sector Strategy and Investment Program (NWSSIP), which is a comprehensive water strategy, action plan and investment program to reform the water sector for 2004-2009. NWSSIP was developed in collaboration with a range of stakeholders in Government and in the donor community. It proposes several reform options for the water sector, explicitly addressing integrated management, and setting out measures to improve institutions and governance issues. The Government and the Bank have agreed to conduct a Poverty and Social Impact Analysis (PSIA) to assess the distributional impacts of several proposed reform options, to assess the political economy within the water sector, and to support the Government in implementing the NWISSP.

In June 2006, the first Joint Annual Review (JAR) of NWSSIP implementation was conducted in close collaboration with all water sector stakeholders to produce a transparent and participatory assessment of strengths and weaknesses of NWSSIP implementation. This was repeated in June 2007. The JAR process clearly enhanced the national ownership and contributed to more integrated comprehension of all involved stakeholders. The reviews verified the continued commitments of partners to the National Strategy, but highlighted that implementation has not been even across all subsectors. The PSIA follows up on the 2006 JAR to uncover some of the reasons for slow implementation in selected subsectors, assess respective distributional impacts, support the policy dialogue and allow Government to take evidence-based decisions on NWSSIP implementation.

2. Rationale for research design

Although the study is led by the World Bank, it is conducted in a consultative manner and considered a Yemeni exercise. The study is carried out by a multi-disciplinary team across partner agencies (WB, MWE/GTZ). A team of local and international researchers in water resource management and social science selected the research tools with government counterparts to meet this demand. The hypothesis that vested interests hamper the implementation of NWSSIP guided the choice of the analytical approach, research methods, and specific tools.

The study used a qualitative and fieldwork-based approach to analyze the distributional impacts of NWSSIP implementation and the political economy of the Yemeni water sector reform at the local, governorate and national levels. The team chose a comparative case study approach for detailed insights into stakeholder interests and influence, formal and informal institutions, distributional impacts, risks and opportunities regarding the implementation of NWSSIP across the different policy levels.

3. Methods and tools

The study used a mix of analyses, drawing on the PSIA methodology and the framework of Tools for Institutional, Political and Social Analysis (TIPS). [98]

[98] World Bank, 2003; World Bank, 2005b

Box 24 - Analytical Methods

The study took a *multi-sectoral and spatial perspective* by purposively selecting sites for in-depth study by a multi-disciplinary team that combined perspectives of integrated water resource management, socio-institutional development, political economy of reform, and local context. The team conducted analysis and policy dialogue in parallel and used the following PSIA/ TIPS tools:

A *Stakeholder Analysis* was conducted to identify key stakeholder characteristics, interests, incentives, and degree of influence in regard to the selected reform options at national, sub-national, district, village, and household levels. Stakeholders include the organizational stakeholders in government (e.g. MWE, MAI, MoLA, municipalities) as well as utilities, and other public water sector entities (at central, district and local level). Stakeholders further comprise users and private providers, such as rural and urban households, civil society, industrial consumers, farmer associations, vendors, and women's associations.

The study conducted an *Institutional Analysis* to analyze the structure and dynamics of the formal and informal institutions and practices of the different organizations at the basin level (Ta'iz, Sana'a), the district, governorate and national policy level in order to understand the political economy that characterizes the water sector.

The study looked into positive and negative impacts from the implementation on the different socio-economic groups through a *Social Impact Analysis*. Impacts were assessed in regard to (i) authority (power relations, decision-making on access to water resources and land), (ii) prices, (iii) assets (water resources, such as well; land ownership which determines access to both surface and groundwater); (iv) access (to water, land, etc) (v) transfer and taxes (e.g. diesel subsidies for irrigated water); and (vi) employment (e.g. staffing, salaries, etc).

The study conducted a *Social Risks Assessment* to identify the risks *to* and *from* the reform to (i) uncover the assumptions about what should and should not happen in order for a policy to achieve its goals; (ii) assess the likelihood that each assumption will hold, and its importance to policy; and (iii) to recommend possible policy adjustments in light of the risks identified. The study uncovered several political economy and institutional risks, plus financial and implementation risks. The study made recommendations to address those risks through respective risk management strategies that will be operationalized through the planned NWSSIP Update and operations.

Source: Authors' own compilation, see World Bank 2003, 2005b, and 2007

Data collection

The study collected primary and secondary data using the following approach:

The study conducted a desk review of secondary material and produced an interim report. This report provided the necessary background for further research. Specifically, it provided (i) an overview of the water and poverty issues in Yemen, (ii) a rapid assessment of the three main water reforms presented in NWSSIP in order to select the reforms that the PSIA should study, and (iii) summarized the findings and reviewed options on how to proceed.

The study carried out intensive stakeholder consultations with representatives of government, parliament, the private sector, civil society and the donor community during the design analysis and implementation

stages to continue and strengthen the ongoing policy dialogue of NWSSIP implementation with in-country stakeholders. This was done at the study design, analytical and implementation stages.

- The aim of the first stakeholder workshop and individual consultations (November-December 2006) was to identify those priority areas, where stakeholders saw the greatest value-added of the PSIA for NWSSIP implementation. Stakeholders selected groundwater extraction and irrigation, and rural water supply and sanitation as the focal points for the PSIA analysis and policy dialogue.
- The aim of the second stakeholder workshop and consultations (March-April 2007) was to present and discuss the preliminary study findings and recommendations to overcome the identified NWSSIP implementation constraints, and to discuss concrete follow-up on how constraints could be overcome. Stakeholders developed and validated the PSIA Matrix of recommendations and suggestions for follow-up (see Annex 4).
- The aim of the third stakeholder workshop and consultations was to discuss the implementation of the PSIA Matrix with stakeholders, and to identify priority areas for operationalization through operations and NWSSIP Update. Stakeholders updated the matrix, and –considering the PSIA recommendations highly valid for the proposed follow-up - selected a wide range of priority areas for implementation through the NWSSIP Update and operations.

The study conducted qualitative fieldwork during December 2006 to gain detailed insights into stakeholder perceptions of the bottlenecks in NWSSIP implementation, including their support and opposition to the reforms, and to gather information on how to possibly address these constraints. The research was conducted in three case study sites of Ta'iz, Aden, Hodeihdah, plus Sana'a. The aim was to collect primary and secondary data at the national, governorate, district and local/ village levels. The study produced visual graphs of information and budget flows of NWRA and GARWSP, plus power maps of reform support and opposition (See Annex 3).

