14.4 Completion Report on Pilot Project Construction Works

COMPLETION REPORT

ON

CONSTRUCTION OF WATER SUPPLY FACILITIES

FOR

RURAL WATER SUPPLY COMPONENT
OF
THE STUDY FOR WATER RESOURCES MANAGEMENT
AND RURAL WATER SUPPLY IMPROVEMENT
IN THE REPUBLIC OF YEMEN

JULY 2007

AHMED ALI MAHDI OFFICE
FOR TRADING AND CONTRACTING

0. Table of Contents

Annex

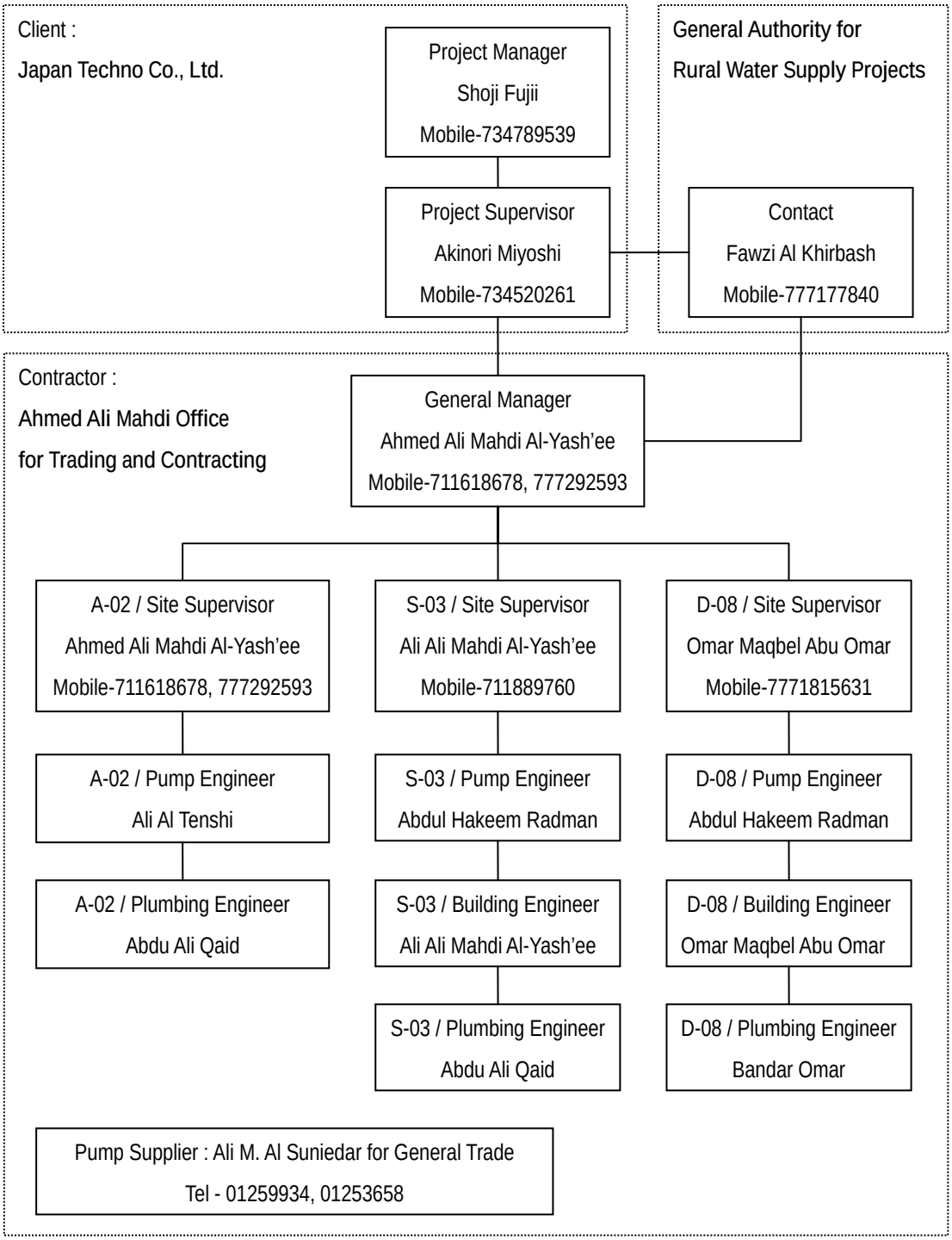
1. Summary of Project

Contract Title	:	Construction of Water Supply Facilities for Rural Water Supply Component of The Study for Water Resources Management and Rural Water Supply Improvement in the Republic of YEMEN
Name & Address of the Client	:	Japan Techno Co. Ltd. SBS Hills III, 10-4, 4-Chome, Yoga, Setagaya-ku, Tokyo 158-0097, JAPAN
Name & Address of the Contractor	:	Ahmed Ali Mahdi Office for Trading and Contracting Al Hassabah, Maintenance Street, beside Owsan School, Sana'a, the Republic of YEMEN
Date of Tendering	:	25th April, 2007
Date of Contract	:	26th April, 2007
Date of Completion	:	4th July, 2007
Contract Price	:	US$220,000.-
Site Name and Location	:	A-02 / Jabal Al Taraf, Al Mahweet District, Al Mahweet Governorate S-03 / Al Kharaba, Bany Matal District, Sana'a Governorate D-08 / Masneat Abdul Aziz, Mafa'a District, Dhamar Governorate

List of Facilities

A-02 / Jabal Al Taraf		Unit
1	Pumping Unit (Vertical Shaft Pump and Diesel Engine) for Well	1
2	Pumping Unit (Horizontal Pump and Diesel Engine) for Booster	1
S-03 / Al Kharaba		Unit
1	Pumping Unit (Submersible Motor Pump and Engine Generator) with Accessories	1
2	Pump House with Pump Pit	1
3	Ground Water Tank (50m^3)	1
4	Pumping Main (3")	1,333m
5	Distribution Main (3/4" to 3")	4,363m
6	Public Fountain	13
D-08 / Masneat Abdul Aziz		Unit
1	Pumping Unit (Submersible Motor Pump and Engine Generator) with Accessories	1
2	Rehabilitation of Existing Pump House	1
3	Rehabilitation of Existing Ground Water Tank (25m^3)	1
4	Pumping Main (3")	2,133m
5	Distribution Main (3/4" to 3")	1,617m
6	Public Fountain	2

