

Chapter 5: The Irrigation Programme

A. Subsector Issues and NWSSIP I

NWSSIP I was based on the identification of four problems in irrigated agriculture. The most important was the unsustainability of irrigated agriculture based on mining of the dwindling groundwater resource. The second was the stagnation and decline of farm incomes, related to the shrinking of water resource availability. The third was the decline of traditional terrace agriculture and the disappointing results of new supply-side investments in watershed management and dam building. The last problem was the institutional shortcoming of MAI in providing adequate field level services to farming in order to improve productivity.

In the light of this diagnostic, NWSSIP I set four objectives for irrigated agriculture:

- Improving sustainability through water resources protection and reduction of groundwater extraction
- Improving farmer incomes through increased water use efficiency
- Enhancing water supplies through watershed management
- Improving institutional performance with the aim of supporting farmers.

The policies adopted in NWSSIP I were: (1) supporting water use efficiency; (2) producing more crop per drop; (3) improving water supplies; and (4) giving a wider role to local communities and water user associations (WUAs).

The NWSSIP I action plan provided for thirteen actions grouped under four strategic heads:

- Sustainability through water resources protection and allocation through: reducing groundwater mining, securing farmers' water rights, and getting incentives right.

Increasing farmer incomes through increased water use efficiency by: refocusing agricultural research and extension, cost recovery on public irrigation schemes, developing water user associations (WUAs) as principal partners, and treating qat as a crop.

Enhancing resource sustainability and quality through watershed management by: reviving watershed/water basin management with an integrated approach, and reviewing and revising the dams program.

Strengthening institutions for a better role in realizing efficient agricultural water use by: repositioning MAI through reviewing and redefining the roles of government and private sector in the agricultural sector, enhancing institutional

coordination on agricultural water use, improving the effectiveness of AFPPF, increasing the role of community organizations and civil society, and implementation of the agricultural institutional reform agenda “A21A”.

During the implementation of NWSSIP I, some progress has been made in improving irrigation efficiency in both groundwater and spate irrigation, largely through GSCP and IIP. JAR III recorded about 6,800 ha of piped conveyance implemented in 2007 (out of a total groundwater irrigated area of about 450,000 ha), and about 700 ha equipped with modern irrigation (drip, bubbler, sprinkler). Also in 2007, MAI constructed 36 new

dams and rehabilitated 21 existing dams. Local level water management is being promoted. The model of the WUA was tested through projects such as GSCP, IIP, SBWMP and CWMP. By the end of 2007, over 800 water

user organizations of various kinds were operational (see Table 5.1). However, these “irrigation” water user organizations are not integrated within the overall basin planning and management which is supervised by NWRA (see Chapter 2). Some local water saving has certainly been effected but no tangible improvement in the groundwater situation has yet been demonstrated.

Table 5.1: Water user organizations in irrigation

	In spate and water harvesting	In groundwater irrigation
Water user groups	364	276
Water user associations	6	159
Total members	27,248	4,232

Source: JAR III

Table 5.2: Public financing of irrigation (\$ million)

	NWSSIP Target	Approved budget	Disbursed	Of which AFPPF
2005	34.3	19.1	29.5	19.0
2006	44.7	51.3	36.9	16.1
2007	43.9	51.9	31.5	13.5
Average 2005-7	41.0	40.8	32.6	16.2

Source: JAR III

The investment programme has been limited. Allocation of finance to irrigation and watershed management has averaged \$40.8 million a year, equal to the NWSSIP target of \$41.0 million annually for 2005-7 (see Table 5.2). However, absorptive capacity has

Table 5.3: Disbursements against projects 2007 (\$ million)

	Approved budget	Disbursed	Disbursed as % of approved
GSCP	19.2	7.5	39%
IIP	5.3	4.3	81%
SBWMP (irrigation components)	3.0	1.8	60%
Dhamar RDP	1.3	0.3	23%
Total	28.8	13.9	48%

Source: JAR III

been less than expected, with donor financed projects under-running their approved budget. In 2007, disbursements were less than half the budget (Table 5.3)

Regarding institutional reform, despite the blueprint of A21A, MAI has not yet succeeded in defining, deciding on or implementing a restructuring programme or in improving the

efficiency of agricultural services. The agricultural fund, AFPPF, has made only a minor increase in its spending on irrigation improvement (only \$321,000 in 2007, compared to \$13 million spent on dams and water harvesting structures). AFPPF continues to suffer from governance problems. Little progress has been made in research and extension on irrigation, and no progress has been made in stemming the spread of *qat*. Cooperation with MWE has been patchy, although with improvement in the more recent period.

Overall results were below expectations, and in 2007 MAI and MWE agreed that a greatly strengthened investment and institutional agenda for irrigated agriculture should be included in the NWSSIP Update.

B. The NWSSIP Update

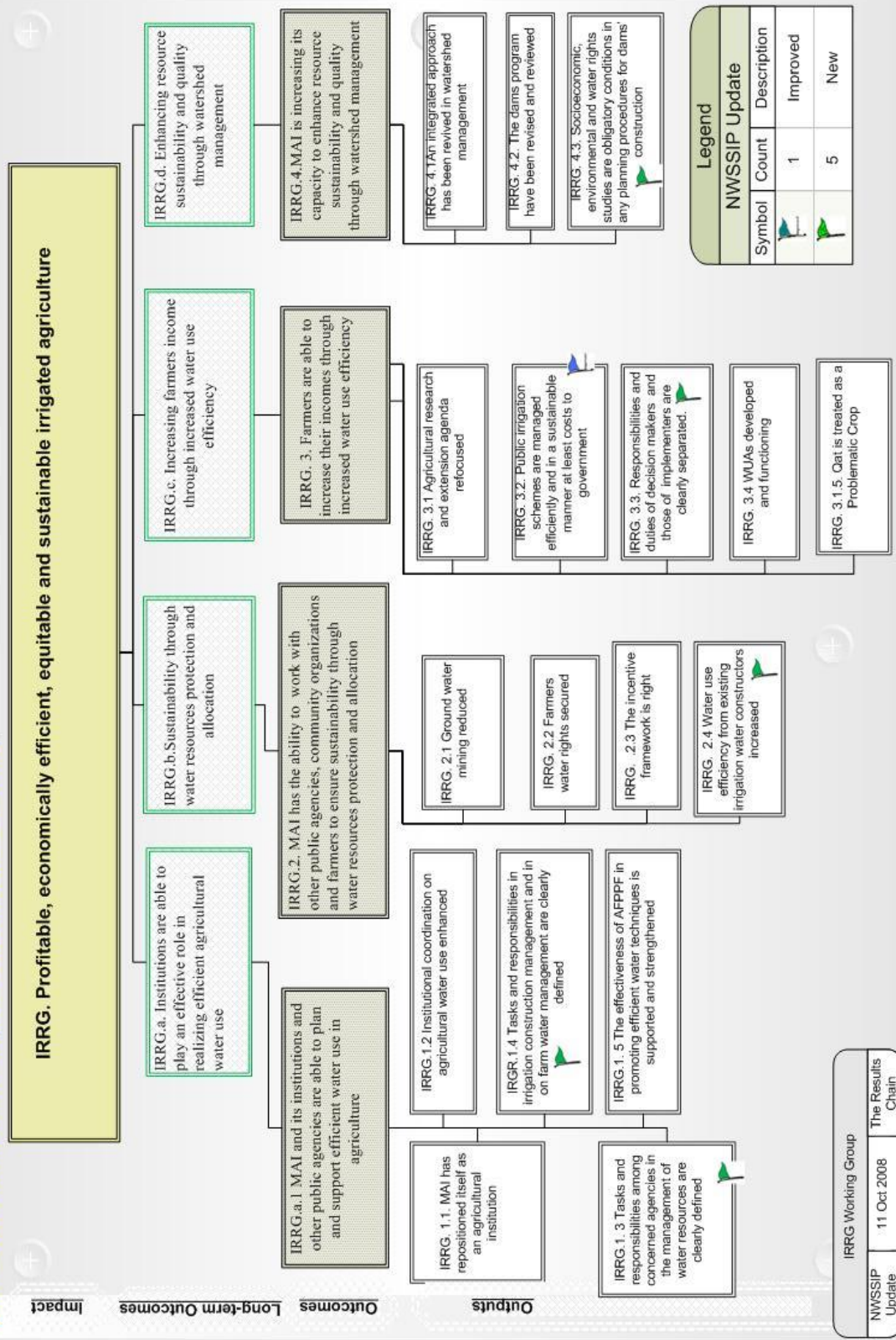
Programme overview

The objectives set in the NWSSIP Update are broadly similar to those of NWSSIP I, slightly reordered and strengthened. The goal is *a profitable, economically efficient, equitable and sustainable agriculture*. Four objectives are targeted: (1) to strengthen institutions to play their role in promoting efficient water use; (2) to promote sustainable agriculture through water resources protection and allocation; (3) to increase farmer incomes through increased water use efficiency; and (4) to enhance resource sustainability and quality through watershed management. The attached Results Chain shows how the outputs and outcomes of the Update contribute to these objectives.

The main themes and changes in the Update are as follows:

- A massive increase in investment in irrigation across the board, which would bring improved irrigation to more than half the current groundwater area by 2015, and upgrade the modern spate irrigated area. The great part of the investment would be scheduled for the later plan period.
- The sector restructuring programme would be vigorously pursued, both for the irrigation sector and across MAI as a whole, including AFPPF.
- The construction of agricultural water structures will be rationalized on the basis of clear and agreed upon economic, social and environmental principles and in close participation of water basin committees throughout the whole process of planning and implementation.
- Irrigation service delivery would be improved through the creation of a National Irrigation Programme and the strengthening of the Irrigation Advisory Service (IAS).
- Decentralization and cooperation with WUAs would be generalized.
- MAI and NWRA would work together with WUAs in the local water management plans, under the overall framework of the basin plans.
- Efforts on research and water harvesting would be intensified.

IRRG – The results Chain, Based on 3 Oct version log frame



Proposed investment plan

Major investment in irrigation works is proposed, totaling \$755 million 2008-2015, with \$159 million programmed for 2008-2010, and \$596 million in 2011-15. This investment would equip 250,000 ha with piped conveyance, equip 61,000 ha with localized (drip or sprinkler) irrigation, and rehabilitate 100,000 ha of spate area. In total, irrigation improvement would take place on over 400,000 ha. Watershed management would be improved, with an investment of \$18 million. In addition, an investment of \$88 million in dams, mainly large dams, is proposed. Investment of \$46 million in policy implementation and institutional development is also proposed, two thirds in the first three years (2008-2010).

The proposed level of investment in irrigation works is equivalent to annual disbursements of \$94 million. A lower annual rate (\$53 million) is proposed for the early period 2008-2010 to allow for financing to be put in place and for the needed institutional reforms and strengthening. After 2010, the programme is expected to be able to absorb \$120 million a year. These disbursement rates are up to three times historical averages (see Table 5.2): clearly an enormous effort will have to be put into policy implementation and institutional development.

Table 5.4: Public sector investment in irrigation 2008-2015: coverage and costs (\$ 000s)

	2008-2010		2011-2015		Total 2008-2015	
	\$ mns	Hectares	\$	Hectares	\$	Hectares
Piped systems	59,087	31,318	209,460	218,337	268,547	249,655
Localized systems	6,671	1,806	194,681	59,225	201,352	61,031
Spate	26,214	3,750	152,892	96,350	179,196	100,100
Watershed management	10,472		7,695		18,167	
Small dams	6,460		3,273		9,713	
Large dams	50,000		27,800		77,800	
Total: Irrigation works	158,884		595,802		754,700	
Policy implementation and inst. development	27,660		18,173		45,833	
TOTAL	186,543	36,874 ha	613,976	373,912 ha	800,519	410,786 ha

Source: EAYRB

Achievement of the ambitious targets depends upon the availability of financing and on implementation capacity. It is expected that the introduction of the SWAp approach based on the NWSSIP Update will increase the finance available. The creation of the proposed National Irrigation Program and reorganization of MAI headquarters and field service functions, together with considerable investment in capacity building, should increase implementation capability. Nonetheless, the targets remain indicative. Lower levels of financing, or slower than expected improvements in implementation capacity, will result in slower extension of coverage.

Policy implementation and institutional development

A substantial investment in policy implementation and institutional development of \$45.8 million (Table 5.6) would be made under the four outcomes targeted: sector restructuring; water resource protection and allocation; water use efficiency; and watershed management. As discussed above, this high level of investment is well justified by the need for thoroughgoing restructuring and capacity building in order to deliver the proposed very large increase in investment in irrigation improvement and to raise water use productivity.

About one fifth of the proposed investment (\$8.5 million, 1.1) will be devoted to sector restructuring. This will include restructuring of MAI as a whole, the reorganization and strengthening of irrigation services, the restructuring of AFPPF, and support to the institutional development of water user organizations as the basic building block of water management. Support would also be provided to institutionalizing cooperation between MAI and MWE.