The team elaborated a thematic topic guide. This allowed the necessary free conversation (using key-informant interviews and focus group discussions), but systematically covered the themes of interest within the selected reform focus and the PSIA transmission channels of distributional impacts[99]. Hence, reform issues were matched with transmission channels to produce a matrix that guided the interviews and focus groups.

- For Groundwater/ WRM/ Irrigation, issues covered include Basin committee and Basin plans; water user associations; Water rights; Regulation and licensing; Well census/ Water resource assessment and drilling; price incentives; water sale – especially regarding rural-urban transfer; and Water productivity increase.
- For rural water supply and sanitation, the themes were low cost technology; DRA/ management via water user associations and communities; investment and financing of operation and maintenance; Gender issues; sanitation; and the need for sustainable water source.

These were matched with the transmission channels illustrated above and produced the **topic guide matrix in Table 8** that guided the primary data collection

[99] Poverty and social impact transmission channels consist of authority, price, access to goods and services, assets, employment, and transfers and taxes (World Bank, 2003, and 2005b).

Table 8: TOPIC GUIDE FOR KEY-INFORMANT INTERVIEWS & FOCUS GROUP DISCUSSIONS

		PSIA Transmission Channels					
		Institutional structures/ dynamics (power relations, decision making, incentives, interests)	**Price**	**Access to goods and services**	**Subsidies (transfer/taxes)**	**Assets (physical, social, etc)**	**Employment**
Subsectors	**Reform Actions**	Is it powerful, does it affect outcomes (which ones), membership/ representation of interests, accountability, functionality	influence on affordability of water services, resources	role in water resource allocation and accountable service delivery	How would subsidies change the behavior of drilling, water consumption, water savings; which incentives would do that?	who owns water rights, land, dams, equipment? how are assets distributed, how can poor people increase their assets? how does regulation affect assets, what kind of regulation (or what kind of changes) are necessary to benefit the poor?	Organizational capacity of agencies (staffing, training, performance incentives); what will happen to the vendors? what is the effect of reforms on rural employment: impoverishment and decreasing income through lack of water; increased income through intensification (vertically)?
Groundwater/ WRM/ Irrigation	Basin committee						
	Basin plans						
	WUA						
	Water rights						
	Regulation/ licensing						
	Well census/ WR Assessment/ drilling						
	Price Incentives						
	water sale/ rural-urban transfer						
	Water productivity increase						
RWSS	Low cost technology						
	DRA/ Mgt via WUA, communities						
	Investment and O&M financing						
	Gender						
	Sanitation						
	Sustainable water source						

Source: Authors' compilation

In addition to consultations with key stakeholders, a total of more than forty interviews and twelve focus group discussions were conducted. The key-informant interviews were used at the policy level (national, governorate and district), and focus group discussion at the village level. Specifically, the key-informant interviews gave insights into stakeholder perceptions and interests, organizational structures, formal and informal institutions, and dynamics within the water sector. The sampling was purposive to cover all organizational stakeholders involved in the water sector. At *national* level, interviews revealed an overview of water resource management issues, while interviews at *governorate and district level* focused more on rural water supply and sanitation, irrigation and ground water. For Sana'a and Ta'iz, representatives of the basin committee have been interviewed.

- At central government level, data were collected through ten expert interviews conducted with representatives of the line ministries—the MWE, MAI, MoPIC, MoLA, representatives of three water agencies – NWRA, GARWSP, NWSA. Further interviews were held with member of the Water and Environment Committee and the Agriculture Committee in Parliament.
- At governorate level, about ten interviews in each site were conducted with representatives of regional and district government. Additionally, representatives of basin committees of Sana'a, Sa'ada, and Ta'iz were interviewed.
- At village level, twelve focus group discussions were conducted. Sampling was purposive to reflect the local context of the different sites.

Data analysis, processing and finalization

All field notes were written up into a fieldnote report to provide the necessary disaggregated spatial context for socioeconomic conditions, stakeholder interest and influence, and incentives, as well as risks and opportunity for NWSSIP implementation. This provided the necessary contextual and disaggregated account of water resource management issues.

The analysis of the political economy is presented in visual format (see Annex 3) to show the support and opposition of different stakeholders to NWSSIP implementation in regard to the two selected reform areas, i.e. rural water supply and sanitation, irrigation and groundwater extraction. These power maps were developed by stakeholders during the second stakeholder workshop in March 2007. Additionally, graphs were used to show flows of funds and information between different organizational stakeholders and policy levels (see Annex 2). These were discussed and validated by NWRA and GARWSP during the March and April 2007 consultations.

The preliminary findings were shared with stakeholders in two stages. A first draft report was shared with stakeholders for review and comments. Then, a short version of the revised draft was translated into Arabic for discussion at the second stakeholder workshop (March 2007). Stakeholders validated the study findings, and the majority of its recommendations. After the workshop, the team consulted individually with all stakeholders that had commented on the draft report, namely the MAI, NWRA, GARWSP, RNE, GTZ, and KFW. Additionally, the team developed a PSIA recommendation matrix and stakeholders provided suggestions for follow-up. The team finalized the report, incorporating stakeholder feedback, and Bank and GTZ staff peer reviewed the report.