2. Project Implementation Structure



3. Actual Work Schedule

		April	May						June						July
		30	5	10	15	20	25	31	5	10	15	20	25	30	4
A-02 / Jabal Al Taraf															
1	Mobilization & Demobilization														
2	Installation of Pumping Unit for Well														
3	Installation of Pumping Unit for Booster														
S-03 / Al Kharaba															
1	Mobilization & Demobilization														
2	Installtion of Pumping Unit														
3	Construction of Pump House														
4	Construction of Water Tank ($50m^3$)														
5	Installtion of Pumping Main														
6	Installtion of Distribution Main														
7	Construction of Public Fountain														
D-08 / Masneat Abdul Aziz															
1	Mobilization & Demobilization														
2	Installtion of Pumping Unit														
3	Rehabilitation of Existing Pump House														
4	Rehabilitation of Existing Water Tank ($25m^3$)														
5	Installtion of Pumping Main														
6	Installtion of Distribution Main														
7	Construction of Public Fountain														
Test Operation and Inspection															

4. Principal Activity and Work Record

Site: A-02 / Jabal Al Taraf

			Principal Activity and Work	Remarks
APRIL, 2007	25	Wed	Tender	
	26	Thu	Contract	
	27	Fri		
	28	Sat		
	29	Sun	Commencement of Works	
	30	Mon	Site Transfer	
MAY, 2007	1	Tue		Labor Day
	2	Wed		
	3	Thu		
	4	Fri		
	5	Sat		
	6	Sun		
	7	Mon		
	8	Tue		
	9	Wed		
	10	Thu		
	11	Fri		
	12	Sat		Regular Meeting
	13	Sun		
	14	Mon		
	15	Tue		
	16	Wed		
	17	Thu		
	18	Fri		
	19	Sat		
	20	Sun		
	21	Mon		
	22	Tue		Re-Unification Day
	23	Wed		Regular Meeting
	24	Thu		
	25	Fri		
	26	Sat		
	27	Sun		
	28	Mon		
	29	Tue	Approval of pumping unit	
	30	Wed		Regular Meeting
	31	Thu		
JUNE, 2007	1	Fri		
	2	Sat		
	3	Sun		
	4	Mon		
	5	Tue		
	6	Wed		Regular Meeting
	7	Thu		
	8	Fri		
	9	Sat		
	10	Sun		
	11	Mon		
	12	Tue		
	13	Wed		
	14	Thu		
	15	Fri		
	16	Sat		Regular Meeting
	17	Sun		
	18	Mon	Inspection of pumping unit before the delivery	
	19	Tue	Installtion of pumping unit	

	20	Wed	Installtion of pumping unit	
	21	Thu		
	22	Fri		
	23	Sat	Warm up of diesel engines	Regular Meeting
	24	Sun	Warm up of diesel engines	
	25	Mon	Warm up of diesel engines	
	26	Tue	Warm up of diesel engines	
	27	Wed	Test operation. Bearing's defect inside gear box	
	28	Thu		
	29	Fri		
	30	Sat	Inspection of bearing inside gear box at workshop	Regular Meeting
JULY, 2007	1	Sun	Re-installation of gear box. Test operation	
	2	Mon	Test operation	
	3	Tue	Inspection	
	4	Wed		

Site: S-03 / Al Kharaba

			Principal Activity and Work	Remarks
APRIL, 2007	25	Wed	Tender	
	26	Thu	Contract	
	27	Fri		
	28	Sat		
	29	Sun	Commencement of Works	
	30	Mon		
MAY, 2007	1	Tue		Labor Day
	2	Wed	Site Transfer	
	3	Thu		
	4	Fri		
	5	Sat	Site camp was built.	
	6	Sun		
	7	Mon		
	8	Tue	Construction of access road to tank site by local council.	
	9	Wed	Concrete work for footings of pump house.	
	10	Thu	Concrete work for underground beams of pump house	
	11	Fri		
	12	Sat	Concrete work for columns of pump house. Broken stone for tank basement	Regular Meeting
	13	Sun		
	14	Mon	Installation of pumping main was finished.	
	15	Tue		
	16	Wed	Masonry work by concrete bloclk wall of pump house	
	17	Thu		
	18	Fri		
	19	Sat	Concrete work for basement of tank	
	20	Sun	Concrete work for roof of pump house	
	21	Mon		
	22	Tue		Re-Unification Day
	23	Wed		Regular Meeting
	24	Thu	Concrete work for wall and roof of tank	
	25	Fri		
	26	Sat	Installation of distribution pipe was finished.	
	27	Sun		
	28	Mon		
	29	Tue	Approval of pumping unit	
	30	Wed	Installation of door and windows of pump house	Regular Meeting
	31	Thu		
JUNE, 2007	1	Fri		
	2	Sat		
	3	Sun		
	4	Mon	Revision of pump due to the unavailability	
	5	Tue		
	6	Wed		Regular Meeting
	7	Thu	Plastering work for pump house	
	8	Fri		
	9	Sat	Plastering work for tank. Construction of public fountain was finished.	
	10	Sun	Installation of pumping unit	
	11	Mon	Warm up of engine generator	
	12	Tue	Warm up of engine generator	
	13	Wed	Test operation and flow examination	
	14	Thu		
	15	Fri		
	16	Sat		Regular Meeting
	17	Sun	Painting work for pump house and tank	
	18	Mon	Test operation and flow examination	
	19	Tue		

	20	Wed		
	21	Thu		
	22	Fri		
	23	Sat		Regular Meeting
	24	Sun		
	25	Mon		
	26	Tue	Painting of national flags	
	27	Wed		
	28	Thu		
	29	Fri		
	30	Sat		Regular Meeting
JULY, 2007	1	Sun		
	2	Mon	Inspection	
	3	Tue		
	4	Wed		