Almost three quarters of the proposed resources (\$33.6 million, 2.1) would be assigned to water resources protection and allocation. The proposed National Irrigation Programme would be prepared, developed and implemented (\$26.9 million), and the existing Irrigation Advisory Service would be scaled up to cover all governorates by 2015. Local water management plans would be prepared by water user organizations within basin plans, in cooperation with NWRA.

Relatively modest resources (\$0.2 million, 3.1) would be allocated to research and development, including research on water use efficiency, studies to support water user organization effectiveness, and an agenda on *qat*. Finally, about 10% of proposed investments (\$3.5 million, 4.1) would be allocated to the watershed management programme, notably to a review of watershed management approaches and to pilot watershed management projects, and to the development of a dams master plan and a multi-criteria planning methodology.

The outcomes, outputs and costs for policy implementation and institutional development are summarized in Table 5.6, and discussed in more detail in Section C below.

Actions that will need to be jointly planned and implemented

For irrigation, the principal programme areas that need to be jointly planned and implemented are:

Table 5.5: Inter-agency approaches for irrigation (lead agency in bold)

Cross cutting topic	Agencies	Joint actions	Reference
1. IWRM at the basin level	MAI, NWRA , basin committees, local authorities, RWSS agencies, WUAs	Development of water users organizations, including a study and strategy for scaling up. Water rights registration and water transfer	2.1.1 2.1.1
5. Improving water use efficiency	MAI, NWRA	Research, technology and pilot programmes on water use efficiency	3.1.1,

**Table 5.6: NWSSIP Update of the irrigation and watershed management programme
Investment in policy implementation and institutional development**

Outcome	Key outputs	Leading indicators	Costs (\$ '000s)		
			2008-10	2011-15	2008-15
Objective 1: to strengthen institutions to play their role in promoting efficient water use					
1.1 Sector restructuring	MAI restructured (1.1.1)	Reform programme and action plan launched in 2010	7,971	536	8,507
	MAI/MWE coordination(1.1.2, 1.1.3)	Regular meeting of PMC and IMSC Protocol effective 2009			
	Irrigation sector reorganized (1.1.4)	Reorganization effective from 2010			
	AFPPF supports irrigation (1.1.5)	AFPPF restructured in 2009, 20% of budget for irrigation			
	Framework for WUAs (1.1.6)				
Objective 2: to promote sustainable agriculture through water resources protection and allocation					
2.1 Water resources protection and allocation	National Irrigation Programme (2.1.1)	NIP launched 2009	16,100	17,550	33,650
	Irrigation Advisory Service scaled up (2.1.1)	IAS covers all governorates by 2015			
	Local water management plans (2.1.1)	Number of plans prepared. WUAs take part in basin committees			
	Protection of water rights (2.1.2)	Study on optimizing water use in peri-urban areas			
Water harvesting (2.1.4)	20 sites equipped annually				
Objective 3: to increase farmer incomes through increased water use efficiency					
3.1 Water use efficiency	Research on water use efficiency (3.1.1)	Resources for WUE research up from 15% to 40%	60	87	147
	Improved public irrigation (3.1.2)	20 structures handed over to WUAs annually			
	WUAs effective (3.1.4)	Study in 2009, lessons scaled up from 2010			
	Qat programme (3.1.5)	Strengthened programme from 2010			
Objective 4: to enhance resource sustainability and quality through watershed management					
4.1 Watershed management (WSM)	Integrated approach (4.1.1) Dams Master Plan, multi-criteria planning (4.1.2, 4.1.3)	Pilots launched from 2009 Plan adopted end 2010 Manual adopted end 2009	3,529	-	3,529
Total			27,660	18,173	45,833

Source: EAYRB 081107

C. The Action Plan

Outcome 1.1 Sector restructuring

Outcome	Key outputs	Leading indicators	Costs (\$ '000s)		
			2008-10	2011-15	2008-15
1.1 Sector restructuring	MAI restructured (1.1.1)	Reform programme and action plan launched in 2010	7,971	536	8,507
	MAI/MWE coordination, assignment of tasks (1.1.2, 1.1.3)	Regular meetings of PMC and IMSC Protocol effective 2009			
	Irrigation sector reorganized (1.1.4)	Reorganization effective [from 2010]			
	AFPPF effectively supports irrigation (1.1.5)	AFPPF restructured in 2009, 20% of budget for irrigation			
	Institutional framework for WUAs (1.1.6)				

For a number of years, government has been reviewing the need for a major restructuring of MAI. The principal objectives cited have been the need to: (1) streamline the ministry and improve its performance by strengthening central services of planning, programming, economic studies, monitoring and statistics; and (2) improve service delivery at the farmer level by decentralization and a participatory approach with farmer organizations.

Several reform documents such as the Aden Agenda, “A21A” and an FAO-supported reform program have been prepared over the years for the ministry as a whole. In addition, a number of specific studies on the organization of MAI’s irrigation services have been carried out. These reform documents need to be updated and streamlined to reflect recent developments in the irrigation sub-sector in particular and in the agriculture sector at large.

Recently MAI has proposed the creation of a National Irrigation Programme (NIP) to improve delivery of irrigation improvement services to farmers. Existing project units would be integrated into NIP.

In order to move the question of overall restructuring forward, the action plan (1.1.1) provides for *support to MAI restructuring*, including a major study of the overall MAI mandate and structure, a consultation process and the preparation of a draft action plan during 2009, all to be presented to the cabinet for approval in early 2010. The action plan also provides for supporting the subsequent implementation.

The action programme also provides specific support to the *restructuring of MAI's irrigation services* (1.1.4). The establishment of the National Irrigation Programme would be the subject of study and action on a parallel fast track during 2008/9 (see 2.1 below).

Since the creation of MWE in 2003, government has been considering how to *institutionalize cooperation between MAI and MWE*, and how to determine the most appropriate division of responsibilities between the two ministries. Under the action plan (1.1.2), the IMSC and the PMC (see Section D of Chapter 1) are expected to serve as the prime means of coordination between MAI and MWE. The action plan also provides (1.1.3) for the PMC to prepare and agree a protocol during 2008 that would provide for division of tasks and for joint work between MAI and MWE. The protocol would be effective from 2009.

Since the 1990s, government has recycled a part of the revenues from diesel sales to the agriculture sector through the AFPPF. Although this institution has recorded some success, there have been problems regarding its management and the effectiveness and transparency of its investment programme, particularly in the dams sector.

In recent years, AFPPF has begun to review its structure and activities, and also to allocate a growing share of its financing to support irrigation improvement. In order to strengthen this process, the action plan (1.1.5) provides for an independent consultant study on the AFPPF to be conducted in 2008/9 (budget \$250,000), and thereafter for a process of discussion, consultation and agreement on *AFPPF restructuring*. The restructuring is expected to be effective in 2009, and thereafter at least 20% of AFPPF's financing would be allocated to improved irrigation.

Outcome 2.1 Water resources protection and allocation

Outcome	Key outputs	Leading indicators	Costs (\$ '000s)		
			2008-10	2011-15	2008-15
2.1 Water resources protection and allocation	National Irrigation Programme (2.1.1)	NIP launched 2009	16,100	17,550	33,323
	Irrigation Advisory Service scaled up (2.1.1)	IAS covers all governorates by 2015			
	Local water management plans (2.1.1)	Number of plans prepared, WUAs take part in basin committees			
	Protection of water rights (2.1.2)	Study on optimizing water use in peri-urban areas			
	Water harvesting (2.1.4)	20 sites equipped annually			

MAI has decided that the institutional and financial model that can best deliver efficiency and water saving improvements at the farm level is to set up a *National Irrigation Programme (NIP)*. The action plan (2.1.1) provides for a study of how this NIP could be established and also for support to its establishment, capacity building and operations 2010-2015. It is expected that the NIP will include the following characteristics:

- Emphasis on the lessons to be drawn from 15 years of experience in irrigation improvement under LWCP/GSCP, IIP, the Sana'a Basin Water Management Project (SBWMP), the Japanese-financed Community Water Management Project (CWMP), and other pilot experiences.
- Separate approaches for purely rural agricultural areas, and for peri-urban areas where there is competition for water from urban consumers
- The introduction of priority zoning for irrigation improvement, with top priority to those zones where the opportunity cost of water is highest and where the life of the aquifer is long enough to justify investment.
- Working within basin plans and in conjunction with basin committees, NWRA and local authorities.
- Working with WUAs as the basic building block of water resource management at the local level.
- Adopting an integrated approach, including both water resource management and irrigation improvement on the model of the CWMP, and working through *local water management plans*.
- Generalization of integrated advice on farming and water management through the Irrigation Advisory Service (IAS).

The reduction of groundwater mining and improving water use efficiency is targeted through the dissemination of efficient irrigation techniques and the scaling up of the *irrigation advisory services (IAS)*. Under the action plan (2.1.1), the scope of IAS will be expanded not only to deliver improved irrigation techniques but also to help farmers improve their irrigated agriculture overall (choice of crops, crop husbandry, post-harvest, marketing etc). The IAS will be supported through capacity building programs for current extension staff and the recruitment of key personnel staff in irrigation techniques to become Subject Matter Specialists (SMSs) in irrigation methods, irrigation agronomy, post-harvest processing, marketing etc. The institutional location of the IAS will be decided as part of the restructuring of irrigation services in the context of the NIP.

As water scarcity increases and the economic value of water grows, water rights are becoming a major issue. During 2009 a study will be carried out under the action plan (2.1.2) in collaboration with NWRA and the TS/MWE on *water rights in peri-urban areas*, building on the pilot water rights project conducted in al-Dhabbab. The objective

will be to assess optimal use of water in these areas and to propose mechanisms for optimizing economic value and for equitable sharing of benefits. A budget of \$300,000 has been assigned to this major study.

Many recently constructed *water harvesting structures (small dams)* are not currently used for irrigation, or are underused. The action plan (2.1.4) provides for the necessary technical and socio-economic studies and for equipment of 20 structures a year with improved irrigation.

Outcome 3.1 Water use efficiency

Outcome	Key outputs	Leading indicators	Costs (\$ '000s)		
			2008-10	2011-15	2008-15
3.1 Water use efficiency	Research on water use efficiency (3.1.1)	Resources for WUE research up from 15% to 40%	60	87	147
	Improved management of public irrigation (3.1.2)	20 structures handed over to WUAs annually			
	WUAs effective (3.1.4)	Study in 2009, lessons scaled up from 2010			
	Qat programme (3.1.5)	Strengthened programme from 2010			

The development of new and improved technologies in water harvesting under rainfed agriculture, supplementary irrigation and the use of efficient water saving techniques are priorities in the efforts to promote sustainable water resource management. The action plan therefore provides (3.1.1) for an intensive review of the current AREA Mid Term Plan (2006-2010), with technical support from ICARDA to ensure that research activities in crop management reflect the priority of water resource management. The allocation of programme resources to *research on water use efficiency in irrigated agriculture* will be increased to 40%. A budget of \$700,000 for 2009/2010 has been allocated to this activity.

For several years, there has been a process to prepare for handover of the *management of public irrigation schemes* (secondary and tertiary flood irrigation canals) in the main wadis to beneficiaries organized in WUAs and groups. This is an ongoing process in the current mandated areas of IIP and the targeted wadis of Hassan and Ahwar during the period 2008-2010. The action plan (3.1.2) provides for 20 structures per year to be handed over, beginning in 2010.

The role of water user organizations is becoming more significant in the management of water resources in the agriculture sector. This is evident in the scaling up and scaling out of the water users groups and water users associations in the current targeted areas, and in the plans to expand these organizations in new areas under both tube well and spate irrigated production systems. Current pilots under CWMP and SBWMP have begun to

extend the mandate of WUAs from simple irrigation improvement to include a broader remit for water resources management in their local area.

The scaling up and scaling out of the water users associations will rely heavily on the assessment of current water users groups and the identification of their achievements and shortcomings, based on the experiences of GSCP, IIP, CWMP etc. The recent Water PSIA and the Wadi MENA study *Issues in Decentralized Water Management* also have some very relevant analysis. The action plan (3.1.4) provides for a major study (budget \$200,000), and for scaling up of WUAs based on study results.

The action plan also provides for the formulation of a national coordination body and the issuing of by laws to institutionalize WUAs in the agriculture sector. All these activities will be conducted in conjunction with NWRA.

For several years, government has treated qat as a commodity in the agricultural statistics and the research agenda. A qat research unit has been set up in AREA, and a government sponsored project is underway to create a data base on qat areas, problems and the use of chemicals in qat cultivation. The action plan (3.1.5) includes a second national conference on qat, and the formulation of a *strategy and mid-term plan on qat*.