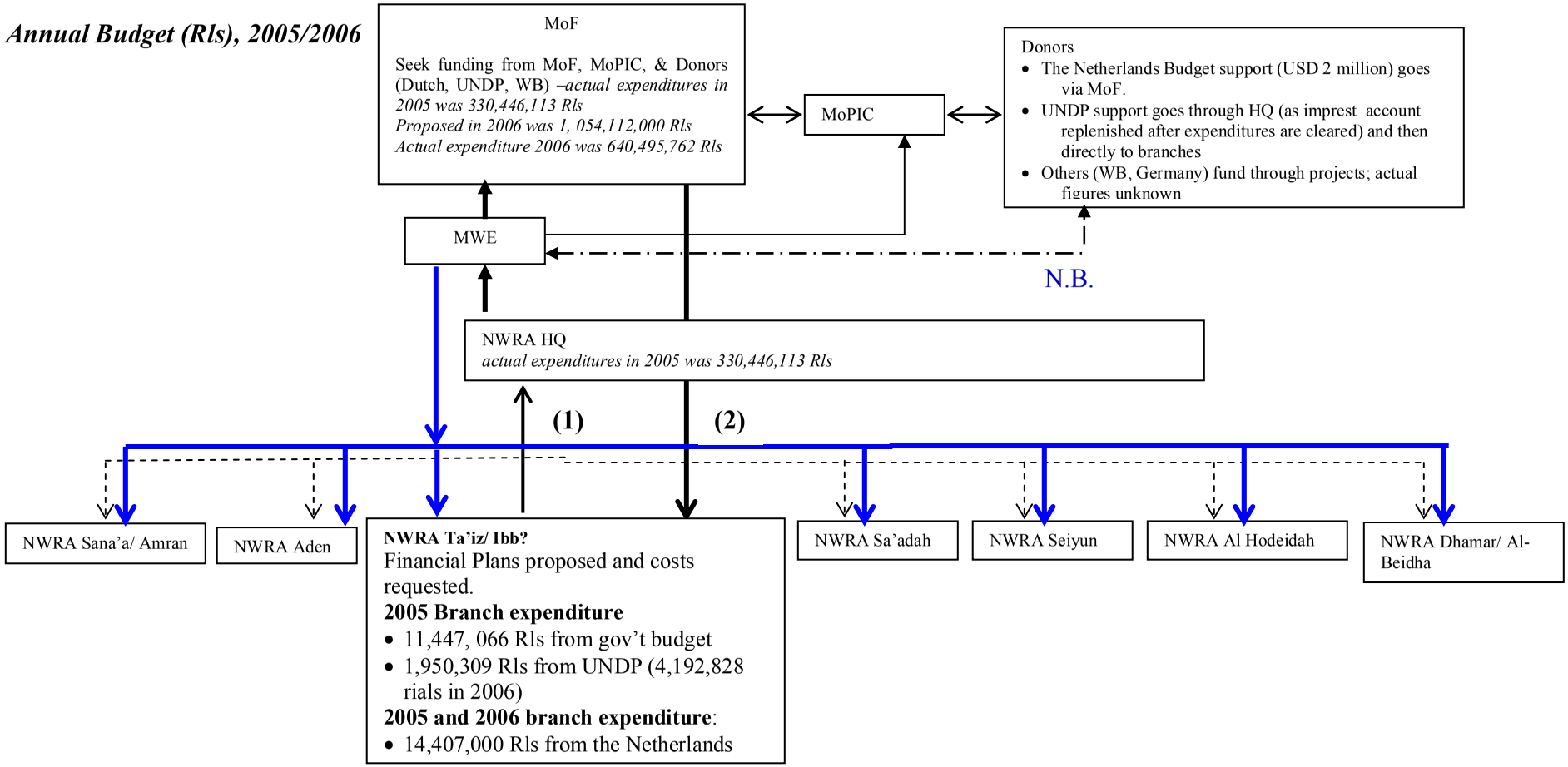
In September 2007, the team held a third stakeholder workshop and consultations to discuss the implementation of the PSIA Matrix (see Annex 4). All stakeholders stressed the need to operationalize the PSIA recommendations and identified PSIA priority actions for follow-up under the planned NWSSIP Update and operations. Additional analysis in the urban sector or follow-up via quantitative assessments may be conducted, if seen necessary by stakeholders.

Annex 2: Flows of budget and information for NWRA, and of budget for GWARSP

The graphs 3, 4, and 5 were developed with, and validated by NWRA and GARWSP respectively during the March/ April 2007 consultations

Graph 3: Flows of Financial Funds NWRA HQ and Branches - Example of Ta'iz (same situation in Abyan, Lahej and Dhala'a)

Annual Budget (Rls), 2005/2006



Legend: direction and thickness of arrows indicates the direction and volume of the flow of funds

➔ Substantial flow– current / Suggested for enhanced NWSSIP implementation

→ Limited flow – current / Suggested for enhanced NWSSIP implementation

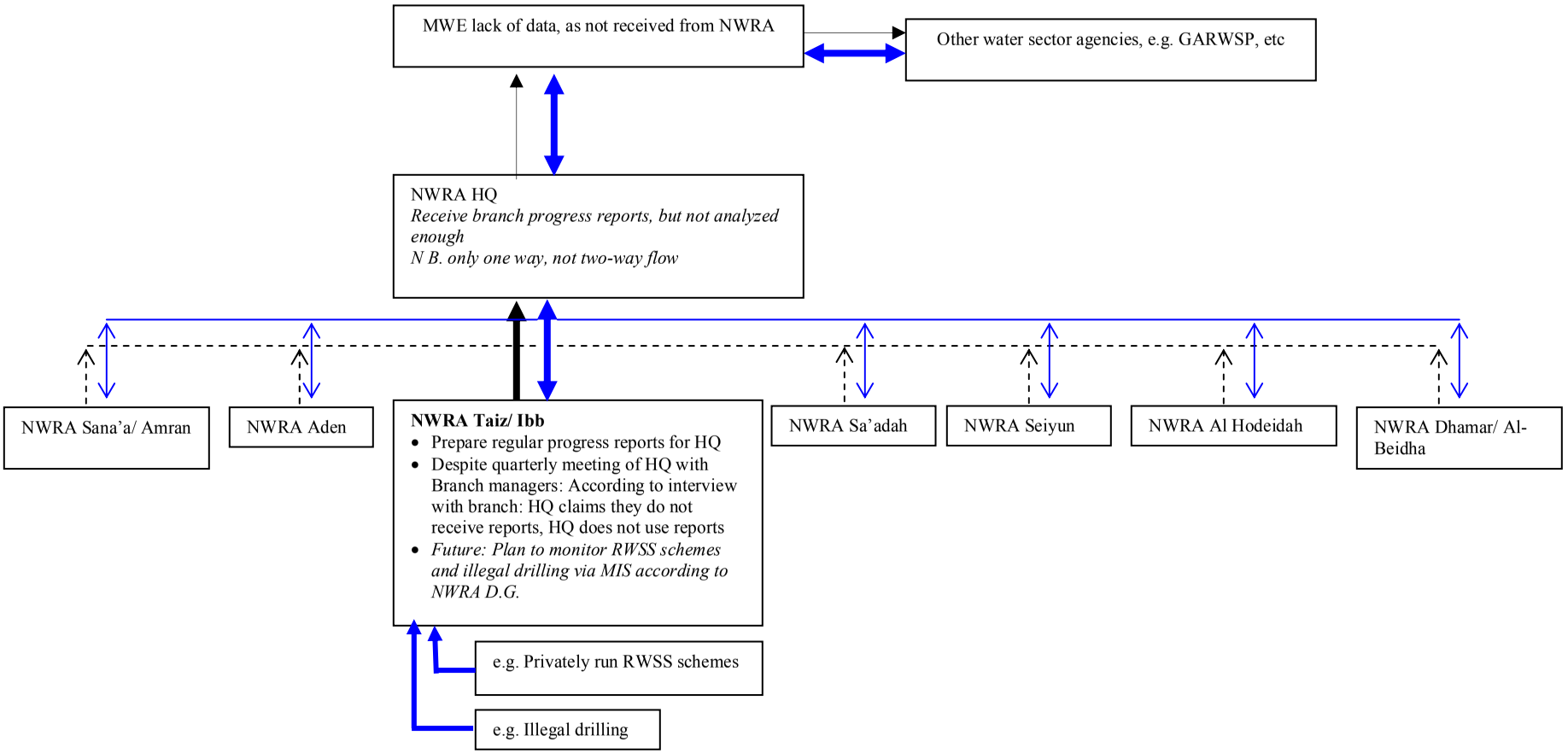
- - > Assumed flow – current / Suggested for enhanced NWSSIP implementation