Site: D-08 / Masneat Abdul Aziz

			Principal Activity and Work	Remarks
APRIL, 2007	25	Wed	Tender	
	26	Thu	Contract	
	27	Fri		
	28	Sat		
	29	Sun	Commencement of Works	
	30	Mon		
MAY, 2007	1	Tue		Labor Day
	2	Wed		
	3	Thu	Site Transfer	
	4	Fri		
	5	Sat		
	6	Sun		
	7	Mon		
	8	Tue		
	9	Wed		
	10	Thu	Site camp was built.	
	11	Fri		
	12	Sat		Regular Meeting
	13	Sun		
	14	Mon		
	15	Tue		
	16	Wed		
	17	Thu		
	18	Fri		
	19	Sat		
	20	Sun		
	21	Mon		
	22	Tue		Re-Unification Day
	23	Wed		Regular Meeting
	24	Thu	Installation of pumping main was finished.	
	25	Fri		
	26	Sat		
	27	Sun		
	28	Mon	Installation of distribution pipe was finished.	
	29	Tue	Approval of pumping unit	
	30	Wed		Regular Meeting
	31	Thu		
JUNE, 2007	1	Fri		
	2	Sat		
	3	Sun	Construction of public fountain was finished.	
	4	Mon	Revision of pump due to the unavailability	
	5	Tue	Installation of pumping unit	
	6	Wed	Warm up of engine generator	Regular Meeting
	7	Thu	Warm up of engine generator	
	8	Fri		
	9	Sat	Test operation and flow examination	
	10	Sun		
	11	Mon		
	12	Tue	Test operation and flow examination	
	13	Wed		
	14	Thu		
	15	Fri		
	16	Sat	Rehabilitation work for pump house was finished.	Regular Meeting
	17	Sun		
	18	Mon		
	19	Tue		

	20	Wed		
	21	Thu	Rehabilitation work for tank was finished.	
	22	Fri		
	23	Sat		Regular Meeting
	24	Sun	Inspection	
	25	Mon		
	26	Tue		
	27	Wed		
	28	Thu		
	29	Fri		
	30	Sat		Regular Meeting
JULY, 2007	1	Sun		
	2	Mon		
	3	Tue		
	4	Wed		

5. List of Equipment and Main Materials

Site: A-02 / Jabal Al Taraf

	Equipment and Materials	Product or Specification	Remarks
Pumping Unit for Well			
1	Vertical Shaft Pump for Well	Caprari/P6C/3/14/20A, Italy (6 impellers removed from P6C/3/20/20A)	See the attached
2	Drive Unit	Caprari/R26/3L/20, R/1:1.8, Italy	See the attached
3	Column Pipe	Carbon Steel/D3"/Flange/3mL	
4	Diesel Engine	MVM/D229-6, Brazil	See the attached
5	Cardan Shaft	CSN/Top-Quality, Germany	
6	Gate Valve beside pump	Al Hababi, GVP/BS5163/PN16/DN3", Italy	
7	Check Valve beside pump	Al Hababi, GVP/BS5153/PN16/DN3", Italy	
8	Water Meter beside pump	Kent/PN16/DN80mm(3inch)	
9	Presssure Gauge beside pump	Wika/40bar/EN837-1, Germany	
10	Flange for pipe	BS4504/PN16/DN3", Japan	
11	Galvanized Steel Pipe	D3", Zenith/BS-M, India	See the attached
Pumping Unit for Booster			
12	Horizontal Pump for Booster	Panelli/PMO40-65/8, Italy (4 impellers removed from PMO40-65/12)	See the attached
13	Diesel Engine	MVM/D229-6, Brazil	See the attached
14	Gear Box	Techno Drive/BD290/150, Twin Disc/RM120, R/0.67S, Italy	See the attached
15	Cardan Shaft	CSN/Top-Quality, Germany	
16	Gate Valve beside pump	Al Hababi, GVP/BS5163/PN16/DN3", Italy	
17	Check Valve beside pump	Al Hababi, GVP/BS5153/PN16/DN3", Italy	
18	Water Meter beside pump	B-Meters/PN16/DN80, Italy	
19	Presssure Gauge beside pump	Wika/40bar/EN837-1, Germany	
20	Flange for pipe	BS4504/PN16/DN3", Japan	
21	Galvanized Steel Pipe	D3", Zenith/BS-M, India	See the attached

Site: S-03 / Al Kharaba

	Equipment and Materials	Product or Specification	Remarks
1	Submersible Motor Pump	Panelli/140PX13-24, Italy	See the attached
2	Motor for pump	Franklin Electric	See the attached
3	Column Pipe	Galvanized Steel/D3"/Flange/6mL	
4	Control Panel	Panelli/Direct, Italy	
5	Engine Generator	Bruno/G51P, Alternator:Leroy-Somer, Engine:Perkins	See the attached
6	Gate Valve beside pump	Al Hababi, GVP/BS5163/PN16/DN3", Italy	
7	Check Valve beside pump	Al Hababi, GVP/BS5153/PN16/DN3", Italy	
8	Water Meter beside pump	Kent/PN16/DN80	
9	Presssure Gauge beside pump	Empco/40bar	
10	Flange for pipe	BS4504/PN16/DN3", Japan	
11	Galvanized Steel Pipe for Pumping Main	Zenith/BS-M/D3", India	See the attached
12	Galvanized Steel Pipe for Distribution Main	Zenith/BS-M/D3/4 to 3", India	See the attached
13	Gate Valve along Distribution Main	UK Product	
14	Cement	Portland Cement/BS12, Amran	
15	Sand	Nehm, Sana'a	
16	Gravel	Bany Hushes, Sana'a	
17	Reinforcing Steel Bar	Turkish Product	
18	Water for Concrete and Mortar	from Private Well	
19	Concrete Mixing Ratio	C1:S2:G3	
20	Water Meter for Publlic Fountain	ABB/D1"	
21	Gate Valve for Public Fountain	UK Product	
22	Tap for Public Fountain	D3/4", Italy	

Site: D-08 / Masneat Abdul Aziz

	Equipment and Materials	Product or Specification	Remarks
1	Submersible Motor Pump	Panelli/140PX13-24, Italy	See the attached
2	Motor for pump	Franklin Electric	See the attached
3	Column Pipe	Galvanized Steel/D3"/Flange/6mL	
4	Control Panel	Panelli/Direct, Italy	
5	Engine Generator	Bruno/G51P, Alternator:Leroy-Somer, Engine:Perkins	See the attached
6	Gate Valve beside pump	Al Hababi, GVP/BS5163/PN16/DN3", Italy	
7	Check Valve beside pump	Al Hababi, GVP/BS5153/PN16/DN3", Italy	
8	Water Meter beside pump	B-Meters/PN16/DN80, Italy	
9	Presssure Gauge beside pump	Empco/40bar	
10	Flange for pipe	BS4504/PN16/DN3", Japan	
11	Galvanized Steel Pipe for Pumping Main	Zenith/BS-M/D3", India	See the attached
12	Galvanized Steel Pipe for Distribution Main	Zenith/BS-M/D3/4 to 3", India	See the attached
13	Gate Valve along Distribution Main	UK Product	
14	Cement	Portland Cement/BS12, Amran	
15	Sand	Nehm, Sana'a	
16	Gravel	Bany Hushes, Sana'a	
17	Reinforcing Steel Bar	Turkish Product	
18	Water for Concrete and Mortar	from Private Well	
19	Concrete Mixing Ratio	C1:S2:G3	
20	Water Meter for Publlic Fountain	ABB/D1"	
21	Gate Valve for Public Fountain	UK Product	
22	Tap for Public Fountain	D3/4", Italy	