Outcome 4.1 Watershed management

Outcome	Key outputs	Leading indicators	Costs (\$ '000s)		
			2008-10	2011-15	2008-15
4.1 Watershed management (WSM)	Integrated approach (4.1.1)	Pilots launched from 2009	3,529	-	3,529
	Dams Master Plan (4.1.2)	Plan adopted end 2010			
	Multi-criteria planning (4.1.3)	Manual adopted end 2009			

Given the decline in groundwater availability, the NWSSIP Update gives priority to traditional and modern forms of water harvesting. However, past experience has been mixed. Traditional terrace systems have declined, and attempts to introduce modern watershed management approaches have had limited success. MAI's costly dam building programme has been fraught with technical and economic problems. The action plan (4.1.1) therefore provides for a major review of *watershed management* and for pilot projects (budget \$1.0 million).

The action plan also provides for preparation of a data base on dams, drawing up of a *Dams Master Plan*, and systematic consideration of socioeconomic, environmental and water rights aspects in dam planning (4.1.2, 4.1.3: budget \$1.5 million).

Irrigation Sub Sector: Log Frame

Goal: Profitable, economically efficient, equitable and sustainable irrigated agriculture
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Hierarchy of Results	Performance Indicators
Overall Impact	
Profitable, economically efficient, equitable and sustainable irrigated agriculture	▶ Increase in per hectare irrigated agriculture GDP
Long Term Outcome 1	
Institutions are able to play an effective role in realizing efficient agricultural water use	▶ The irrigation sector is structured in a clear public-private partnership approach, with efficient public agencies supporting engaged farmer organizations
Outcome 1	
MAI and its institutions and other public agencies are able to plan and support efficient water use in agriculture	▶ The restructuring and by laws of MAI as an agricultural institution is finalized and approved by mid 2009
Outputs	
1.1 MAI has repositioned itself as an agricultural institution	▶ Reform program for overall MAI mandate and structure has undergone broad consultation and is adopted by end of 2009 ▶ Reform program and action plan under implementation from 2010
1.2 Institutional coordination on agricultural water use enhanced	▶ The PMC meets regularly at a rate of four meetings annually.
1.3 Tasks and responsibilities among concerned agencies in the management of water resources are clearly defined	▶ A Protocol with clear tasks and responsibilities prepared, signed and issued by the PMC before mid 2009.
1.4 Tasks and responsibilities in irrigation construction management and in on farm water management are clearly defined	▶ Headquarters units dealing with irrigation policy and strategy, M&E and reporting are set up and staffed, and are operational from 2010.
1.5 The effectiveness of AFPPF in promoting efficient water techniques is supported and strengthened	▶ The restructuring decree of AFPPF is finalized and issued by mid 2009. ▶ Actual expenditures on modern irrigation techniques in the annual budget of AFPPF are increased by 20 % annually from the base amount of the previous year.

Hierarchy of Results	Performance Indicators
Long Term Outcome 2	
Sustainability through water resources protection and allocation	<ul style="list-style-type: none"> ▶ Efficient irrigation techniques are disseminated at a rate of 20.000 ha annually to reach a target of 40.000 ha by the year 2010 in selected areas and according to agreed upon criteria. ▶ Tripartite agreements involving farmers, local councils and MAI branches developed and systematically employed to limit expansion and impose use of modern techniques. ▶ An approach, to ensure that small farmers are benefiting from modern irrigation techniques developed before the end of 2009.
Outcome 2	
MAI has the ability to work with other public agencies, community organizations and farmers to ensure sustainability through water resources protection and allocation	<ul style="list-style-type: none"> ▶ Plan for setting up NIP is agreed in 2009 ▶ NIP is established and operational in 2010 ▶ Irrigation advisory services (IAS) are scaled up and scaled out to cover all governorates by the year 2015. ▶ Number of training days in IAS for staff ▶ Number of training days for WUAs.
Outputs	
2.1 Ground water mining reduced	<ul style="list-style-type: none"> ▶ Water use efficiency increased from the current level of 35% to 75% at the end of the five year plan (2006-2010) in targeted areas. ▶ Groundwater balance stabilizes (at a lower level) in key basins ▶ Number of farmers organized in WUAs cooperating in water resources management. ▶ Number of agricultural wells monitored and controlled by WUAs.
2.2 Farmers water rights secured	<ul style="list-style-type: none"> ▶ Water Law and its by Law are enforced ▶ WUAs are actively participating in basin management committees. ▶ Study on optimizing water use in peri-urban areas in 2009
2.3 The incentive framework is right	<ul style="list-style-type: none"> ▶ The study on the incentive framework published in 2008 ▶ Relevant recommendations of the study implemented from 2009
2.4 Water use efficiency from existing irrigation water constructions increased	<ul style="list-style-type: none"> ▶ 20 irrigation water structures supplied with efficient irrigation techniques annually.

Hierarchy of Results	Performance Indicators
Long Term Outcome 3	
Increasing farmers income through increased water use efficiency	<ul style="list-style-type: none"> ▶ Rural incomes are sustained ▶ Number of hectares using water saving techniques has increased.
Outcome 3	
3. Farmers are able to increase their incomes through increased water use efficiency	▶ Increase the dissemination of efficient irrigation techniques at a rate of 20.000 ha annually to reach a target of 40.000 ha by the year 2010
Outputs	
3.1 Agricultural research and extension agenda refocused	<ul style="list-style-type: none"> ▶ Share of research on rainfed agriculture in the Mid Term Plan (2006-2010) increased 25% to 40 %. ▶ Research agenda on water use efficiency in the MTP increased from 15% to 40 % in the final year of the mid term program (2006-2010). ▶ Research outputs in selection of drought resistant varieties of field crops increased to four annually by the year 2010. ▶ Production of certified seeds through official and non official channels increased at a rate of 4000 ha (2000 ha annually) till the end of the year 2010.
3.2 Public irrigation schemes are managed efficiently and in a sustainable manner at least costs to government	▶ Number of irrigation constructions in which secondary and tertiary channels were handed over to WUAs or beneficiaries.
3.3 Responsibilities and duties of decision makers and those of implementers are clearly separated. (The role of MAI becomes policy formulation, M&E, technical backstopping, and implementation of central services. The role of agricultural units will be implementation of activities.)	<ul style="list-style-type: none"> ▶ The plan for decentralization of MAI services finalized in 2009. ▶ The number of MAI branches adopting decentralization reaches 10 by the end of 2010
3.4 WUAs developed and functioning	<ul style="list-style-type: none"> ▶ Assessment study of WUAs(CWMP, IIP, SBWMP and GSCP) prepared and published by end of 2009. ▶ Positive lessons of pilot WUAs (CWMP, IIP, SBWMP and GSCP) agreed upon and scaled out.
3.5 Qat is treated as a Problematic Crop	<ul style="list-style-type: none"> ▶ MTP (2008-2015) to strengthen the Qat Research Unit in AREA prepared before the end of 2008.. ▶ Qat is included in the dissemination of modern irrigation techniques, with provision of no expansion. ▶ Crop management practices to minimize the use of chemicals in qat cultivation produced and disseminated (production packages documents) ▶ A list of alternative crops to qat cultivation suggested and introduced . Measures agreed (at the proposed qat conference 2008) to minimize the demand for qat supported.

Hierarchy of Results	Performance Indicators
Long Term Outcome 4	
Enhancing resource sustainability and quality through watershed management	<ul style="list-style-type: none"> ▶ Forestry and water shed management law updated and issued by the end of 2009. ▶ Comprehensive plan on integrated watershed management in 2009 ▶ One pilot project per governorate in the mandated areas of GSCP, Dhamar and Dhala Rural Development Projects. ▶ The number of plans prepared for targeted watershed management incorporated within the water basins management plans(Sana'a- Amran- Abyan- Taez- Sa'ada) during the period 2006-2015.. ▶ one pilot project per governorate annually in targeted governorates to revive the traditional approaches in the integrated watershed management
Outcome 4	
MAI has increased capacity to enhance resource sustainability and quality through watershed management	<ul style="list-style-type: none"> ▶ The capacity of the forestry and range management department staff improved by the end of 2009. ▶ The administrative status of watershed management in MAI clarified in terms of chain of command during drafting the MAI by laws. ▶ Capacities of MAI branches to perform their tasks in resource sustainability and watershed management strengthened by the end of 2010.
Outputs	
4.1 An integrated approach has been revived in watershed management	▶ Approaches comprising the local knowledge and the international experiences are reviewed and incorporated into plans of integrated watershed management by the end of 2009.
4.2 The dams program have been revised and reviewed	▶ National Master Plan for dam construction prepared by the end of 2010.
4.3 Socioeconomic, environmental and water rights studies are obligatory conditions in any planning procedures for dams' construction	<ul style="list-style-type: none"> ▶ Manuals for dam construction including provisions for socioeconomic studies and water rights and environmental studies prepared and disseminated by the end of 2009. ▶ The number of agricultural water structures following the conditions in the prepared manuals is 100% from 2010.

NWSSIP Update

Irrigation Sector: Action Plan and Budget

Activities	Monitorable steps	Due date	Key actor	Budget and Source of funding (US\$)		Additional Comments and clarifications
Output # 1.1 MAI has repositioned itself as an agricultural institution						
Activity #1.1.1 Implement restructuring program in the agriculture sector	Step 1.1.1.1 International and local assistance sought to review policies and reform initiatives carried in the agriculture sector .and prepare an action plan. To implement the reform program.	Mid 2009	MAI	8.000.000	SWAp	Annual budget for 2009 and 2010 is \$3,000,000 The subsequent years budget for 2011-2015 is \$1,000,000 annually Despite the fact that the budget allocation covers the whole structure of MAI emphasis will be on the irrigation sector
	Step 1.1.1.2 A national workshop involving all stakeholders to discuss and the action plan organized and implemented	End 2009	MAI			
	Step 1.1.1.3 The reform program with the action plan submitted to the Cabinet for approval.	Beginning 2010	MAI +CABINET			
	Step 1.1.1.4 Source of funding of the reform program identified and secured.	Mid 2010	MAI + MOPIC + MOF			
	Step 1.1.1.5 Reform Program and action plan launched	Mid 2010	MAI			
	Step 1.1.1.6 A monitoring system established to follow progress.	Mid 2010	MAI			
Output # 1.2 Institutional coordination on agricultural water use enhanced						
Activity #1.2.1 Enhance MAI/MWE coordination	Step 1.2.1.1 The regular meetings of the coordination committee between MAI and MWE activated	Beginning of each quarter and whenever deemed necessary	Deputy Ministers of MAI/ MWE	10.000	Donors	
	Step 1.2.1.2 Minutes and outputs of the coordination committee meetings are submitted to the inter ministerial committee after each meeting	Beginning of each quarter and whenever deemed necessary	Chairman of the PPC Committee			
	Step 1.2.1.3 The meetings of Inter Ministerial Steering Committee activated	Every six months and whenever deemed necessary	Deputy Prime Minister (Minister of Planning) + Ministers of MAI/MWE			

Activities	Monitorable steps	Due date	Key actor	Budget and Source of funding		
Output # 1.3 Tasks and responsibilities among concerned agencies in the management of water resources are clearly defined						
Activity #1.3.1 Clearly define cross cutting tasks and responsibilities among concerned agencies in the management of water resources.	Step 1.3.1.1 The cross cutting tasks and responsibilities of concerned agencies in water management are clearly defined by the PMC	end of 2008	PMC	SWAp	-----	
Output # 1.4 Tasks and responsibilities in irrigation construction management and on farm water management are clearly defined						
Activity #1.4.1. Identify clear tasks and responsibilities for on farm water management and the management of irrigation structures	Step 1.4.1.1 Separate departments with clear tasks and responsibilities at the national and local levels are established as per the outputs of the reform program	Mid 2009	MAI/ Minister + deputy Minister	50.000	Gov	
	Step 1.4.1.2 The newly established departments are supported with required recruitment, training of staff and budget.	Mid	MAI / Minister + Assistant Deputy/Irrig.	100.000	Gov	
Output # 1.5 The effectiveness of APPF in promoting efficient water techniques is supported and strengthened.						
Activity #1.5.1 Finalize restructuring of AFPPF	Step 1.5.1.1 A study on AFPPF restructuring conducted	End of 2008	AFPPF/Irrigation Sector	250.000	Gov	
	Step 1.5.1.2 The conclusions of the assessment study discussed, agreed and necessary legal amendments made.	Beginning of 2009	AFPPF/Irrigation Sector	5.000	AFPPF	
Activity #1.5.2 Increase the budget for irrigation techniques in the annual budget of AFPPF	Step 1.5.2.1 Financial planning in AFPPF adopt program budgeting to improve utilization of funds.	Beginning of 2009	AFPPF/Irrigation Sector	5.000	AFPPF	
	Step 1.5.2.2 Realistic annual budgeted plan with clear targets and indicators for promotion of water savings techniques are prepared	Mid 2009	AFPPF/Irrigation Sector	5.000	AFPPF	
	Step 1.5.2.3 The budget for irrigation techniques in the annual budget of AFPPF has been increased to 20 % during the period 2008-2010	Mid 2009	AFPPF Board of Directors	5.000	AFPPF	
	Step 1.5.2.4 Donors contribute to the joint financing with AFPPF in the irrigation sector	End 2009	AFPPF Board of Directors + Donors			