N.B. The broken line between Donors and MWE suggests that sometimes grants, TA programs, workshops, study tours and fellowships (*i.e. software)* are directly requested by the agency through the MWE and funded by donors

(1), (2) Indicate sequence of flows: (1) indicates budget request submission from NWRA Branch to HQ, MWE, MoF ; (2) indicates budget flow from MoF to NWRA Branch

Graph 4: Flow of Information NWRA branches to Headquarters– example of Ta'iz illustrated

2006, progress reports



Legend: direction and thickness of arrows indicates the direction and volume of the flow of information.

⇒ Substantial flow – current / Suggested for enhanced NWSSIP implementation

→ Limited flow – current / Suggested for enhanced NWSSIP implementation

- - > Assumed flow – current / Suggested for enhanced NWSSIP implementation

N.B.: **one way flow -** lack of capacity to analyze the information, act upon the data and give feedback.

The situation on flows of fund and information in Aden and Amran are illustrated in the text below

Example 2: NWRA - Aden Branch Flow of Funds and Information

The Annual Budget.
Financial requests for the next fiscal year are put in a single report and submitted to the D.G. of the Aden branch for approval. The requests show estimates on each budget line, based on the budget of the previous year. The D.G. submits the report to NWRA HQ in Sana'a. NWRA Sana'a Branch adds 20% to the general total amount. The MoF decides on the allocations after discussions with NWRA HQ. The final decision lies with MoF. Disbursement of the allocations is very often delayed and causes difficulties for expenditures, plus there are problems in seeking other resources to finance the deficits. The stations under Aden branch are financed through the branch itself.

Flow of Information.
Field engineers and other specialists prepare reports and submit them to the relevant department. The departments of "Studies, Wells licensing and Awareness" prepare monthly reports and one annual report. The reports are submitted to NWRA HQ in Sana'a. The latter then compiles all the monthly reports from all branches, and prepares a unified report on all branch activities. The unified report is submitted to MWE.

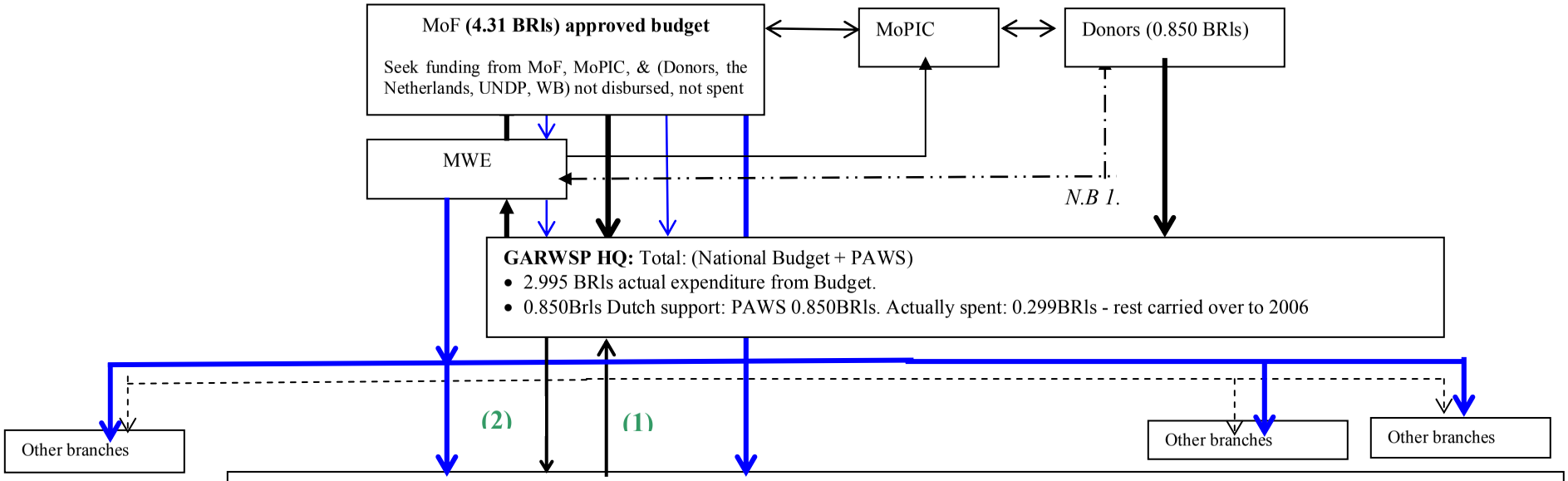
Example 3: NWRA - Amran Branch Flow of Funds and Information

The Annual Projects' Budget
The Executive Offices (including the branches of Ministries and Authorities) submit their financial requests for funding projects to the Budget "Preparation Committee" in the Governorate. The Committee discusses and approves the budget before submitting it to MoF and MoPIC. The projects, approved for the Governorate to implement locally, are usually small projects, such as maintenance of small dams or small water harvesting constructions. Large projects are handled centrally by the relevant Ministry or Authority.