6. Photographs of Constructed Facilities (A-02 / Jabal Al Taraf)

Vertical Shaft Pump for Well before Replacement

Diesel Engine for Well before Replacement

Horizontal Pump for Booster before Replacement

Diesel Engine for Booster before Replacement

Foundation after Removal of Diesel Engine for Well

Foundation after Removal of Pumping Unit for Booster

New Vertical Shaft Pump for Well

Installation of New Vertical Shaft Pump for Well

 Installation of New Column Pipe for Well	 Installation of New Drive Unit for Well
 Installed Vertical Shaft Pump and Accessories for Well	 Installed Diesel Engine for Well
 Installed Horizontal Pump and Accessories for Booster	 Installed Diesel Engine for Booster
 Water Flowing in Existing Ground Water Tank	

6. Photographs of Constructed Facilities (S-03 / Al Kharaba)

Site Camp

Galvanized Steel Pipe in Stock Yard

Rebar Bending at Stock Yard

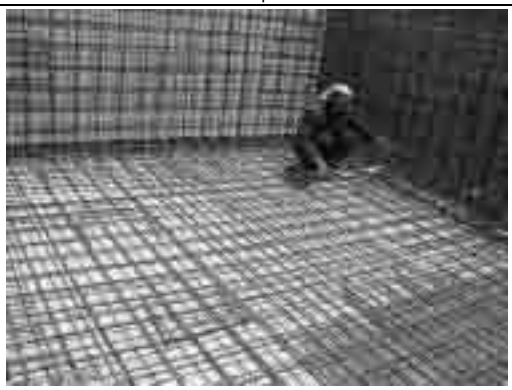
Cement for Concrete

Sand for Concrete

Gravel for Concrete

Reinforced Concrete Work for Underground Beam of Pump House

Reinforced Concrete Work for Column of Pump House

 Masonry Work by Concrete Block for Wall of Pump House	 Reinforced Concrete Work for Beam and Roof of Pump House
 Reinforcing Rebar for Beam and Roof of Pump House	 Door and Windows for Pump House
 Plastering Work for Pump House	 Constructed Pump House and Pit
 Crushed Stone for Foundation of Ground Water Tank (50m^3)	 Reinforcement Placing for Floor of Ground Water Tank (50m^3)

Concrete Casting for Floor of Ground Water Tank (50m³)

Formwork for Wall of Ground Water Tank (50m³)

Concrete Casting for Wall and Roof of Ground Water Tank (50m³)

Concrete Compacting for Wall of Ground Water Tank (50m³)

Ground Water Tank (50m³) after Concrete Work

Ground Water Tank (50m³) after Plastering Work

Constructed Ground Water Tank (50m³)

Water Flowing in Constructed Ground Water Tank (50m³)

 Installation of Pumping Main (3")	 Installed Pumping Main (3")
 Installation of Distribution Main (1.5")	 Valve Chamber along Distribution Main
 Constructed Public Fountain	 Constructed Public Fountain
 Constructed Public Fountain	 Constructed Public Fountain

 Submersible Motor Pump	 Installation of Submersible Motor Pump
 Installation of Electric Wire and Water Level Probe	 Installation of Column Pipe
 Inside Pump Pit (after Installation of Pump and Pipe)	 Accessories (Pressure Gauge, Water Meter, Check and Gate Valves)
 Diesel Engine Generator (45kVA)	 Control Panel for Pump

6. Photographs of Constructed Facilities (D-08 / Masneat Abdul Aziz)

Existing Pump House constructed by Community

Well inside Existing Pump House

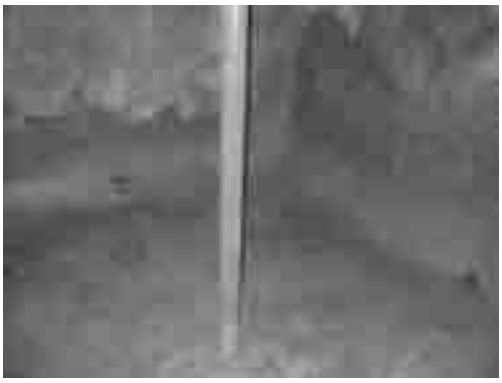
Existing Pump House under Rehabilitation

Rehabilitated Existing Pump House

Existing Ground Water Tank (25m^3) constructed by GARWSP

Rooftop of Existing Ground Water Tank (25m^3)

Water Leakage of Existing Ground Water Tank (25m^3)



Rehabilitated Inside of Existing Ground Water Tank (25m^3)

Rehabilitated Existing Ground Water Tank (25m³)

Rehabilitated Rooftop of Existing Ground Water Tank (25m³)