Activities	Monitorable steps	Due date	Key actor	Budget and Source of funding		
Output # 2.1 Ground water mining reduced						
Activity #2.1.1 Disseminate modern irrigation systems to farmers at a rate of 20.000 ha annually. (2 x 20.000 = 40 .000 ha) Ibb 2000 ha Al-Baidha 1200 ha Abyan 1500 ha Taez 2500 ha Gawf 2000ha Hajja 2000ha Hudaida 8500 ha Hadramout 1500 ha Dhamar 4000 Shabwa 1500 Sa'ada 1600 ha Sana'a 4000 ha Lahj 1500 Mareb 2200 ha Al-Mahweet 600 ha Al-Mahara 1050 ha Amran 1500 ha Dhala 850 ha	Step 2.1.1.1 A study on how to institutionalize support to groundwater through a National Irrigation Programme (NIP) conducted with emphasis on experiences generated in GSCP, Sana'a Basin (SBWMP), , CWMP etc.	2009	MAI, NWRA, MWE	2.500.000 Reduced to 1.000.000	Donors	Flexibility should be ensured to allow shifting of funds among governorates based on actual progress during implementation Budget allocation is for the years 2009-2010
	Step 2.1.1.2 Results of the study discussed , agreed and implemented.					
	Step 2.1.1.3 Capacities and capabilities of irrigation functions strengthened within the context of the NIP.					
	Step 2.1.1.4 Criteria and program developed that will: (1) improve incomes and save water; (2) target areas where the economic, water saving and social returns are highest; (3) favour poorer farmers; and (4) phase out subsidies over time.					
	Step 2.1.1.4 Surveys to identify targeted areas for intervention conducted.	2009	GDI+ Irrigation Departments in Ag. Offices			
	Step 2.1.1.1.5 Program budgeting for activities related to dissemination prepared.	2009	Irrigation Departments in Ag. Offices			
	Step 2.1.1.6 Areas selected in collaboration with local councils and Water Users Associations (WUAs).	2009	irrigation Departments in Ag. Offices+ Local councils			
	Step 2.1.1.7 Establish and develop WUAs for all irrigation improvement, and scale them up to be the basic building blocks of water resources management .					
	Step 2.1.1.8 Designs and quantities for modern irrigation systems calculated, bids prepared and purchase finalized.	Beginning 2009	GDI+ AFPPF + GSCP + San'a Basin + Dhamar RDP + SFD	50.000.000 (25.000.000 x 2 years) The actual figures should be copied from the costab	Donors +SFD + AFPPF	The calculations made in costab are the basis for budget allocations here
Step 2.1.1.9 Irrigation units installed in collaboration with farmers and WUAs.	Mid 2009	Irrigation Departments in Ag. Offices				

Activities	Monitorable steps	Due date	Key actor	Budget and Source of funding		
Activity #2.1.2 - Scale up and scaled out IASs to cover whole governorates by the year 2015.	Step 2.1.2.1 Depending on the results of the study in 2.1.1, plan prepared for scaling up and scaling out IAS	Beginning 2009	GDI+ AFPPF + GSCP + San'a Basin + Dhamar RDP + SFD	3.500.000	GDI+ AFPPF + GSCP + San'a Ba + Dhamar RDP + SFD	Budget for the years 2011-2015 should be added at a rate of 1.000.000 annually = 5.000.000
	Step 2.1.2.2 Capacities and capabilities of irrigation departments and extension agencies in regional agricultural offices in IASs strengthened			4.000.000		
	Step 2.1.2.3. Program budgets for IASs activities prepared	Beginning 2009	GDI+ AFPPF + GSCP + San'a Basin + Dhamar RDP + SFD	Replaced to 1.000.000 x 2 = 2.000.000 for 2009-2010		
	Step 2.1.2.4 IASs in the targeted areas launched	Mid 2009	GDI+ AFPPF + GSCP + San'a Basin + Dhamar RDP + SFD			
	Step 2.1.2.5 Farmers capacities through organizing them in water users groups increased .	Mid 2009	GDI+ AFPPF + GSCP + San'a Basin + Dhamar RDP + SFD	500.000	SFD	
Activity #2.1.3 Develop local water management plans (e.g. Groundwater Management Action Plans), and agree between WUAs, MAI, NWRA, local councils	Step 2.1.3.1 A legal document to serve as a tri partite agreement involving the three parties formulated	Mid 2009	GDI+ AFPPF + GSCP + San'a Basin + Dhamar RDP + SFD + Local Councils	5000	Donors +SFD + AFPPF	
	Step 2.1.3.2 The agreement with farmers and local councils was discussed for consensus.	Mid 2009	Irrigation Departments in Ag Offices+ Local Councils	10.000	Donors +SFD + AFPPF	
	Step 2.1.3.3. Signing of the agreement launched	Mid 2009	Irrigation Departments in Ag Offices+ Local Councils	5.000	Donors +SFD + AFPPF	
	Step 2.1.1.3.4 Participatory monitoring and evaluation procedures launched to ensure smooth implementation.	Beginning 2010	GDI + Irrigation Departments in Ag Offices (merge cells wit above)	10.000	Donors +SFD + AFPPF.	

Activities	Monitorable steps	Due date	Key actor	Budget and Source of funding	
Activity #2.1.4 Increase water use efficiency to 35-50 % at the end of 2010.	Step 2.1.4.1 A base line survey in targeted areas to assess current water efficiency levels and irrigation practices conducted.	Mid 2008	GDI + Irrigation Departments in Ag Offices + Research Stations + Sana'a Basin	800.000	IPP+GSCD +IFAD
	Step 2.1.4.2 The IASs packages among targeted farmers implemented.	Beginning 2009	Irrigation Departments in Ag Offices + Research Stations +Extension Agencies	see 2.1.2	Gov.
	Step 2.1.4.3 Training of farmers in application of packages conducted	Beginning 2009	Irrigation Departments in Ag Offices + Research Stations +Extension Agencies	see 2.1.2	Gov.
	Step 2.1.1.4.4 Impact at the end of each year assessed	Annually as of 2010	GDI + Irrigation Departments in Ag Offices	see 2.1.2	Gov.
Activity #2.1.5 Provide Support to local water management plans	Step 2.1.5.1 Current levels of drop of underground water in critical basins assessed as a first step.	Beginning 2009	NWRA+GDI+ Irri. Dep. in Offices	200.000 NWRA	Gov+ Donor agencies
	Step 2.1.5.2 Drilling of new wells and deepening current wells in critical basins prohibited.	continuous	NWRA + its branches	5.000 NWRA	Gov
	Step 2.1.5.3 Constructions for artificial recharge of ground water promoted	Beginning 2009	NWRA + AFPPF + GDI	300.000 NWRA	AFPPF + Donor agencies
	Step 2.1.5.4 Shifting to electric pumps is prohibited	Beginning 2009	NWRA + Local Councils	5.000 NWRA	Gov
	Step 2.1.5.5 Taxes on casing of wells increased	Beginning 2009	NWRA + Local Councils	5 .000 NWRA	Gov
	Step 2.1.5.6 Water law in critical basins is strictly enforced	Beginning 2009	NWRA + Local Councils	10.000 NWRA	Gov
	Step 2.1.5.7 The utilization of irrigation water from surrounding irrigation structures is promoted.	Beginning 2009	GDI+AFPPF+ Irri. Dep. in Ag. Offices	See WUAs and IASs	
	Step 2.1.5.8 An effective monitoring and evaluation procedures to assess on farm water use is practiced.	Beginning 2009	GDI + Irri.Dep. in Ag. Offices		

Activities	Monitorable steps	Due date	Key actor	Budget and Source of funding (US\$) 2009-2010		Additional Comments and clarifications
Output # 2.2 Farmers water rights and obligations secured (Note: This output will be implemented under the overall coordination of NWRA.)						
Activity #2.2.1 Implement water law	Step 2.2.1.1 By laws of the water law issued	End 2008	NWRA+GDI + Ministry of Civil Service	5.000 NWRA		Gov.
Activity #2.2.2 Recognize farmers' water rights and obligations	Step 2.2.2.1 A study on feasible methods of equitable water use and equitable water transfer in key peri-urban areas as well as major watersheds conducted.	Beginning 2009	NWRA+GDI	300.000 NWRA		Donors
	Step 2.2.2.2 Implementation of al Dhabbab water rights studied as a pilot case and lessons applied where applicable.					
	Step 2.2.2.3 Procedures to ensure protection of these rights in close collaboration with local councils and community organizations applied.	Mid 2009	NWRA+GDI+ Local Council	50.000 NWRA		Donors
	Step 2.2.2.4 Capacities of WUAs strengthened	Beginning 2009	NWRA +MAI	200.000 NWRA		Donors
Activity #2.2.3 Promote awareness regarding water rights	Step 2.2.3.1 Extension messages on water rights to disseminate among farmers prepared.	Mid 2009	NWRA +GDE +GDI	200.000		Donors
	Step 2.2.3.2 Communication programs on farmers' water rights for broadcasting through multimedia channels prepared.	Mid 2009	NWRA + GDE+GDI	100.000 NWRA		Donors
Output # 2.3 The incentive framework is right						
Activity #2.3.1 Carry out a study leading to review of the incentive framework	{see steps under NWRA responsibility in the IWRM Action Plan)	Mid 2008	NWRA	NWRA		
Output # 2.4 Water use efficiency from existing irrigation water constructions increased and improved						
Activity #2.4.1 Supply 20 irrigation water structures with modern irrigation techniques annually	Step 2.4.1.1 A participatory base line survey conducted involving local communities in targeted irrigation structures to assess needs and develop criteria for prioritization.	Beginning 2009	GDI +AFPPF + SFD	See 2.1.1		AFPPF =SFD
	Step 2.4 1.2 Prepare designs for each irrigation structure and conduct procurement	Beginning 2009	GDI + IDs in branches+ AFPPF	200.000		AFPPF.+SFD
	Step 2.4.1.3 work with the farming communities to build their capacities and organize them in water users groups accomplished	Mid 2009	IDs in Branches	100.000		SFD
	Step 2.4.1.4 IASs activities in targeted areas launched.	End 2009	IDs and Ext. Age. in Bra. + Regional R. Stations	200.000		Donors

Activities	Monitorable steps	Due date	Key actor	Budget and Source of funding (US\$) 2008-2010		Additional Comments and clarifications
Output # 3.1 Agricultural research and extension agenda refocused						
Activity #3.1.1 – Increase the % of research activities in the Mid Term Plan (2006-2010) by 40 % in rainfed agriculture.	Step 3.1.1.1 Progress of the current mid term plan reviewed.	Beginning 2009	AREA +GDI	5.000	Gov	
	Step 3.1.1.2 Actions to increase the % of activities under rainfed conditions to reach a target of 40 % were achieved through the existing rainfed and livestock project .	Beginning 2009	AREA+GDI+Rainfed Project	700.000 (2x 350.000)	Rainfed and Livestock Project +AREA	Budget for subsequent years 2011-2015 are estimated to be at a rate of 350.000 x 5 years = 1.750.000 for rainfed agricultural research
Activity #3.1.2 Increase research agenda on water use efficiency in the MTP by 40% in the final year of the mid term program (2006-2010)	Step 3.1.2.1 The current Medium Term Plan in AREA revised .	Mid 2009	AREA +GDI	5.000	Gov	
	Step 3.1.2.2 Potential interventions in the research activities to increase water use efficiency in irrigated agriculture to 40% suggested. Research activities on the use of non conventional sources of water for irrigation incorporated.	Beginning 2009	AREA + GDI+AFPPF	700.000 (2 years x 350.000)	Government + Contracted projects	Budget for subsequent years 2011-2015 are estimated to be at a rate of 350.000 x 5 years = 1.750.000 For irrigated agricultural research
Activity #3.1.3 Increase research outputs in selection of drought resistant varieties of field crops by 10 in the year 2010.	3.1.3.1 The research MTP in the field of crop enhancement in rainfed and irrigated areas revised. (Means to promote development of drought resistant varieties through the bilateral programs with the IAEA program and with ICARDA international center suggested to develop and disseminate four varieties per year.)	Mid 2009	AREA + General Corp. Seed. Multiplication	200.000 (2 years x 100.000)	Gov	
Activity #3.1.4 Increase production of certified seeds in the formal and informal sectors at a rate of 4.000 ha (2000 ha annually) till the end of the year 2010.	3.1.4.1 A study on the current capacities of the Seed Multiplication Corporation (GSMC) and the progress made in the informal sector in seed multiplication conducted.	Beginning 2009	GCSM +AREA	50.000 (2 Years x 25.000)	Gov+ Donors	
	3.1.4.2 The support of the SMC in seed multiplication and scale out the success stories of the outreach program in the informal seed sector into new areas promoted to cater for cultivation of 2000 ha annually.	Mid 2009	AFPPF +Crop Improvement Project	6.000.000 (2 years x 3.000.000) Reduced to 1.000.000 annually	Gov+ Donors	