Flow of Information
Data and information flows from the Executive Offices directly to the relevant Ministry or Authority in Sana'a with copies to the Governor's Office. Local Councils at the District levels send data and information to the Governor's Office. Sometimes an Executive Committee sends information and data on a particular topic to the General Department of Information in the Governorate for coordination with other agencies and committees within the Governorate itself.

Graph 5. Flow of Financial Funds- GARWSP HQ and Branches – Example Aden/Lahej Branch

Annual budget in billion Rials (BRls), 2005



Legend: direction and thickness of arrows indicates the direction and volume of the flow of funds

➔ Substantial flow– current / Suggested for enhanced NWSSIP implementation

→ Limited flow – current / Suggested for enhanced NWSSIP implementation

- - > Assumed flow – current / Suggested for enhanced NWSSIP implementation

N.B 1. The broken line between Donors and MWE suggests that sometimes grants, TA programs, workshops, study tours and fellowships (*i.e. software)* are directly requested by GARWSP through MWE and funded by donors

N.B. 2: Decentralization is implemented according to branch categories (A, B, C) and type of works, i.e. Procurement of civil works (drilling, pump house construction) is decentralized for Category A branches, but all procurement and payments remains centralized for Category B and C branches. All large-scale procurement of goods (pipes, pumps,

engines) remains centralized, which means that the bulk of donor financing (incl. PAWS) continues to go to GARWSP HQ. Additionally, GARWSP HQ disbursed allocated funds to its branches only in installments of 5%-7%. This hinders the implementation of a large number of projects that are technically sound and approved.

GARWSP Flow of Fund Explanatory text:

N.B. 2: In 2007, Lahej branch received a total of Rls 203 million from GARWSP Headquaters, of which Rls 170 millions had already been committed, leaving only Rls 33million for 2007. (These are allocated for new projects in 2007 under the budget line of "studies and designs", "travel" etc.). In 2006, 58 projects were allocated, but only 22 were implemented. Out of a total of 45 budgeted tanks, only 39 had been built. (GARWSP key-informant interview, Sana'a, 12th March).

There is limited decentralization, for instance, the Aden /Lahej branch (categorized by GARWSP as a category "A" branch) can call for and subsequently approve project tenders for wells and tanks for projects up to 5 Rls million. The 25% allocated is sent in installments of about 5% - 7% (i.e. 4 - 5 installments). Branches have to request installments release each time.

Local contractors also have difficulties in getting paid. They sometimes spend more money to go to Sana'a to follow up to get their payments. According to information collected in the field sites, governorates near Sana'a, such as Dhamar, Amran, have better opportunities to follow up, because they are geographically and /or perhaps politically closer to the capital.

Funds needed to cover expenses of engineers visiting projects sites are reduced and very often delayed. Salaries are delayed particularly in the first few months of the year because of the delays in disbursements. At the end of the year, the actual amounts spent are only 15-20% of the requested amount. These delays impede the implementation of projects. The amounts are carried out from one year to the next. Local contractors are hesitant to bid due to such delays.

The GARWSP Information Flow is illustrated by the application procedures for rural water supply and sanitation projects. This requires the applicant (e.g. communities) to complete five GARWSP forms that have to be signed by a variety of GARWSP and government officials at district, governorate and central level until the project can be approved at the branch level. A further, sixth application form is used to record information of the new project at the GARWSP branch level. The approval at the local level is reported to GARWSP headquarter in Sana'a. The time for application processing is very lengthy – it may take more than 18 months to start the work in a small rural water project. The D.G. in the branch can make contracts for the well and the tank only. Delays in fully disbursing the required funding further contribute to the difficult implementation of RWSS projects.

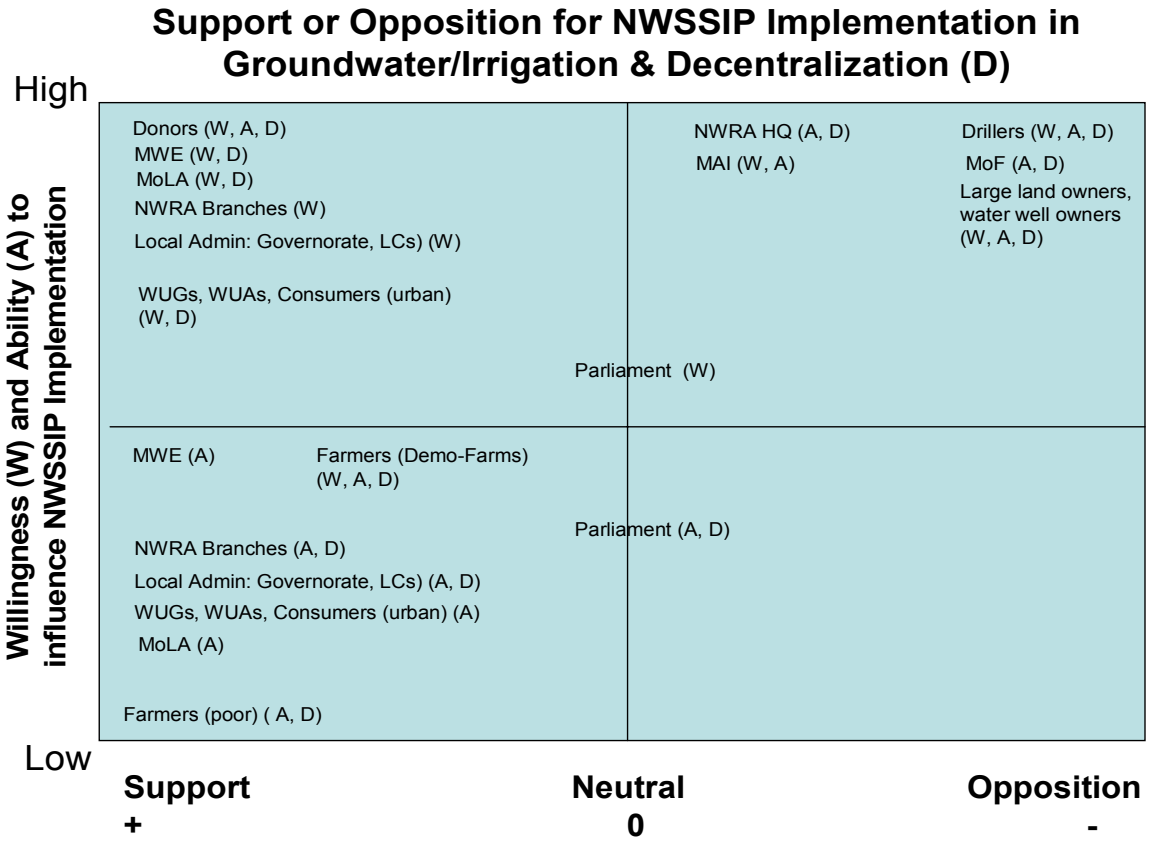
Annex 3: Power Maps: Stakeholder support, opposition and influence regarding NWSSIP implementation, based on maps produced by in-country stakeholders at the March 2007 consultation workshop (see Annex 5)