Pipeline in Stock Yard

Installed Pumping and Distribution Main to/from Water Tank

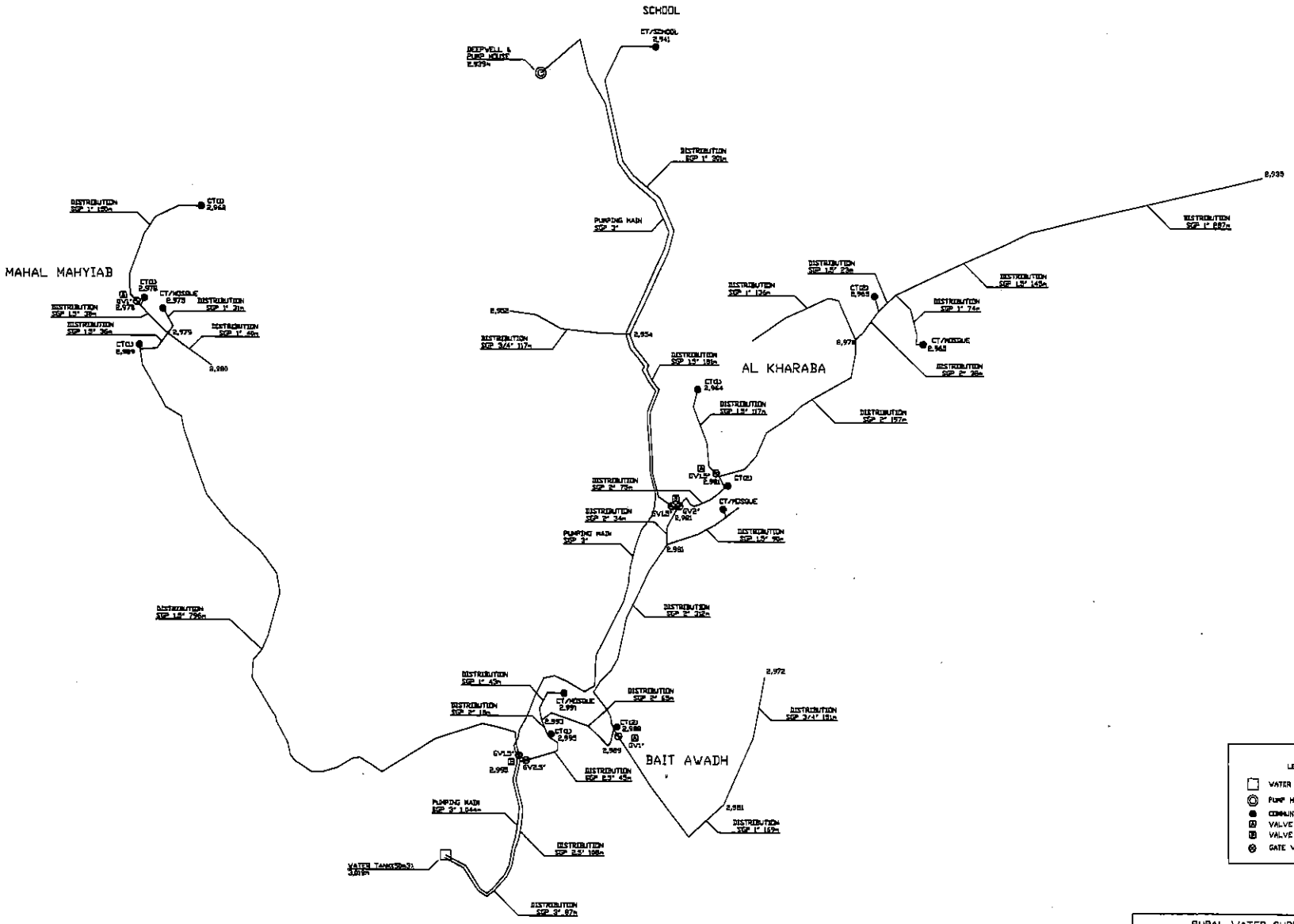
Installed Pumping and Distribution Main

Installed Distribution Main

Fountain at Mosque

Gate Valve and Water Meter beside Fountain at Mosque

 Submersible Motor Pump	 Installation of Submersible Motor Pump
 Installation of Column Pipe	 Installation of Electric Wire and Water Level Probe
 Column Pipe to be installed	 Diesel Engine Generator (45kVA)
 Accessories (Pressure Gauge, Water Meter, Check and Gate Valves)	 Control Panel for Pump

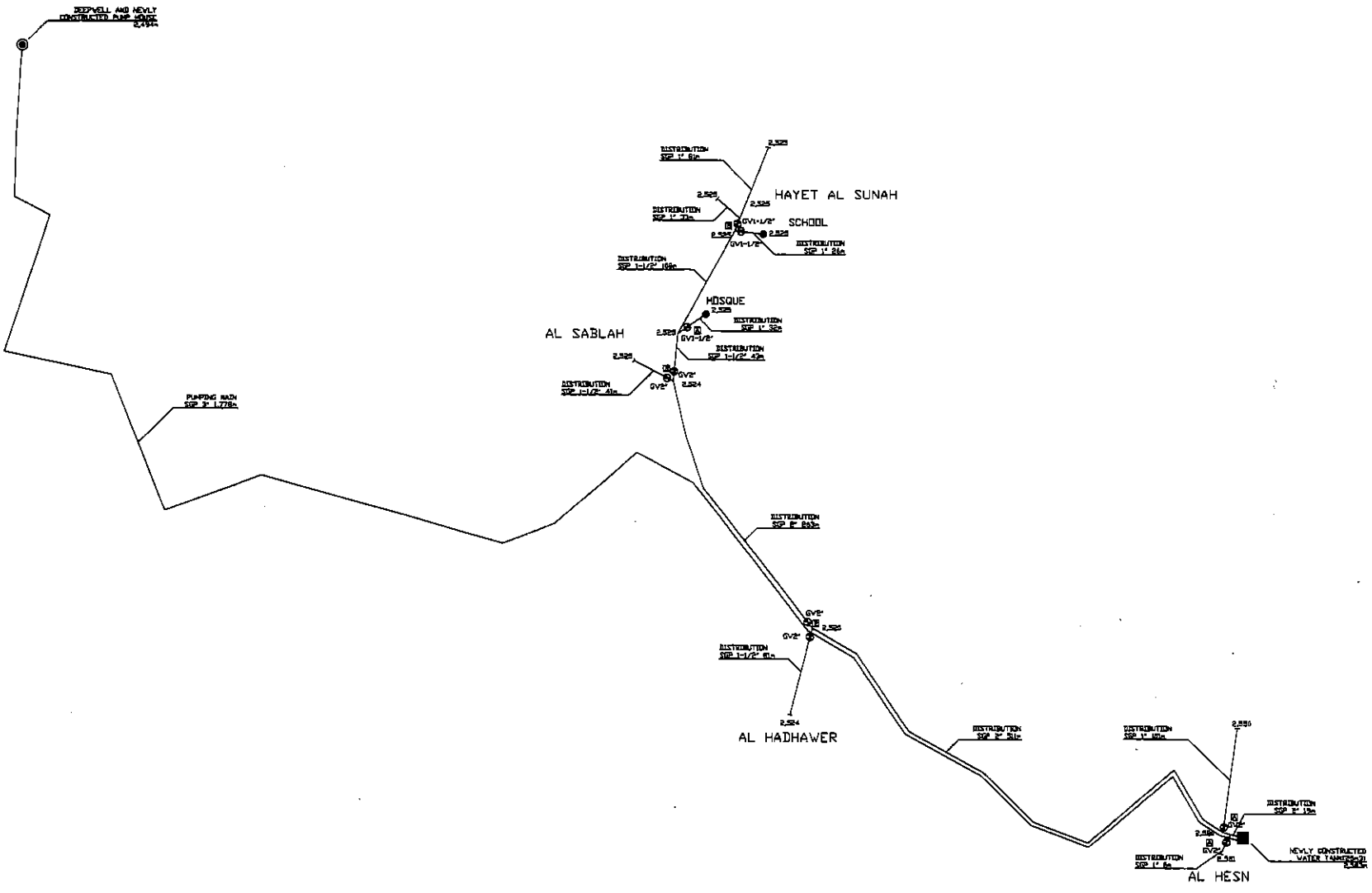


RURAL WATER SUPPLY COMPONENT OF
THE STUDY FOR WATER RESOURCES MANAGEMENT
AND RURAL WATER SUPPLY IMPROVEMENT
IN REPUBLIC OF YEMEN