Activities	Monitorable steps	Due date	Key actor	Budget and Source of funding (US\$) 2008-2010		Additional Comments and clarifications
Output #3.2 Public irrigation schemes are managed efficiently and in a sustainable manner at least costs to government						
Activity #3.2.1 increase number of wadis in which secondary and tertiary canals are handed over to WUAs or beneficiaries to two wadis starting on the year 2010.	Step 3.2.1.1 The experience of WUAs scaled out to Wadi Hassan, Ahwar.	Beginning 2009	GDI+Local Councils in targeted areas	30.000.000 15.000.000 x 2 wadis over 5 years) Budget reduced to 5.000.000 annually for both projects	IIP Phase 2 + Wadi Hassan Project	Costs do not cover the construction of the main dam but covers the secondary and tertiary canals and the formulation of WUAs in both wadis Budget for 2011-2015 estimated to be similar 5.000.000 x 5 years= 25 mln
Activity #3.2.2 Finalize the transfer of the management of irrigation water structures and their distribution pipes to farmers through their association by the year 2010	Step 3.2.2.1 The transfer of irrigation water structures and their distribution pipes system to beneficiaries through the WUAs at a rate of 20 irrigation structure per year finalized.	2010	GDI+AFPPF+ Local Councils in targeted areas	----		----
Output # 3.3 Responsibilities and duties of decision makers and those of implementers are clearly separated						
Activity #3.3.1 Finalize restructuring of MAI by end of 2010.	Step 3.3.1.1 International and local assistance sought to review policies, strategies and reform initiatives carried in the agriculture sector and prepare an action plan for implementing the reform program. .	2010	MAI	Repeated		
Activity #3.3.2 Finalize the plan for decentralization of MAI services by 2010.	Step 3.3.2.1 International consultancy assistance to prepare a plan for application of reform program and decentralization in the agriculture sector sought.	beginning 2009	MAI + Restructuring Department.	see 1.1.1	SWAp	
	Step 3.3.2.2 A national team from MAI and from other concerned agencies (counterparts to the International consultant) for the preparation of the plan on decentralization of the agricultural sector formulated.	Mid 2009	MAI + Restructuring Department.	see 1.1.1	SWAp	
	Step 3.3.2.3 Decentralization in selected governorates (Sana'a , Hadramout, Taz and Lahej) as pilot areas during the period 2009-1010 launched.	Beginning 2010	MAI+ Restructuring Department.+ Local Administration	see 1.1.1	SWAp	
Activity # 3.1.3.3 Apply decentralization concept by end of 2015 at all levels of agriculture activities.	Step 3.3.3.1 The application of decentralization to ensure that application is covering all governorates by the year 2015 gradually expanded.	Mid 2010	MAI+ Restructuring Department.	see 1.1.1	SWAp	
Activity # 3.1.3.4 Increase capacities of MAI branches to adopt decentralization	Step 3.3.4.1 A program was prepared and launched to strengthen capacities of MAI branches to implement decentralization	End 2010		see 1.1.1	SWAp	

Activities	Monitorable steps	Due date	Key actor	Budget and Source of funding (US\$) 2008-2010		Additional Comments and clarifications
Output # 3.4 WUAs developed and functioning						
Activity #3.4.1 Assess status of WUAs to identify shortcomings in their sustainability by end of 2009 under spate and underground water production systems.	Step 3.4.1.1 A joint team from international and local experts to assess the experience of WUAs and Irrigation Councils and their capacities to sustain their activities and suggest means to strengthen these capacities was selected.	Beginning 2009	NWRA + GDI	\$200.000 NWRA	Donors	
Activity #3.4.2 Scale out the experience of WUAs into new sites and wadis such as Ahwar, and Hassan by the end of 2010.	Step 3.4.2.1 Assistance from international experts to assess the pilot activities in Wadi Tuban and Wadi Zabid and draw lessons for scaling up these activities in other wadis. Such as Ahwar and Hassan by the end of 2010 accomplished	Mid 2009	GDI + IIP	See 3.1.2.1		
	Step 3.4.2.2 Criteria for expansion to new wadis was prepared	Mid 2009	GDI	See 3.1.2.1		
	Step 3.4.2.3 Budgets for the scaling out of pilot activities to new targeted wadis were calculated and source of funding was identified	2010	GDI	See 3.1.2.1		
Activity #3.4.3 By laws of water law issued by the end of 2008.	Step 3.4.3.1 Participation with MWE in Finalizing the By laws of the Water Law was accomplished.	Beginning 2009	NWRA + GDI	NWRA		
Activity #3.4.4 Formulate the National Coordinating Body of WUAs by the end of 2009	Step 3.4.4.1 Participation with MWE in seeking international assistance with clear terms of reference for the formulation of a National coordinating body for WUAs done.	Mid 2009	NWRA + GDI	NWRA		
Activity # 3.4.5 Issue by laws for WUAs beginning of 2010	Step 3.4.5.1 Participation with NWRA for issuing by laws for WUAs accomplished	Beginning 2010	NWRA + GDI	NWRA		
Output #3.5 Qat is treated as a problematic crop						
Activity #3.5.1 Prepare a MTP (2008-2015) to strengthen the Qat Research Unit in AREA to conduct research activities on qat in water requirements, crop management and socioeconomic studies.	Step 3.5.1.1 The Second National Conference on Qat organized.	2009	MAI GD(Plant Production)+ AREA	150.000	Gov + Donors	
	Step 3.5.1.2 A Mid Term Plan and an action plan for Qat with budget required based on the outputs of the Second Qat Conference prepared	Mid 2009	AREA + GDE+AFPPF	150.000	Gov + Donors	
Activity #3.5.2 Include qat in the dissemination of modern irrigation techniques with provision of limiting expansion of areas under qat. - Improve crop management practices and minimize the use of chemicals in qat cultivation	Step 3.5.2.1 The Implementation of the action plan derived from the MTP launched	Mid 2009	AREA + GDE+AFPPF	1.000.000 Budget is for two years	Gov + Donors	Subsequent allocations for 2011-2015 are 5 years x 250.000= 1.250.000

Activities	Monitorable steps	Due date	Key actor	Budget and Source of funding (US\$) 2009-2010		Additional Comments and clarifications
Output # 4.1 An integrated approach has been revived in watershed management						
Activity #4.1.1 Review traditional approaches of integrated watershed management and adjust this local knowledge to existing situation by the end of 2009.	Step 4.1.1.1 International consultancy and technical support identified and invited to lead efforts and work with the local team on reviewing traditional approaches of integrated watershed management and adjust this local knowledge to existing situation by end 2009	Beginning 2009	Irrigation Sector + GSCP + SBWMP+ SFD+ Dhamar RDP + Rainfed and Rainfed and Livestock Project + Dhala RDP GD Forestry + GDI +AFPPF	1.000.000 Budget has been increased to 2.000.000 for two years	Gov + Donors	Budget for subsequent years 2011-2015 is 5 years x 1.000.000 = 5.000.000 The constructions and rehabilitations cover : wadi bank protection, spate breakers, terrace rehabilitation re forestation activities and canal control in wadis Unit area cannot be estimated due to diverse approaches
Activity # 4.1.2 Suggest approaches comprising the local knowledge and the international experiences in integrated watershed management by mid 2010	Step 4.1.2.1 The implementation of the prepared study in pilot areas before launched.	Mid 2010				
Output # 4.2 The dams program have been revised and reviewed						
Activity #4.2.1 Prepare a National Master Plan for dam construction by the end of 2010, within and outside Basin management Plans where these exist.	Step 4.2.1.1 The establishment of a data base on dams and irrigation water construction and establish a GIS unit in the GDI in collaboration with concerned parties finalized.	Beginning 2009	GDI + NWRA	1.400.000	Gov + Donors +AFPPF	
	Step 4.2.1.2 A comprehensive study to allocates sites of current dams and irrigation water constructions conducted.	Mid 2009	GDI +NWRA			
	Step 4.2.1.3 Based on study on current dam sites, potential sites in master plan identified .	Mid 2010	GDI +NWRA +EPA			
	Step 4.2.1.4 The Master Plan for Dams and irrigation water constructions submitted to the Council Of Ministers for approval.	End 2010	MAI + NWRA			
Output # 4.3 Socioeconomic, environmental and water rights studies are obligatory conditions in any planning procedures for dam construction						
Activity #4.3.1 Prepare manuals for dam construction including provisions for socioeconomic studies, water rights and environmental studies in the planning for construction of each dam	Step 4.3.1.1 Principles and guidelines prepared and approved by the Council of Ministers and distribute these guidelines to different authorities in a form of manuals with required explanations and simplified language compiled and implemented before the end of 2009	Beginning 2009	GDI +AFPPF +AREA	50.000	Gov + Donors	
Activity # 4.3.2 Number of studies of irrigation and water structures incorporating the conditions above in the preparation of documents and implementation increases.	Step 4.3.2.1 Annual review of the implemented projects in dams and irrigation water constructions to assess the level of compliance with the above-mentioned guidelines and manuals conducted.	End of each year	GDI	5.000	Gov	

Yemen
NWSSIP
Expenditure Accounts by Years -- Base Costs
Irrigation (US\$ '000)

	2008	2009	2010	2011	2012	2013	2014	2015	Total
1. Irrigation Works									
a. Irrigation Improvement Pipe Systems									
Pipe Conveyance Systems	19,883	14,140	20,663	47,502	37,199	50,787	22,214	21,502	233,890
Pipe Conveyance Installation	1,819	1,220	1,362	6,548	6,064	6,064	5,899	5,680	34,657
Subtotal Irrigation Improvement Pipe Systems	21,702	15,360	22,025	54,050	43,263	56,851	28,113	27,183	268,547
b. Irrigation Improvement Localized Systems									
Localized Systems	2,023	1,582	1,537	31,926	31,060	31,060	31,060	31,060	161,308
Localized Systems Installation	579	455	496	7,924	7,648	7,648	7,648	7,648	40,044
Subtotal Irrigation Improvement Localized Systems	2,602	2,036	2,033	39,850	38,708	38,708	38,708	38,708	201,352
c. Watershed Protection Soil Conservation	-	3,562	6,910	7,067	157	157	157	157	18,167
d. Small Spate	-	371	417	935	576	576	576	576	4,028
e. Small Dams	2,964	1,738	1,738	1,137	335	676	676	448	9,713
f. Large Spate	2,172	3,467	18,563	22,262	20,678	36,031	26,504	25,980	155,657
g. Large Dam/Diversion Structures	-	22,300	27,700	17,200	10,600	-	-	-	77,800
h. Spate Irrigation Heavy Equipment	-	-	1,224	122	6,803	11,271	-	-	19,421
Subtotal irrigation Works	29,440	48,834	80,610	142,622	121,121	144,271	94,735	93,052	754,686
2. Capacity Development Irrigation									
a. Irrigation Sector Restructuring	-	4,651	3,320	515	5	5	5	5	8,507
b. Water Resource Protection and Allocation	10	4,718	1,647	-	-	-	-	-	6,375
c. Water Use Efficiency	-	22	38	29	29	29	-	-	147
d. Watershed Management	5	1,790	1,734	-	-	-	-	-	3,529
e. Irrigation National Program	2,709	3,273	3,554	5,416	4,257	3,178	2,242	2,319	26,948
f. GSCP Extension	-	62	127	138	-	-	-	-	327
Subtotal capacity Development Irrigation	2,725	14,515	10,420	6,099	4,292	3,212	2,247	2,324	45,833
Total Investment Costs	32,165	63,349	91,029	148,721	125,413	147,484	96,982	95,376	800,519
Physical Contingencies	1,455	2,084	2,702	9,223	7,866	9,086	9,503	9,350	51,268
Price Contingencies	827	2,982	5,721	21,923	23,337	35,599	46,888	54,986	192,262
TOTAL	34,447	68,415	99,452	179,867	156,616	192,168	153,373	159,711	1,044,050

File: EAYRB

Yemen
NWSSIP
Project Components by Year -- Base Costs
Irrigation and Watershed Management (US\$ '000)