The maps illustrate which stakeholder influence –support and oppose- NWSSIP implementation in (1) Groundwater/ Irrigation, and (2) Rural Water Supply and Sanitation. Stakeholders are defined as social groups, not individuals. The maps also show how willing and able stakeholders are to influence NWSSIP implementation in the two sub-sectors. Stakeholders can appear more then once, if their ability/ willingness and support/opposition to NWSSIP implementation and decentralization is different.

- The *horizontal axis (Y-axis)* shows high versus low stakeholder ability and willingness to influence NWSSIP implementation – ability is referenced with (A) and willingness with (W) behind each stakeholder.
- The *vertical axis (X-axis)* shows stakeholder support, neutrality or opposition to NWSSIP implementation and to decentralization – as the latter is a means to full NWSSIP implementation, it is reflected by (D).

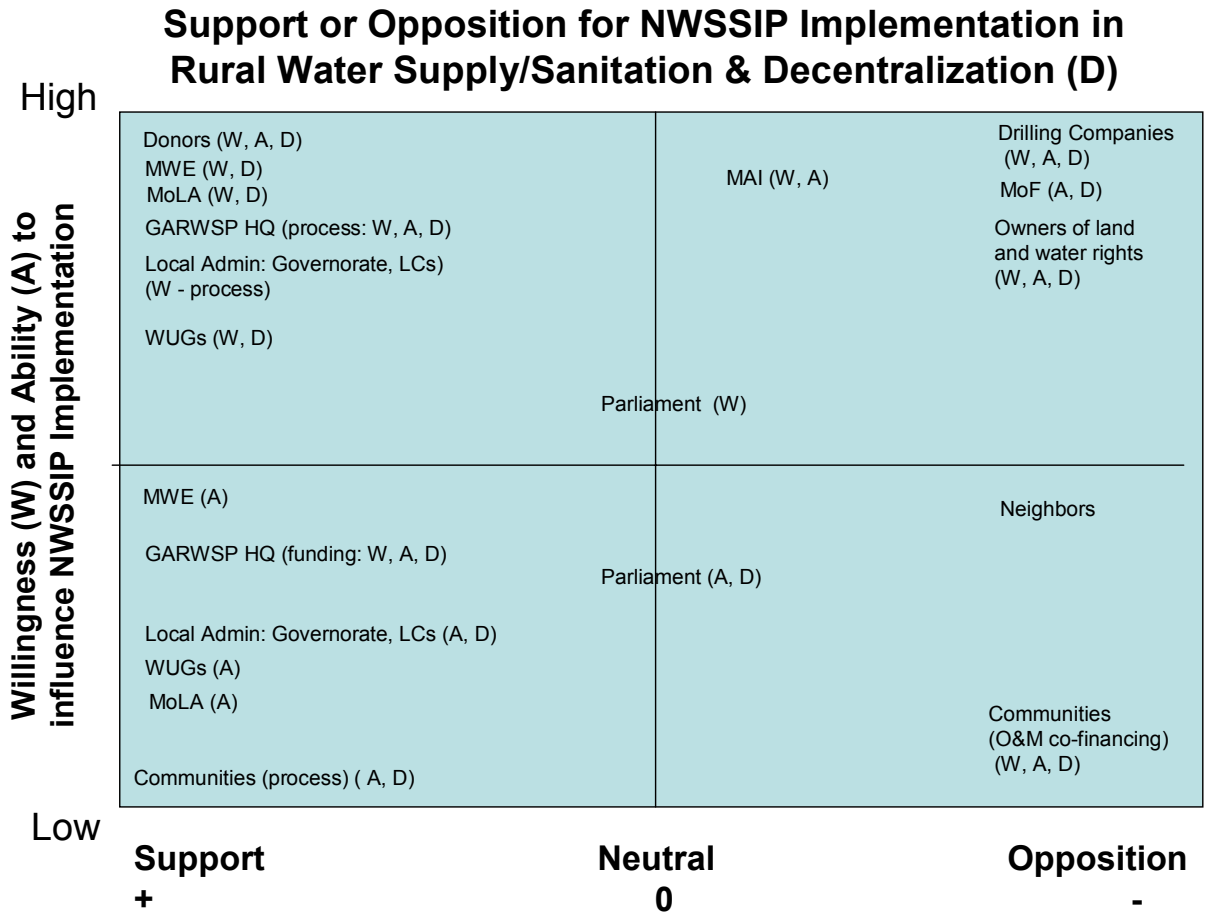
1. Groundwater/ Irrigation

Stakeholders in the **top left quadrant** support NWSSIP implementation and Decentralization and their willingness and ability to influence NWSSIP implementation is considered to be very high, for instance donors. MWE is seen to have high willingness to support NWSSIP implementation and Decentralization (top left), but only medium ability to do so (middle left). NWRA HQ is seen to have high ability to oppose the implementation of NWSSIP and decentralization (top right). NWRA branches are considered highly willing to support reform implementation (top left), but their ability to do so is low (bottom left). In the **lower left quadrant**, stakeholders, such as poor farmers, are seen to have low ability to influence NWSSIP implementation and Decentralization. Stakeholders in the **top right quadrant** are seen to have high influence to oppose NWSSIP implementation and decentralization, such as drillers and large land owners and water well owners. MoF is seen to have high ability to oppose NWSSIP implementation and decentralization.