CONSTRUCTED FACILITIES LAYOUT : S-03, AL KHARABA

DRAWING NO : ANNEX1-1 | DATE - JULY 2007

AHMED ALI MAHDI OFFICE FOR TRADING AND CONTRACTING
DRAWN WITH SUPPORT FROM JAPAN TECHNO CO., LTD



RURAL WATER SUPPLY COMPONENT OF
THE STUDY FOR WATER RESOURCES MANAGEMENT
AND RURAL WATER SUPPLY IMPROVEMENT
IN REPUBLIC OF YEMEN

CONSTRUCTED FACILITIES LAYOUT :
D-08, MASNEAT ABDUL AZIZ

DRAWING NO : ANNEX1-2	DATE - JULY 2007

AHMED ALI MAHDI OFFICE FOR TRADING AND CONTRACTING
DRAWN WITH SUPPORT FROM JAPAN TECHNO CO., LTD

MINUTES OF 1st REGULAR MEETING

Date: am9:00- 12/5/2007

1. ATTENDANCE AND PLACE

Name	Position
Fawzi Al-Khirbash	Director of International Cooperation Department, GARWSP
Akinori Miyoshi	Client, Representative, Japan Techno Co., Ltd.
Ahmed Ali Mahdi	Contractor, Director

Place : JICA Study Team office in GARWSP

2. PROGRESS AND PLAN

Site: A-02 / Jabal Al-Taraf

Work Item	Progress 5 - 11 May	Plan 12 - 18 May
Mobilization and Demobilization	Site transfer was conducted.	-
Pumping Unit and Accessories	-	Final specification to be confirmed
Booster Unit and Accessories	-	Final specification to be confirmed

Site name: S-03 / Al-Kharaba

Work Item	Progress 5 - 11 May	Plan 12 - 18 May
Mobilization and Demobilization	Site transfer was conducted. Site camp was located at school. 2 Supervisors and labors were allocated, 10 for construction, 5 for piping work and 2 drivers Access road was constructed by the community	-
Pumping Unit and Accessories	-	Final specification to be confirmed
Construction of Pump House	Some materials (cement, gravel, sand, steel bars and etc) were delivered. Reinforced concrete foundation completed.	Delivery of some materials (concrete blocks and etc) Reinforced concrete work for column and roofing, concrete block masonry for wall, and so on.
Construction of Ground Water Tank	Excavation of foundation and gravel paving.	Leveling concrete, Reinforced concrete work for foundation
Piping Work for Pumping Main	All pipes were delivered. More than 300mL has been installed.	Completion of installation of pipes

Piping Work for Distribution Main	All pipes were delivered.	Starting installation of pipes
Construction of Public Tapstand	-	-

Site: D-08 / Maesneat Abdul Aziz

Work Item	Progress 5 - 11 May	Plan 12 - 18 May
Mobilization and Demobilization	Site Transfer was conducted.	-
Pumping Unit and Accessories	-	Final specification to be confirmed
Construction of Pump House (Maintenance only)	-	-
Construction of Ground Water Tank (Maintenance only)	-	-
Piping Work for Pumping Main	-	Delivery of pipes.
Piping Work for Distribution Main	-	Delivery of pipes.
Construction of Public Tapstand	-	-

3. TOPICS

- Pump specification will be confirmed by the Client and be informed to the Contractor.
-

MINUTES OF 2nd REGULAR MEETING

Date: am9:00- 23/5/2007

1. ATTENDANCE AND PLACE

Name	Position
Fawzi Al-Khirbash	Director of International Cooperation Department, GARWSP
Akinori Miyoshi	Client, Representative, Japan Techno Co., Ltd.
Ahmed Ali Mahdi	Contractor, Director

Place : JICA Study Team office in GARWSP

2. PROGRESS AND PLAN

Site: A-02 / Jabal Al-Taraf

Work Item	Progress 12 - 22 May	Plan 23 – 30 May
Mobilization and Demobilization	-	-
Pumping Unit and Accessories	Final specification was confirmed and instructed by the Client. Catalog with specification was submitted to the Client.	Specification submitted will be checked and approved by the Client, and the unit will be procured.
Booster Unit and Accessories	Final specification was confirmed and instructed by the Client. Catalog with specification was submitted to the Client.	Specification submitted will be checked and approved by the Client, and the unit will be procured.

Site name: S-03 / Al-Kharaba

Work Item	Progress 12 - 22 May	Plan 23 – 30 May
Mobilization and Demobilization	-	-
Pumping Unit and Accessories	Final specification was confirmed and instructed by the Client. Catalog with specification was submitted to the Client.	Specification submitted will be checked and approved by the Client, and the unit will be procured.
Construction of Pump House	Reinforced concrete work for columns, beams and roof was finished. Concrete block masonry for wall was finished.	Reinforced concrete work for floor will be conducted. Door and windows will be installed.
Construction of Ground Water Tank	Leveling concrete work was finished. Reinforced concrete work for floor was finished.	Reinforced concrete work for wall and roof will be conducted.

	Steel rebar work for wall is in progress.	
Piping Work for Pumping Main	Installation of pipes was completed.	-
Piping Work for Distribution Main	Installation of D2.5" and D2" pipes was completed. Installation of D1.5" pipes is in progress.	D1.5", D1" and D3/4" pipes will be installed.
Construction of Public Tapstand	-	-

Site: D-08 / Maesneat Abdul Aziz

Work Item	Progress 12 - 22 May	Plan 23 - 30 May
Mobilization and Demobilization	Site camp was located. 2 Supervisor and labors were allocated, 10 for construction, 5 for piping work and 3 drivers.	-
Pumping Unit and Accessories	Final specification was confirmed and instructed by the Client. Catalog with specification was submitted to the Client.	Specification submitted will be checked and approved by the Client, and the unit will be procured.
Construction of Pump House (Maintenance only)	Maintenance work is in progress.	Maintenance work will be continued.
Construction of Ground Water Tank (Maintenance only)	-	Maintenance work will be started.
Piping Work for Pumping Main	Installation of pipes is in progress.	Installation of pipes will be completed.
Piping Work for Distribution Main	-	Installation of pipes will be started.
Construction of Public Tapstand	-	-

3. TOPICS

- Level indicator for water tank is not necessary.
- Outside ladder for water tank can be removal type if village wish.