	2008	2009	2010	2011	2012	2013	2014	2015	Total
1. Irrigation Sector Institutional Development									
a. Irrigation Sector Restructuring									
MAI Restructuring and decentralization 1.1.1	-	4,335	3,315	510	-	-	-	-	8,160
MAI/MWE Coordination 1.1.2	-	5	5	5	5	5	5	5	36
Irrigation sector staffing and training 1.1.4	-	51	-	-	-	-	-	-	51
AFPPF Restructuring 1.1.5	-	56	-	-	-	-	-	-	56
Institutional Framework for WUAs 1.1.6	-	204	-	-	-	-	-	-	204
Subtotal Irrigation Sector Restructuring	-	4,651	3,320	515	5	5	5	5	8,507
b. Water Resource Protection and Allocation									
Planning for groundwater irrigation improvement 2.1.1.1	-	530	510	-	-	-	-	-	1,040
Planning for IAS 2.1.1.2	-	1,535	1,127	-	-	-	-	-	2,662
District Water Management Agreements 2.1.1.3	-	20	10	-	-	-	-	-	31
Baseline Survey on Irrigation Practices 2.1.1.4	-	816	-	-	-	-	-	-	816
Support to District Water Management Plans 2.1.1.5	5	536	-	-	-	-	-	-	541
Assessment and protection of water rights 2.1.2.1	5	770	-	-	-	-	-	-	775
Water use efficiency from existing water structures 2.1.4.1	-	510	-	-	-	-	-	-	510
Subtotal Water Resource Protection and Allocation	10	4,718	1,647	-	-	-	-	-	6,375
c. Water Use Efficiency									
Research on water use efficiency 3.1.1.1	-	7	9	4	4	4	-	-	27
Management of spate structures by WUAs 3.1.2.1	-	13	26	26	26	26	-	-	115
Qat Program 3.1.5	-	2	3	-	-	-	-	-	5
Subtotal Water Use Efficiency	-	22	38	29	29	29	-	-	147
d. Watershed Management									
Assessment and Improvement of traditional systems 4.1.1.1	-	1,020	1,020	-	-	-	-	-	2,040
National Master Plan for dams 4.1.2.1	-	714	714	-	-	-	-	-	1,428
Socio economic and environmental studies on dams 4.1.3	5	56	-	-	-	-	-	-	61
Subtotal Watershed Management	5	1,790	1,734	-	-	-	-	-	3,529

	2008	2009	2010	2011	2012	2013	2014	2015	Total
e. Irrigation National Program									
Irrigation Support Team	-	-	-	118	118	41	-	-	277
GDI Irrigation Advisory Services	-	-	-	2,445	1,646	1,700	841	1,024	7,656
Spate Irrigation Improvement (IIP)	2,709	3,273	4,778	2,976	9,296	12,708	1,401	1,295	38,435
Subtotal Irrigation National Program	2,709	3,273	4,778	5,539	11,061	14,449	2,242	2,319	46,369
f. GSCP Extension National									
PCU GSCP	-	25	36	63	-	-	-	-	123
Advisory Services GSCP	-	37	91	75	-	-	-	-	204
Water Harvesting and Soil Conservation GSCP	-	862	910	910	-	-	-	-	2,681
Small Spate Irrigation GSCP	-	371	417	359	-	-	-	-	1,148
Subtotal GSCP Extension National	-	1,295	1,454	1,407	-	-	-	-	4,156
Subtotal Irrigation Sector Institutional Development	2,725	15,749	12,970	7,490	11,095	14,483	2,247	2,324	69,083
2. Dams Program									
Small Dams	2,964	1,738	1,738	1,137	335	676	676	448	9,713
3. Watershed Management and Soil Conservation (National)									
Terrace Rehabilitation	-	-	-	154	154	154	154	154	771
Wadi Bank Protection Upland	-	-	-	154	154	154	154	154	771
Soil Conservation and Erosion Control	-	-	-	3	3	3	3	3	15
Small Spate Irrigation	-	-	-	422	422	422	422	422	2,110
Subtotal Watershed Management and Soil Conservation (National)	-	-	-	733	733	733	733	733	3,667
4. Sana'a Irrigation and Watershed Management									
Irrigation Improvement Sana'a	3,301	-	-	1,020	858	858	858	858	7,753
5. Hajjah Irrigation and Watershed Management									
Groundwater Irrigation Improvement Hajjah	581	468	567	7,530	8,064	8,064	7,366	6,435	39,076
Watershed Management Hajjah	-	900	2,000	2,000	-	-	-	-	4,900
Subtotal Hajjah Irrigation and Watershed Management	581	1,368	2,567	9,530	8,064	8,064	7,366	6,435	43,976
6. Ibb Irrigation and Watershed Management									
Groundwater Irrigation Improvement Ibb	502	1,590	1,590	2,139	1,905	1,905	1,905	1,905	13,441
Watershed Management Ibb	-	900	2,000	2,000	-	-	-	-	4,900
Subtotal Ibb Irrigation and Watershed Management	502	2,490	3,590	4,139	1,905	1,905	1,905	1,905	18,341
7. Amran Irrigation and Watershed Management /a									
Groundwater Irrigation Improvement Amran	316	422	563	3,201	2,545	2,545	2,545	2,545	14,682

	2008	2009	2010	2011	2012	2013	2014	2015	Total
8. Dhamar Irrigation and Watershed Management									
Groundwater Irrigation Improvement Dhamar	704	632	489	6,597	6,042	6,013	6,013	6,013	32,503
AREA Program	165	210	260	-	-	-	-	-	635
Dhamar Participatory Rural Development	885	-	-	-	-	-	-	-	885
Subtotal hamar Irrigation and Watershed Management	1,754	842	749	6,597	6,042	6,013	6,013	6,013	34,023
9. Al Mahweet Irrigation and Watershed Management									
Groundwater Irrigation Improvement Al Mahweet	263	-	-	366	264	264	264	264	1,685
10. Wadi Hadramout Irrigation and Watershed Management									
Groundwater Irrigation Improvement Wadi Hadramout	863	665	799	5,697	4,870	4,870	4,870	4,870	27,503
11. Coastal Hadramout Irrigation and Watershed Management									
Wadi Hajr Project	1,000	4,200	6,390	9,900	-	-	-	-	21,490
12. Lahj Irrigation and Watershed Management									
Groundwater Irrigation Improvement Lahj	858	732	899	5,506	4,632	4,632	4,632	4,632	26,525
Watershed Management Lahj	-	900	2,000	2,000	-	-	-	-	4,900
Subtotal Lahj Irrigation and Watershed Management	858	1,632	2,899	7,506	4,632	4,632	4,632	4,632	31,425
13. Al Mahara Irrigation and Watershed Management									
Groundwater Irrigation Improvement Al Mahara	-	-	-	681	476	476	476	476	2,585
14. Mareb Irrigation and Watershed Management									
Groundwater Irrigation Improvement Mareb	-	-	-	6,366	6,245	6,245	6,245	6,245	31,347
Eastern Region Project	3,700	1,090	960	-	-	-	-	-	5,750
Subtotal Mareb Irrigation and Watershed Management	3,700	1,090	960	6,366	6,245	6,245	6,245	6,245	37,097
15. Al Jawf Irrigation and Watershed Management									
Groundwater Irrigation Improvement Al Jawf	-	-	-	2,779	2,545	2,545	2,545	2,545	12,959
16. Al Dalah Irrigation and Watershed Management									
Groundwater Irrigation Improvement Al Dalah	355	117	117	719	466	466	466	466	3,172
17. Hoddeida Irrigation and Watershed Management									
Groundwater Irrigation Improvement Hoddeidah	1,452	735	819	11,639	10,741	10,741	10,741	10,741	57,610
Spate Irrigation Hoddeidah	-	-	931	1,375	83	6,462	12,696	12,560	34,107
Subtotal Hoddeida Irrigation and Watershed Management	1,452	735	1,749	13,014	10,825	17,204	23,437	23,302	91,717
18. Taiz Irrigation and Watershed Management									
Groundwater Irrigation Improvement Taiz	380	422	429	6,705	6,149	6,149	6,149	6,149	32,533
19. Shabwa Irrigation and Watershed Management									
Groundwater Irrigation Improvement Shabwa	399	187	261	2,760	2,339	2,339	2,339	2,339	12,964

	2008	2009	2010	2011	2012	2013	2014	2015	Total
20. Saada Irrigation and Watershed Management									
Groundwater Irrigation Improvement Saada	1,058	203	220	3,864	3,652	3,652	3,652	3,652	19,954
Northern Region Project	725	445	4,460	5,200	9,200	26,090	-	-	46,120
Subtotal Saada Irrigation and Watershed Management	1,783	648	4,680	9,064	12,852	29,742	3,652	3,652	66,074
21. Abyan Irrigation and Watershed Management									
Groundwater Irrigation Improvement Abyan	440	4,187	5,235	9,483	9,392	6,119	4,170	4,170	43,197
Spate Irrigation Abyan	2,172	1,417	6,232	7,206	195	7,099	13,809	13,419	51,549
Hassan Dam	-	22,300	27,700	17,200	10,600	-	-	-	77,800
Wadi Ahwar Project	-	2,050	11,400	13,680	20,400	22,470	-	-	70,000
Subtotal Abyan Irrigation and Watershed Management	2,612	29,954	50,567	47,570	40,587	35,688	17,979	17,589	242,546
22. Al Beida Irrigation and Watershed Management									
Groundwater Irrigation Improvement Al Beida	388	-	-	1,746	1,584	1,584	1,584	1,584	8,470
25. Irrigation Programs									
EU Program	5,970	1,090	-	-	-	-	-	-	7,060
	32,165	63,349	91,029	148,721	125,413	147,484	96,982	95,376	800,519
Physical Contingencies	1,455	2,084	2,702	9,223	7,866	9,086	9,503	9,350	51,268
Price Contingencies	827	2,982	5,721	21,923	23,337	35,599	46,888	54,986	192,262
TOTAL	34,447	68,415	99,452	179,867	156,616	192,168	153,373	159,711	1,044,050

File: COMYRB

Yemen
NWSSIP
Expenditure Accounts by Financiers
Irrigation (US\$ '000)

	Foreign		Foreign Gap		Budget GOY		Other Local		The Government		Total	
	Amount	%	Amount	%	Amount	%	Amount	%	Amount	%	Amount	%
1. Irrigation Works												
a. Irrigation Improvement Pipe Systems												
Pipe Conveyance Systems	102,032	34.5	134,402	45.5	25,295	8.6	16,800	5.7	16,800	5.7	295,329	28.3
Pipe Conveyance Installation	-	-	-	-	-	-	49,159	100.0	0	-	49,159	4.7
Subtotal Irrigation Improvement Pipe Systems	102,032	29.6	134,402	39.0	25,295	7.3	65,960	19.1	16,800	4.9	344,488	33.0
b. Irrigation Improvement Localized Systems												
Localized Systems	5,944	2.5	180,846	77.6	1,095	0.5	22,606	9.7	22,606	9.7	233,096	22.3
Localized Systems Installation	-	-	-	-	-	-	57,592	100.0	0	-	57,592	5.5
Subtotal Irrigation Improvement Localized Systems	5,944	2.0	180,846	62.2	1,095	0.4	80,198	27.6	22,606	7.8	290,689	27.8
c. Watershed Protection Soil Conservation	12,054	62.3	4,422	22.8	2,646	13.7	117	0.6	117	0.6	19,356	1.9
d. Small Spate	-	-	5,055	85.5	-	-	429	7.3	429	7.3	5,914	0.6
e. Small Dams	-	-	-	-	11,753	100.0	-	-	0	-	11,753	1.1
f. Large Spate	61,479	28.8	125,860	58.9	11,900	5.6	200	0.1	14,268	6.7	213,706	20.5
g. Large Dam/Diversion Structures	63,018	81.0	-	-	14,782	19.0	-	-	-	-	77,800	7.5
h. Spate Irrigation Heavy Equipment	-	-	24,623	100.0	-	-	-	-	0	-	24,623	2.4
Subtotal irrigation Works	244,526	24.7	475,208	48.1	67,471	6.8	146,904	14.9	54,220	5.5	988,329	94.7
2. Capacity Development Irrigation												
a. Irrigation Sector Restructuring	-	-	10,064	100.0	-	-	-	-	-	-	10,064	1.0
b. Water Resource Protection and Allocation	-	-	7,443	100.0	-	-	-	-	-	-	7,443	0.7
c. Water Use Efficiency	-	-	183	100.0	-	-	-	-	0	-	183	-
d. Watershed Management	-	-	4,115	100.0	-	-	-	-	0	-	4,115	0.4
e. Irrigation National Program	-	-	33,400	99.6	-	-	-	-	121	0.4	33,520	3.2
f. GSCP Extension	-	-	396	100.0	-	-	-	-	0	-	396	-
Subtotal capacity Development Irrigation	-	-	55,600	99.8	-	-	-	-	121	0.2	55,721	5.3
Total Investment Costs	244,526	23.4	530,808	50.8	67,471	6.5	146,904	14.1	54,341	5.2	1,044,050	100.0

File: EXPFIN

Yemen
NWSSIP
Components by Financiers
Irrigation (US\$ '000)