2. Rural Water Supply and Sanitation

Stakeholders in the **top left quadrant** support NWSSIP implementation and Decentralization and their willingness and ability to influence NWSSIP implementation is identified as very high, for instance donors. As in GW/IRR, MWE is seen to have high willingness to influence NWSSIP implementation and Decentralization (top left), but has only medium ability to do so (middle left). In-country stakeholders identified GARWSP HQ to have high willingness and ability to support the reform process (top left), but less influence in regard to funding the reform (lower left). Similarly, MoLA and governorates and local councils are seen to have high willingness to support the process (top left), but little ability to do so (lower left). In the **lower left quadrant**, stakeholders, such as communities, are identified to support the reform even though they have little influence, and they oppose the reform due to the co-financing requirements for operation and maintenance of rural water supply and sanitation schemes. Stakeholders in the **top right quadrant** are considered to have high influence to oppose NWSSIP implementation and decentralization, such as drilling companies, and owners of land and water rights. MoF is seen to have high ability to oppose NWSSIP implementation and decentralization.



Annex 4: The PSIA Matrix - Key Recommendations and Stakeholder Responses for Implementation

Recommendations	Stakeholder suggestions for follow up
NWSSIP Road show and enhanced dissemination at governorate level	MWE and other Yemeni agencies will disseminate NWSSIP message at the governorate level and at the policy level (via Interministerial Committee- lead by Prime Minister, plus MoPIC, MWE, MAI, MoF, MoLA)
Possible PSIA follow-up	-Contextual analysis to be added to the planned Incentive Study -Quantitative analysis added to GARWSP planned inventory of RWSS -Planned PSIA in UWSS

A. GROUNDWATER/ IRRIGATION – validated by stakeholder consultations (September 2007) for follow-up through the NWSSIP Update and operations

Recommendations	Stakeholder suggestions for follow up
1. Improving NWSSIP implementation	
Basin Committees: -monitoring and best practice study (IWRM Group or consultant) -NWRA role is critical	-NWRA will organize workshops, round tables to assess different Basin Committee models and transfer lessons learnt into the further development of Basin Committees -Conditional to Yemeni cooperation, GTZ will conduct a best practice study in 2008 -NWRA to lead the coordination and alignment of the different contributions from GTZ, UNDP, WB and others (SIWI) for the TC Water Sector Program
WUAs: monitoring, and study (IWRM Group or consultant) to develop WUA typology, conditions for success, methodology for creating and supporting WUAs	-NWRA will further support exchange of experience across WUAs via study visits; will organize a workshop, round table in coming months to assess different WUA models, and to decide next steps (e.g. WUA best practice study) on how to best transfer lessons learnt into the further development of WUAs -GTZ aims to support the best practice study (possibly in 2008) -MAI supports the WUA study, and the institutionalization of WUAs that should be part of the Irrigation Strategy and Investment Plan (see below)
Regulation: -write Water Law by-laws with Ministry of Justice & Attorney General's Office; -support Ta'iz/ Amran water management pilots	NWRA underlines need for implementation in close cooperation with local council and security; agrees to pilots at governorate level only; and highlights the need to complete the decentralization with qualified staff and to evaluate currently decentralized units to draw lessons and make amendments as necessary
Agricultural Trade Policy: postpone trade policy reforms until WTO framework is agreed	MAI agrees (see below); suggests to develop trade/ economy outside of agriculture sector, e.g. via small projects for handicrafts by women
Treat Qat as a crop: MAI (+AREA) and MWE revive agenda (qat as a crop) at cabinet level, seek agreement to coherent approach for water saving in qat production	-MAI asks WB to disseminate its qat study. -Qat production control within next 10 years, based on 2007 law signed by Parliament

Recommendations	Stakeholder suggestions for follow up
Water productivity: MAI scales up GSCP, IIP with (a) more focus on equity; (b) water mgt advice at farm level; (c) technical packages to increase incomes; (d) monitoring & evaluation, including the impact of demonstrations farms; and (e) capacity building of extension staff, and farmers in modern irrigation techniques, harmonized with ACU (water saving programs)	-MAI agreed, and has prepared investment proposals for scaling up improved irrigation, and will work with MoPIC, MWE and donors to develop a strategy for irrigated agriculture -The consultants for planned incentive study have been selected and study is expected to start. Study ToRs to be amended to capture impacts of recent diesel price rise
AFPPF Governance reform: more investment in water saving and modern irrigation (e.g. GSCP mechanism)	MAI agrees to reform and to conduct a study. Cabinet resolution to restructure AFPPF exists.
Support for WUAs and cooperatives to expand as lowest level of WRM.	Agreed by stakeholders
Attention to domestic/export markets for high value crops: pro-poor & Public-Private Partnership	MAI aims to collaborate with private sector
Harmonized approach on WRM/ irrigation b/w MAI and MWE: (a) governorate level cooperation; (b) joint work with NWRA; (c) cooperation b/w MAI & NWRA	MAI supports the signing of a cooperation agreement between MAI and MWE
Irrigation strategy and investment plan: that includes transparency on dams and AFPPF reform and is developed with MoPIC, MWE and stakeholders (large program support) and is directly linked to NWSSIP.	MAI agreed and calls for donor support. Strategy will be developed as part of the NWSSIP update. MAI identified the need to restructure the irrigation sector to align with NWSSIP as a priority for the NWSSIP Update, and calls for technical assistance for GDI to update the PIP.
2. ***Improving Equity/ pro-poor orientation of NWSSIP***	
Rapid expansion of public programs for agricultural water productivity	Further discussion needed
Improve pro-poor design and entry criteria for subsidized programs (GSCP +)	MAI will examine issues
Restructure AFPPF for more pro-poor focus	MAI will employ independent consultant to conduct study to reform AFPPF, see below
Sequence reforms: balance price rises by increased access to coping mechanisms	Concerted efforts needed by government and donors to implement NWSSIP as a reform package, not as individual reform actions (e.g. balancing diesel price increase with support for improved water productivity)
3. ***Considering the political economy, and institutional constraints***	
"**Large farmer constraint"**: -Identify lead at very top (from President down) to support NWSSIP; -ACU and cooperative movement expanded for broader membership	Enhance profile of NWSSIP and get support for its implementation through Interministerial Committee (Lead by Prime Minister, plus MoPIC, MWE, MAI, MoF, MoLA)