MINUTES OF 3rd REGULAR MEETING

Date: am9:00- 30/5/2007

1. ATTENDANCE AND PLACE

Name	Position
Fawzi Al-Khirbash	Director of International Cooperation Department, GARWSP
Akinori Miyoshi	Client, Representative, Japan Techno Co., Ltd.
Ahmed Ali Mahdi	Contractor, Director

Place : JICA Study Team office in GARWSP

2. PROGRESS AND PLAN

Site: A-02 / Jabal Al-Taraf

Work Item	Progress 23 - 29 May	Plan 30 May - 7 June
Mobilization and Demobilization	-	-
Pumping Unit and Accessories	Specification submitted was approved by the Client.	The unit will be procured by the Contractor.
Booster Unit and Accessories	Specification submitted was approved by the Client..	The unit will be procured by the Contractor.

Site name: S-03 / Al-Kharaba

Work Item	Progress 23 - 29 May	Plan 30 May - 7 June
Mobilization and Demobilization	-	-
Pumping Unit and Accessories	Specification submitted was approved by the Client.	The unit will be procured and installed by the Contractor.
Construction of Pump House	Reinforced concrete work for floor was finished.	Door and windows will be installed.
Construction of Ground Water Tank	Reinforced concrete work for wall and roof was finished.	Curing
Piping Work for Pumping Main	Concrete pipe supports are under construction.	Concrete pipe supports will be constructed.
Piping Work for Distribution Main	D1.5” and D1” pipes were installed.	D3/4” pipes will be installed. Concrete pipe supports and valve chambers will be constructed.
Construction of Public Tapstand	-	Concrete public tapstands will be constructed.

Site: D-08 / Maesneat Abdul Aziz

Work Item	Progress 23 - 29 May	Plan 30 May - 7 June
Mobilization and Demobilization	-	-
Pumping Unit and Accessories	Specification submitted was approved by the Client.	The unit will be procured and installed by the Contractor.
Construction of Pump House (Maintenance only)	Maintenance work is in progress.	Maintenance work will be continued.
Construction of Ground Water Tank (Maintenance only)	-	Maintenance work will be started.
Piping Work for Pumping Main	Installation of pipes was finished. Concrete pipe supports are under construction.	Concrete pipe supports will be constructed.
Piping Work for Distribution Main	Installation of all pipes was finished.	Concrete pipe supports and valve chambers will be constructed.
Construction of Public Tapstand	-	Concrete public tapstands will be constructed.

3. TOPICS

MINUTES OF 4th REGULAR MEETING

Date: am10:00- 6/6/2007

1. ATTENDANCE AND PLACE

Name	Position
Fawzi Al-Khirbash	Director of International Cooperation Department, GARWSP
Akinori Miyoshi	Client, Representative, Japan Techno Co., Ltd.
Ahmed Ali Mahdi	Contractor, Director

Place : JICA Study Team office in GARWSP

2. PROGRESS AND PLAN

Site: A-02 / Jabal Al-Taraf

Work Item	Progress 30 May - 5 June	Plan 6 - 13 June
Mobilization and Demobilization	-	-
Pumping Unit and Accessories	-	The unit will be procured by the Contractor.
Booster Unit and Accessories	-	The unit will be procured by the Contractor.

Site name: S-03 / Al-Kharaba

Work Item	Progress 30 May - 5 June	Plan 6 - 13 June
Mobilization and Demobilization	-	-
Pumping Unit and Accessories	-	The unit will be procured and installed by the Contractor.
Construction of Pump House	Door and windows were installed.	Plastering for wall will be done. Concrete foundation for well will be constructed.
Construction of Ground Water Tank	Curing finished and wooden frames were removed.	-
Piping Work for Pumping Main	Concrete pipe supports were constructed.	-
Piping Work for Distribution Main	All pipes were installed. Concrete pipe supports and valve chambers are under construction.	All concrete pipe supports and valve chambers will be constructed.
Construction of Public Tapstand	Public tapstands are under constructed.	All public tapstands will be constructed.

Site: D-08 / Maesneat Abdul Aziz

Work Item	Progress 30 May - 5 June	Plan 6 - 13 June
Mobilization and Demobilization	-	-
Pumping Unit and Accessories	The unit was procured and installed by the Contractor.	Pipe fixing and adjustment will be done.
Construction of Pump House (Maintenance only)	Maintenance work is in progress. Plastering and floor concrete casting were finished.	Maintenance work (painting, etc) will be continued.
Construction of Ground Water Tank (Maintenance only)	-	Maintenance work will be started.
Piping Work for Pumping Main	Concrete pipe supports were constructed.	-
Piping Work for Distribution Main	Concrete pipe supports were constructed and valve chambers are under construction.	Valve chambers will be constructed.
Construction of Public Tapstand	-	Concrete public tapstands will be constructed.

3. TOPICS

MINUTES OF 5th REGULAR MEETING

Date: am10:00- 16/6/2007

1. ATTENDANCE AND PLACE

Name	Position
Fawzi Al-Khirbash	Director of International Cooperation Department, GARWSP
Akinori Miyoshi	Client, Representative, Japan Techno Co., Ltd.
Ahmed Ali Mahdi	Contractor, Director

Place : JICA Study Team office in GARWSP

2. PROGRESS AND PLAN

Site: A-02 / Jabal Al-Taraf

Work Item	Progress 6 - 15 June	Plan 16 – 22 June
Mobilization and Demobilization	-	-
Pumping Unit and Accessories	-	The unit will be procured and installed. Pipes and valves will be fixed.
Booster Unit and Accessories	-	The unit will be procured and installed. Pipes and valves will be fixed.

Site name: S-03 / Al-Kharaba

Work Item	Progress 6 - 15 June	Plan 16 - 22 June
Mobilization and Demobilization	-	-
Pumping Unit and Accessories	The unit was procured and installed. Pipes and valves were fixed.	Pump operation will be adjusted.
Construction of Pump House	Plastering for wall was done. Concrete foundation for well was constructed.	Painting of wall will be done.
Construction of Ground Water Tank	Plastering for wall and installation of pipes and valves were done.	Painting of wall will be done.
Piping Work for Pumping Main	Water leakage was not found during pump operation.	-
Piping Work for Distribution Main	Valve chambers were constructed. Water leakage was not found during pump operation.	Some chambers will be repaired.
Construction of Public Tapstand	Public tapstands were constructed.	Some tapstands will be repaired.