	Foreign		Foreign Gap		Budget GOY		Other Local		The Government		Total	
	Amount	%	Amount	%	Amount	%	Amount	%	Amount	%	Amount	%
1 Irrigation Sector Institutional Development												
a Irrigation Sector Restructuring												
MAI Restructuring and decentralization 1.1.1	-	-	9,657	100.0	-	-	-	-	-	-	9,657	0.9
MAI/MWE Coordination 1.1.2	-	-	48	100.0	-	-	-	-	-	-	48	-
Irrigation sector staffing and training 1.1.4	-	-	59	100.0	-	-	-	-	-	-	59	-
AFPPF Restructuring 1.1.5	-	-	65	100.0	-	-	-	-	-	-	65	-
Institutional Framework for WUAs 1.1.6	-	-	235	100.0	-	-	-	-	-	-	235	-
Subtotal Irrigation Sector Restructuring	-	-	10,064	100.0	-	-	-	-	-	-	10,064	1.0
b. Water Resource Protection and Allocation												
Planning for groundwater irrigation improvement 2.1.1.1	-	-	1,229	100.0	-	-	-	-	-	-	1,229	0.1
Planning for IAS 2.1.1.2	-	-	3,134	100.0	-	-	-	-	-	-	3,134	0.3
District Water Management Agreements 2.1.1.3	-	-	36	100.0	-	-	-	-	-	-	36	-
Baseline Survey on Irrigation Practices 2.1.1.4	-	-	941	100.0	-	-	-	-	-	-	941	0.1
Support to District Water Management Plans 2.1.1.5	-	-	623	100.0	-	-	-	-	-	-	623	0.1
Assessment and protection of water rights 2.1.2.1	-	-	893	100.0	-	-	-	-	-	-	893	0.1
Water use efficiency from existing water structures 2.1.4.1	-	-	588	100.0	-	-	-	-	-	-	588	0.1
Subtotal Water Resource Protection and Allocation	-	-	7,443	100.0	-	-	-	-	-	-	7,443	0.7
c. Water Use Efficiency												
Research on water use efficiency 3.1.1.1	-	-	33	100.0	-	-	-	-	0	-	33	-
Management of spate structures by WUAs 3.1.2.1	-	-	145	100.0	-	-	-	-	0	-	145	-
Qat Program 3.1.5	-	-	5	100.0	-	-	-	-	0	-	5	-
Subtotal Water Use Efficiency	-	-	183	100.0	-	-	-	-	0	-	183	-
d. Watershed Management												
Assessment and Improvement of traditional systems 4.1.1.1	-	-	2,380	100.0	-	-	-	-	-	-	2,380	0.2
National Master Plan for dams 4.1.2.1	-	-	1,666	100.0	-	-	-	-	0	-	1,666	0.2
Socio economic and environmental studies on dams 4.1.3	-	-	70	100.0	-	-	-	-	0	-	70	-
Subtotal Watershed Management	-	-	4,115	100.0	-	-	-	-	0	-	4,115	0.4
e. Irrigation National Program												
Irrigation Support Team	-	-	345	96.3	-	-	-	-	13	3.7	358	-
GDI Irrigation Advisory Services	-	-	10,132	100.0	-	-	-	-	0	-	10,132	1.0
Spate Irrigation Improvement (IIP)	-	-	47,545	99.8	-	-	-	-	108	0.2	47,653	4.6
Subtotal Irrigation National Program	-	-	58,022	99.8	-	-	-	-	121	0.2	58,143	5.6
f. GSCP Extension National												
PCU GSCP	-	-	150	100.0	-	-	-	-	0	-	150	-
Advisory Services GSCP	-	-	246	100.0	-	-	-	-	0	-	246	-
Water Harvesting and Soil Conservation GSCP	-	-	3,485	100.0	-	-	-	-	0	-	3,485	0.3
Small Spate Irrigation GSCP	-	-	1,622	100.0	-	-	-	-	0	-	1,622	0.2
Subtotal GSCP Extension National	-	-	5,503	100.0	-	-	-	-	0	-	5,503	0.5
Subtotal irrigation Sector Institutional Development	-	-	85,329	99.9	-	-	-	-	121	0.1	85,450	8.2

	Foreign		Foreign Gap		Budget GOY		Other Local		The Government		Total	
	Amount	%	Amount	%	Amount	%	Amount	%	Amount	%	Amount	%
2. Dams Program												
Small Dams	-	-	-	-	11,753	100.0	-	-	0	-	11,753	1.1
3. Watershed Management and Soil Conservation (National)												
Terrace Rehabilitation	-	-	919	80.0	-	-	115	10.0	115	10.0	1,148	0.1
Wadi Bank Protection Upland	-	-	919	80.0	-	-	115	10.0	115	10.0	1,148	0.1
Soil Conservation and Erosion Control	-	-	18	80.0	-	-	2	10.0	2	10.0	23	-
Small Spate Irrigation	-	-	2,515	80.0	-	-	314	10.0	314	10.0	3,143	0.3
Subtotal watershed Management and Soil Conservation (National)	-	-	4,371	80.0	-	-	546	10.0	546	10.0	5,463	0.5
4. Sana'a Irrigation and Watershed Management												
Irrigation Improvement Sana'a	801	7.8	6,182	60.2	89	0.9	2,417	23.6	773	7.5	10,262	1.0
5. Hajjah Irrigation and Watershed Management												
Groundwater Irrigation Improvement Hajjah	1,774	3.2	33,481	59.6	197	0.4	16,582	29.5	4,185	7.4	56,220	5.4
Watershed Management Hajjah	4,018	82.0	-	-	882	18.0	-	-	-0	-0.0	4,900	0.5
Subtotal Hajjah Irrigation and Watershed Management	5,792	9.5	33,481	54.8	1,079	1.8	16,582	27.1	4,185	6.8	61,120	5.9
6. Ibb Irrigation and Watershed Management												
Groundwater Irrigation Improvement Ibb	2,549	13.8	9,916	53.8	283	1.5	4,450	24.1	1,240	6.7	18,439	1.8
Watershed Management Ibb	4,018	82.0	-	-	882	18.0	-	-	0	-	4,900	0.5
Subtotal Ibb Irrigation and Watershed Management	6,567	28.1	9,916	42.5	1,165	5.0	4,450	19.1	1,240	5.3	23,339	2.2
7. Amran Irrigation and Watershed Management /a												
Groundwater Irrigation Improvement Amran	1,475	7.0	11,707	55.9	164	0.8	6,147	29.3	1,463	7.0	20,957	2.0
8. Dhamar Irrigation and Watershed Management												
Groundwater Irrigation Improvement Dhamar	1,563	3.4	35,182	75.4	609	1.3	4,891	10.5	4,398	9.4	46,642	4.5
AREA Program	-	-	-	-	635	100.0	-	-	-	-	635	0.1
Dhamar Participatory Rural Development	752	85.0	-	-	133	15.0	-	-	-	-	885	0.1
Subtotal Dhamar Irrigation and Watershed Management	2,315	4.8	35,182	73.0	1,376	2.9	4,891	10.2	4,398	9.1	48,162	4.6
9. Al Mahweet Irrigation and Watershed Management												
Groundwater Irrigation Improvement Al Mahweet	209	8.9	1,301	55.2	23	1.0	662	28.1	163	6.9	2,358	0.2
10. Wadi Hadramout Irrigation and Watershed Management												
Groundwater Irrigation Improvement Wadi Hadramout	2,555	6.5	22,135	56.3	284	0.7	11,567	29.4	2,767	7.0	39,309	3.8
11. Coastal Hadramout Irrigation and Watershed Management												
Wadi Hajr Project	17,837	83.0	-	-	3,653	17.0	-	-	0	-	21,490	2.1
12. Lahj Irrigation and Watershed Management												
Groundwater Irrigation Improvement Lahj	2,755	7.3	21,039	55.6	306	0.8	11,115	29.4	2,630	6.9	37,846	3.6
Watershed Management Lahj	4,018	82.0	-	-	882	18.0	-	-	-0	-0.0	4,900	0.5
Subtotal Lahj Irrigation and Watershed Management	6,773	15.8	21,039	49.2	1,188	2.8	11,115	26.0	2,630	6.2	42,746	4.1
13. Al Mahara Irrigation and Watershed Management												
Groundwater Irrigation Improvement Al Mahara	-	-	2,365	63.4	-	-	1,071	28.7	296	7.9	3,732	0.4
14. Mareb Irrigation and Watershed Management												
Groundwater Irrigation Improvement Mareb	-	-	28,299	62.1	-	-	13,736	30.1	3,537	7.8	45,573	4.4
Eastern Region Project	-	-	-	-	5,750	100.0	-	-	-	-	5,750	0.6
Subtotal Mareb Irrigation and Watershed Management	-	-	28,299	55.1	5,750	11.2	13,736	26.8	3,537	6.9	51,323	4.9
15. Al Jawf Irrigation and Watershed Management												
Groundwater Irrigation Improvement Al Jawf	-	-	11,707	62.2	-	-	5,645	30.0	1,463	7.8	18,815	1.8
16. Al Dalah Irrigation and Watershed Management												
Groundwater Irrigation Improvement Al Dalah	607	13.7	2,249	50.9	67	1.5	1,216	27.5	281	6.4	4,422	0.4

	Foreign		Foreign Gap		Budget GOY		Other Local		The Government		Total	
	Amount	%	Amount	%	Amount	%	Amount	%	Amount	%	Amount	%
17. Hoddeida Irrigation and Watershed Management												
Groundwater Irrigation Improvement Hoddeidah	2,929	3.5	48,218	58.2	605	0.7	25,064	30.3	6,027	7.3	82,843	7.9
Spate Irrigation Hoddeidah	-	-	56,193	90.5	-	-	142	0.2	5,742	9.3	62,077	5.9
Subtotal Hoddeida Irrigation and Watershed Management	2,929	2.0	104,411	72.0	605	0.4	25,206	17.4	11,769	8.1	144,921	13.9
18. Taiz Irrigation and Watershed Management												
Groundwater Irrigation Improvement Taiz	1,441	3.1	27,835	59.3	160	0.3	14,023	29.9	3,479	7.4	46,938	4.5
19. Shabwa Irrigation and Watershed Management												
Groundwater Irrigation Improvement Shabwa	872	4.7	10,752	57.9	97	0.5	5,516	29.7	1,344	7.2	18,581	1.8
20. Saada Irrigation and Watershed Management												
Groundwater Irrigation Improvement Saada	936	3.3	16,644	58.2	104	0.4	8,815	30.8	2,081	7.3	28,580	2.7
Northern Region Project	37,224	80.7	-	-	8,896	19.3	-	-	-0	-0.0	46,120	4.4
Subtotal Saada Irrigation and Watershed Management	38,160	51.1	16,644	22.3	9,000	12.0	8,815	11.8	2,081	2.8	74,700	7.2
21. Abyan Irrigation and Watershed Management												
Groundwater Irrigation Improvement Abyan	24,397	41.0	18,961	31.8	4,229	7.1	9,586	16.1	2,370	4.0	59,544	5.7
Spate Irrigation Abyan	3,379	4.1	69,666	85.3	-	-	58	0.1	8,525	10.4	81,629	7.8
Hassan Dam	63,018	81.0	-	-	14,782	19.0	-	-	-	-	77,800	7.5
Wadi Ahwar Project	58,100	83.0	-	-	11,900	17.0	-	-	-0	-0.0	70,000	6.7
Subtotal Abyan Irrigation and Watershed Management	148,894	51.5	88,628	30.7	30,911	10.7	9,644	3.3	10,896	3.8	288,972	27.7
22. Al Beida Irrigation and Watershed Management												
Groundwater Irrigation Improvement Al Beida	309	2.5	7,274	59.7	34	0.3	3,654	30.0	909	7.5	12,180	1.2
25. Irrigation Programs												
EU Program	6,989	99.0	-	-	71	1.0	-	-	-	-	7,060	0.7
	244,526	23.4	530,808	50.8	67,471	6.5	146,904	14.1	54,341	5.2	1,044,050	100.0

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NWSSIP
Physical Aggregations
Irrigation

	Unit	2008	2009	2010	2011	2012	2013	2014	2015	Total
B. Irrigation improvement										
pipe conveyance area										
Groundwater Irrigation Improvement Sana'a										
Pipe Conveyance SBWMP	ha	1,500	-	-	-	-	-	-	-	1,500
Pipe Conveyance GSCP	ha	368	-	-	-	-	-	-	-	368
Pipe Conveyance GDI	ha	-	-	-	300	300	300	300	300	1,500
Subtotal Groundwater Irrigation Improvement Sana'a		1,868	-	-	300	300	300	300	300	3,368
Groundwater Irrigation Improvement Hajjah										
Pipe Conveyance GSCP	ha	753	550	650	550	-	-	-	-	2,503
Pipe Conveyance GDI	ha	-	-	-	694	2,428	2,428	1,387	-	6,937
Subtotal Groundwater Irrigation Improvement Hajjah		753	550	650	1,244	2,428	2,428	1,387	-	9,440
Ibb Groundwater Irrigation Improvement										
Pipe Conveyance GDI	ha	-	-	-	1,540	1,540	1,540	1,540	1,540	7,700
Pipe Conveyance GSCP	ha	454	750	750	-	-	-	-	-	1,954
Subtotal Ibb Groundwater Irrigation Improvement		454	750	750	1,540	1,540	1,540	1,540	1,540	9,654
Groundwater Irrigation Improvement Amran										
Pipe Conveyance GSCP	ha	392	600	800	600	-	-	-	-	2,392
Pipe Conveyance GDI	ha	-	-	-	1,640	1,640	1,640	1,640	1,640	8,200
Subtotal Groundwater Irrigation Improvement Amran		392	600	800	2,240	1,640	1,640	1,640	1,640	10,592
Groundwater Irrigation Improvement Dhamar										
Pipe Conveyance GSCP	ha	735	600	600	600	-	-	-	-	2,535
Pipe Conveyance GDI	ha	-	-	-	3,540	3,540	3,540	3,540	3,540	17,700
Dhamar Participatory Rural Development	ha	885	-	-	-	-	-	-	-	885
Subtotal Groundwater Irrigation Improvement Dhamar		1,620	600	600	4,140	3,540	3,540	3,540	3,540	21,120