Recommendations	Stakeholder suggestions for follow up
NWRA capacity: review and completes its decentralization to empower branches	NWRA agrees and calls for donor support
MAI and NWSSIP: - MAI develops irrigation strategy (incl. transparency on dams and AFPPF reform) that is complementary to NWSSIP with MoPIC, MWE, NWRA, donors, and within an integrated approach; - MAI and MWE sign cooperation agreements (central, local levels), specifying respective mandates and cooperation	MAI agrees and identified this as one of the key priorities for NWSSIP Update - See above on both points
AFPPF reform: Study to lead to reform of AFPPF towards transparent procedures and full accountability, support to water productivity investments, and a pro-poor emphasis	Study to be rolled into the Update of NWSSIP.

B. RURAL WATER SUPPLY AND SANITATION – validated by stakeholder consultations (September 2007) for follow-up through the NWSSIP Update and operations

Recommendations	Stakeholder suggestions for follow up
1. Improving NWSSIP implementation	
Sector strategy and coordination: (a) sectoral round table to revalidate/ amend strategy for rapid implementation (b) strengthening coordination & joint programming (central, governorate) to identify project, support implementation, performance M&E; plus donor harmonization and alignment (e.g. joint operation).	Agreed by GARWSP Agreed by RNE with suggestion that this can also be accomplished through special meeting of RWSS working group Agreed by GARWSP, and RNE
Local involvement in applications and approvals -Real mechanisms for hearing and meeting needs of poorest (e.g. higher subsidy); -attention to simplify/ streamline project implementation	-GARWSP highlights the pro-poor criteria in its program -Mission suggests that report is prepared on poverty and gender focus of GARWSP program (possible subject for Dutch study)
Supporting community/ private schemes; Encourage NGOs participation under the umbrella of existing or planned water resource mgt plans and basin committees: -adopt formal policy for NGOs to intervene (esp. in poorest communities); empower them to gain access to public and donor financing. -support start-ups, capacity building for community or private schemes to supplement public efforts (esp. remote, mountainous areas) and work with NGOs and SFD	-GARWSP agrees to develop a partnership framework for cooperation with NGOs.- NGOs could, for example, carry out the community mobilization and training for GARWSP projects, and develop water supply schemes in poorer areas

Recommendations	Stakeholder suggestions for follow up
Demand responsive approaches, community self-management: GARWSP revive its skills in community mobilization and in managerial, technical and accounting training	GARWSP agrees to form cooperative partnership with SFD, RWSSP, PWP and NGOs for community mobilization and capacity building, but calls for donor support on financing
Water resources sustainability -cooperation agreements (governorate level) between GARWSP & NWRA for all RWSS projects (i) to integrate rural water supply and sanitation into water resource management in order to guarantee sustainable resource allocation for all RWSS projects, (ii) that all wells are properly licensed; and (iii) that site selection is conducted jointly with NWRA -No reservoirs tanks and network construction before water resource availability has been secured -GARWSP continues to inform NWRA's monitoring and annual implementation program on location and water resource use of all RWSS (public, private) schemes	GARWSP and NWRA agree that these recommendations are top priority and need to be implemented, but highlight that there are capacity and financial constraints. The two agencies plan to meet to develop respective action plan
Gender, sanitation and health -revive focus in GARWSP programs (learning together with RWSSP, SFD); consider best approach to waste water and sanitation that reflect specific conditions of the local context, and draw on experiences of UNICEF, SURWAS; SFD and others -governorate level coordination on health issues b/w water sector agencies and health sector programs	GARWSP agrees. See above points on proposed study and partnership approach to social mobilization and capacity building
GARWSP decentralization (a) *Recommend that GARWSP*: • Completes decentralization over next 2 years (planning, capacity building) • Complete the management information system (MIS) for real time tracking of project implementation; • Exploits scope for more community contracting. (b) *Recommend that projects financed by NGOs and donors outside GARWSP* support sector coordination, and capacity building under the umbrella of existing or planned water resource mgt plans and Basin Committees, incl. cooperation with or strengthening of GARWSP branches in functions with lower capability e.g. social organization, training	GARWSP plan provides for completion of decentralization by 2009, but requires extensive capacity building, agreement of MoF and concerted donor support GARWSP is completing MIS, but needs support and follow-up See above Stakeholders agree to the need to design and specifically to implement performance-based improved remuneration system

Recommendations	Stakeholder suggestions for follow up
2. Improving equity/ pro-poor focus of NWSSIP implementation	
More focus on pro-poor selection criteria, more focus on lower cost technologies, possibly higher subsidy for poorest	Mission suggests this issues be discussed at the proposed sector round table
More NGO involvement, more improved coordination, joint programming b/w GARWSP, SFD , NGOs at governorate level	See above
Transition mechanism to be developed for RWSSP to capitalize on project achievements, to ensure sustainability of project outcome and to retain the capacity (particularly in social mobilization, gender inclusion, and focus on health education, sanitation and poverty.	All stakeholders agree on this necessity and urgency of a dialogue process to define a transition process (through RWSS working group, or special meetings)
3. Considering the political economy, and institutional constraints	
Strengthen project selection based on DRA: (a) the adopted sector strategy is published and transparently adhered to; (b) an open debate is held on the implementation progress (achievements, failures and causes)	See above on proposed study and report
Mobilizing political constituency behind a single water program	Concerted efforts through interministerial committees, sector round table, and JAR process
Use process of RWSS strategy revalidation proposed as a means of resolving issues amongst government, agencies (including SFD, PWP and RWSSP) and donors, so that there is common understanding of terminology (e.g. coverage, safe water), unified implementation mechanism of DRA, joint programming and exchange of data	Stakeholders agreed that round table, and RWSS working group, JAR process should be used for this process

Source: Authors' compilation based on stakeholder suggestions and consultations, April 2007

Annex 5 – Map of Yemen