	Unit	2008	2009	2010	2011	2012	2013	2014	2015	Total
Groundwater Irrigation Improvement Al Mahweet										
Pipe Conveyance GDI	ha	-	-	-	100	100	100	100	100	500
Pipe Conveyance GSCP	ha	333	-	-	-	-	-	-	-	333
Subtotal Groundwater Irrigation Improvement Al Mahweet		333	-	-	100	100	100	100	100	833
Groundwater Irrigation Improvement Hadramout										
Pipe Conveyance GSCP	ha	875	600	800	600	-	-	-	-	2,875
Pipe Conveyance GDI	ha	-	-	-	2,560	2,560	2,560	2,560	2,560	12,800
Subtotal Groundwater Irrigation Improvement Hadramout		875	600	800	3,160	2,560	2,560	2,560	2,560	15,675
Groundwater Irrigation Improvement Lahj										
Pipe Conveyance GSCP	ha	823	700	900	700	-	-	-	-	3,123
Pipe Conveyance GDI	ha	-	-	-	2,500	2,500	2,500	2,500	2,500	12,500
Subtotal Groundwater Irrigation Improvement Lahj		823	700	900	3,200	2,500	2,500	2,500	2,500	15,623
Groundwater Irrigation Improvement Al Mahara										
Pipe Conveyance GDI	ha	-	-	-	220	220	220	220	220	1,100
Groundwater Irrigation Improvement Mareb										
Pipe Conveyance GDI	ha	-	-	-	3,240	3,240	3,240	3,240	3,240	16,200
GOY Contribution	ha	3,700	1,090	960	-	-	-	-	-	5,750
Subtotal Groundwater Irrigation Improvement Mareb		3,700	1,090	960	3,240	3,240	3,240	3,240	3,240	21,950
Groundwater Irrigation Improvement Al Jawf										
Pipe Conveyance GDI	ha	-	-	-	1,640	1,640	1,640	1,640	1,640	8,200
Groundwater Irrigation Improvement Al Dalah										
Pipe Conveyance GSCP	ha	368	150	150	150	-	-	-	-	818
Pipe Conveyance GDI	ha	-	-	-	450	450	450	450	450	2,250
Subtotal Groundwater Irrigation Improvement Al Dalah		368	150	150	600	450	450	450	450	3,068
Groundwater Irrigation Improvement Hoddeidah										
Pipe Conveyance GSCP	ha	1,575	900	1,000	900	-	-	-	-	4,375
Pipe Conveyance GDI	ha	-	-	-	11,800	11,800	11,800	11,800	11,800	59,000
Pipe Conveyance Tihama Region	ha	280	-	-	-	-	-	-	-	280
Subtotal Groundwater Irrigation Improvement Hoddeidah		1,855	900	1,000	12,700	11,800	11,800	11,800	11,800	63,655
Groundwater Irrigation Improvement Taiz										
Pipe Conveyance GSCP	ha	473	600	600	600	-	-	-	-	2,273
Pipe Conveyance GDI	ha	-	-	-	3,880	3,880	3,880	3,880	3,880	19,400
Subtotal Groundwater Irrigation Improvement Taiz		473	600	600	4,480	3,880	3,880	3,880	3,880	21,673

	Unit	2008	2009	2010	2011	2012	2013	2014	2015	Total
Groundwater Irrigation Improvement Shabwa										
Pipe Conveyance GSCP	ha	473	250	350	250	-	-	-	-	1,323
Pipe Conveyance GDI	ha	-	-	-	1,920	1,920	1,920	1,920	1,920	9,600
Subtotal Groundwater Irrigation Improvement Shabwa		473	250	350	2,170	1,920	1,920	1,920	1,920	10,923
Groundwater Irrigation Improvement Saada										
Pipe Conveyance GSCP	ha	798	150	150	-	-	-	-	-	1,098
Pipe Conveyance GDI	ha	-	-	-	1,920	1,920	1,920	1,920	1,920	9,600
Northern Region	ha	725	-	-	-	-	-	-	-	725
Northern Region Phase II	ha	-	445	4,460	5,200	9,200	26,090	-	-	45,395
Subtotal Groundwater Irrigation Improvement Saada		1,523	595	4,610	7,120	11,120	28,010	1,920	1,920	56,818
Groundwater Irrigation Improvement Abyan										
Pipe Conveyance GSCP	ha	543	400	500	400	-	-	-	-	1,843
Pipe Conveyance GDI	ha	-	-	-	2,300	2,300	2,300	2,300	2,300	11,500
Abyan Project Phase II	ha	-	3,800	4,750	4,750	5,090	1,900	-	-	20,290
Subtotal Groundwater Irrigation Improvement Abyan		543	4,200	5,250	7,450	7,390	4,200	2,300	2,300	33,633
Groundwater Irrigation Improvement Al Beida										
Pipe Conveyance GDI	ha	-	-	-	1,480	1,480	1,480	1,480	1,480	7,400
Pipe Conveyance GSCP	ha	490	-	-	-	-	-	-	-	490
Subtotal Groundwater Irrigation Improvement Al Beida		490	-	-	1,480	1,480	1,480	1,480	1,480	7,890
Subtotal pipe conveyance area localized systems area		16,543	11,585	17,420	57,024	57,748	71,448	42,417	41,030	315,215
Groundwater Irrigation Improvement Sana'a										
Localized Systems SBWMP	ha	200	-	-	-	-	-	-	-	200
Localized Systems GSCP	ha	27	-	-	-	-	-	-	-	27
Localized Systems GDI	ha	-	-	-	200	200	200	200	200	1,000
Subtotal Groundwater Irrigation Improvement Sana'a		227	-	-	200	200	200	200	200	1,227
Groundwater Irrigation Improvement Hajjah										
Localized Systems GSCP	ha	23	30	40	30	-	-	-	-	123
Localized Systems GDI	ha	-	-	-	1,960	1,960	1,960	1,960	1,960	9,800
Subtotal Groundwater Irrigation Improvement Hajjah		23	30	40	1,990	1,960	1,960	1,960	1,960	9,923
Ibb Groundwater Irrigation Improvement										
Localized System GDI	ha	-	-	-	340	340	340	340	340	1,700
Localized Systems GSCP	ha	11	250	250	-	-	-	-	-	511

	Unit	2008	2009	2010	2011	2012	2013	2014	2015	Total
Subtotal Ibb Groundwater Irrigation Improvement		11	250	250	340	340	340	340	340	2,211
Groundwater Irrigation Improvement Amran										
Localized Systems GSCP	ha	16	6	8	6	-	-	-	-	36
Localized Systems GDI	ha	-	-	-	440	440	440	440	440	2,200
Subtotal Groundwater Irrigation Improvement Amran		16	6	8	446	440	440	440	440	2,236
Groundwater Irrigation Improvement Dhamar										
Localized Systems GSCP	ha	14	6	8	6	-	-	-	-	34
Localized Systems GDI	ha	-	-	-	1,140	1,140	1,140	1,140	1,140	5,700
Subtotal Groundwater Irrigation Improvement Dhamar		14	6	8	1,146	1,140	1,140	1,140	1,140	5,734
Groundwater Irrigation Improvement Al Mahweet										
Localized Systems GDI	ha	-	-	-	60	60	60	60	60	300
Localized Systems GSCP	ha	12	-	-	-	-	-	-	-	12
Subtotal Groundwater Irrigation Improvement Al Mahweet		12	-	-	60	60	60	60	60	312
Groundwater Irrigation Improvement Hadramout										
Localized Systems GSCP	ha	84	80	80	80	-	-	-	-	324
Localized Systems GDI	ha	-	-	-	960	960	960	960	960	4,800
Subtotal Groundwater Irrigation Improvement Hadramout		84	80	80	1,040	960	960	960	960	5,124
Groundwater Irrigation Improvement Lahj										
Localized Systems GSCP	ha	93	80	90	80	-	-	-	-	343
Localized Systems GDI	ha	-	-	-	900	900	900	900	900	4,500
Subtotal Groundwater Irrigation Improvement Lahj		93	80	90	980	900	900	900	900	4,843
Groundwater Irrigation Improvement Al Mahara										
Localized Systems GDI	ha	-	-	-	100	100	100	100	100	500
Groundwater Irrigation Improvement Mareb										
Localized Systems GDI	ha	-	-	-	1,240	1,240	1,240	1,240	1,240	6,200
Groundwater Irrigation Improvement Al Jawf										
Localized Systems GDI	ha	-	-	-	440	440	440	440	440	2,200
Groundwater Irrigation Improvement Al Dalah										
Localized Systems GSCP	ha	33	5	5	-	-	-	-	-	43
Localized Systems GDI	ha	-	-	-	50	50	50	50	50	250
Subtotal Groundwater Irrigation Improvement Al Dalah		33	5	5	50	50	50	50	50	293

	Unit	2008	2009	2010	2011	2012	2013	2014	2015	Total
Groundwater Irrigation Improvement Hoddeidah										
Localized Systems GSCP	ha	35	40	45	40	-	-	-	-	160
Localized Systems GDI	ha	-	-	-	860	860	860	860	860	4,300
Subtotal Groundwater Irrigation Improvement Hoddeidah		35	40	45	900	860	860	860	860	4,460
Groundwater Irrigation Improvement Taiz										
Localized Systems GSCP	ha	19	6	8	6	-	-	-	-	39
Localized Systems GDI	ha	-	-	-	1,080	1,080	1,080	1,080	1,080	5,400
Subtotal Groundwater Irrigation Improvement Taiz		19	6	8	1,086	1,080	1,080	1,080	1,080	5,439
Groundwater Irrigation Improvement Shabwa										
Localized Systems GSCP	ha	25	6	8	6	-	-	-	-	45
Localized Systems GDI	ha	-	-	-	320	320	320	320	320	1,600
Subtotal Groundwater Irrigation Improvement Shabwa		25	6	8	326	320	320	320	320	1,645
Groundwater Irrigation Improvement Saada										
Localized Systems GSCP	ha	73	15	20	15	-	-	-	-	123
Localized Systems GDI	ha	-	-	-	720	720	720	720	720	3,600
Subtotal Groundwater Irrigation Improvement Saada		73	15	20	735	720	720	720	720	3,723
Groundwater Irrigation Improvement Abyan										
Localized Systems GSCP	ha	23	6	8	6	-	-	-	-	43
Localized Systems GDI	ha	-	-	-	800	800	800	800	800	4,000
Subtotal Groundwater Irrigation Improvement Abyan		23	6	8	806	800	800	800	800	4,043
Groundwater Irrigation Improvement Al Beida										
Localized Systems GDI	ha	-	-	-	180	180	180	180	180	900
Localized Systems GSCP	ha	18	-	-	-	-	-	-	-	18
Subtotal Groundwater Irrigation Improvement Al Beida		18	-	-	180	180	180	180	180	918
Subtotal localized systems area		706	530	570	12,065	11,790	11,790	11,790	11,790	61,031
spate irrigation area										
Rehabilitation & Improvement of Irrigation Infrastructure in Wadi Bana (16,000 Ha)										
Main works for modern spate scheme	ha	-	-	-	-	-	3,200	6,400	6,400	16,000
Rehabilitation & Improvement of Irrigation Infrastructure in Wadi Ahwar (7,500 Ha)										
Main works for modern spate scheme	ha	-	605	3,145	3,750	-	-	-	-	7,500

	Unit	2008	2009	2010	2011	2012	2013	2014	2015	Total
Rehabilitation & Improvement of Irrigation Infrastructure in Wadi Mawr (60,000 Ha)										
Main works for modern spate scheme	ha	-	-	-	-	-	12,000	24,000	24,000	60,000
Rehabilitation & Improvement of Irrigation Infrastructure in Wadi Siham (8,600 Ha)										
Main works for modern spate scheme	ha	-	-	-	-	-	1,720	3,440	3,440	8,600
Rehabilitation & Improvement of Irrigation Infrastructure in Wadi Rema'a (8,000 Ha)										
Main works for modern spate scheme	ha	-	-	-	-	-	1,600	3,200	3,200	8,000
Subtotal spate irrigation area		-	605	3,145	3,750	-	18,520	37,040	37,040	100,100
		17,249	12,720	21,135	72,839	69,538	101,758	91,247	89,860	476,346
TOTAL		17,249	12,720	21,135	72,839	69,538	101,758	91,247	89,860	476,346

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