Site: D-08 / Maesneat Abdul Aziz

Work Item	Progress 6 - 15 June	Plan 16 - 22 June
Mobilization and Demobilization	-	-
Pumping Unit and Accessories	Pipes and valves were fixed.	Pump operation will be adjusted.
Construction of Pump House (Maintenance only)	Maintenance works were completed.	-
Construction of Ground Water Tank (Maintenance only)	Maintenance work is under progress.	Maintenance work will be finished.
Piping Work for Pumping Main	Water leakage was not found during pump operation.	-
Piping Work for Distribution Main	Valve chambers were constructed. Water leakage was not found during pump operation.	-
Construction of Public Tapstand	Concrete public tapstands were constructed.	-

3. TOPICS

- Prior to pump unit installation in A-02, Jabal Al Taraf, an existing well pump shall be removed under responsibility of local council or GARWSP.
- Water leakage was found at existing ground water tank constructed by GARWSP.

MINUTES OF 6th REGULAR MEETING

Date: am10:00- 23/6/2007

1. ATTENDANCE AND PLACE

Name	Position
Fawzi Al-Khirbash	Director of International Cooperation Department, GARWSP
Akinori Miyoshi	Client, Representative, Japan Techno Co., Ltd.
Ahmed Ali Mahdi	Contractor, Director

Place : JICA Study Team office in GARWSP

2. PROGRESS AND PLAN

Site: A-02 / Jabal Al-Taraf

Work Item	Progress 16 - 22 June	Plan 23 – 29 June
Mobilization and Demobilization	-	-
Pumping Unit and Accessories	The unit was procured and installed. Pipes and valves were fixed.	Concrete for foundation and basement will be cured. Test operation
Booster Unit and Accessories	The unit was procured and installed. Pipes and valves were fixed.	Concrete for foundation and basement will be cured. Test operation

Site name: S-03 / Al-Kharaba

Work Item	Progress 16 - 22 June	Plan 23 – 29 June
Mobilization and Demobilization	-	-
Pumping Unit and Accessories	-	Test operation
Construction of Pump House	Painting of wall was done.	-
Construction of Ground Water Tank	Painting of wall was done.	Painting of national flags will be done.
Piping Work for Pumping Main	-	-
Piping Work for Distribution Main	Some chambers and leakage were repaired.	Some chambers and leakage will be repaired.
Construction of Public Tapstand	Some tapstands were repaired.	Some tapstands will be repaired.

Site: D-08 / Maesneat Abdul Aziz

Work Item	Progress 16 - 22 June	Plan 23 - 29 June
Mobilization and Demobilization	-	-
Pumping Unit and Accessories	-	Test operation
Construction of Pump House (Maintenance only)	-	-
Construction of Ground Water Tank (Maintenance only)	Maintenance work was finished.	-
Piping Work for Pumping Main	-	-
Piping Work for Distribution Main	-	-
Construction of Public Tapstand	-	-

3. TOPICS

- Final inspection for all 3 sites is scheduled from 30/June (Sat) to 3/July (Tue).

MINUTES OF 7th REGULAR MEETING

Date: am12:00- 30/6/2007

1. ATTENDANCE AND PLACE

Name	Position
Fawzi Al-Khirbash	Director of International Cooperation Department, GARWSP
Akinori Miyoshi	Client, Representative, Japan Techno Co., Ltd.
Ahmed Ali Mahdi	Contractor, Director

Place : JICA Study Team office in GARWSP

2. PROGRESS AND PLAN

Site: A-02 / Jabal Al-Taraf

Work Item	Progress 23 - 29 June	Plan 30 June - 4 July
Mobilization and Demobilization	-	-
Pumping Unit and Accessories	Concrete for foundation and basement was cure. Test Operation	-
Booster Unit and Accessories	Concrete for foundation and basement was cure. Test Operation but defect was found with bearing of gear box.	Bearing will be replaced by new and genuine one. Test Operation with training to village operator.

Site name: S-03 / Al-Kharaba

Work Item	Progress 23 - 29 June	Plan 30 June - 4 July
Mobilization and Demobilization	-	-
Pumping Unit and Accessories	Test operation	Test Operation with training to village operator.
Construction of Pump House	-	-
Construction of Ground Water Tank	National flags were painted.	-
Piping Work for Pumping Main	-	-
Piping Work for Distribution Main	Some chambers and leakage were repaired.	Some chambers and leakage will be repaired.
Construction of Public Tapstand	Some tapstands were repaired.	Some tapstands will be repaired.

Site: D-08 / Maesneat Abdul Aziz

Work Item	Progress 23 - 29 June	Plan 30 - 4 July
Mobilization and Demobilization	-	-
Pumping Unit and Accessories	-	Test Operation with training to village operator.
Construction of Pump House (Maintenance only)	-	-
Construction of Ground Water Tank (Maintenance only)	-	Paint of wall again. Replacement of ladder
Piping Work for Pumping Main	-	-
Piping Work for Distribution Main	-	-
Construction of Public Tapstand	-	-

3. TOPICS

- Guarantee period for the gear box of booster unit in A-02 will be 2 or 3 years because of parts replacement, suggested by pump supplier.
- Final inspection for all 3 sites is scheduled from 3rd to 5th of July.

JAPAN TECHNO CO., LTD.
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E-mail : jat-tyo@jat.co.jp

15th May, 2007

INSTRUCTION

We inform you of the revised design specification of pump and booster units as below. The extra cost due to this design modification shall be paid by the Contractor.

Code	Site Name	Unit	Pumping Rate (lit/sec)	Total Head (m)	Column Pipe (m)	Standby Pipe (m)
A-02	Jabal Al Taraf	Pumping Unit	4.4	166	44	12
		Booster Unit	4.4	208	-	-
S-03	Al Kharaba	Pumping Unit	2.3	198	79	12
D-08	Maesneat Abdul Aziz	Pumping Unit	2.0	210	100	12

* Column pipe length is equal to pump suction (installation) depth from ground level.

It'd be appreciated if you comply with this specification. Thank you very much for your cooperation.

Akinori Miyoshi
Member of JICA Study Team
Japan Techno Co., Ltd.

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E-mail : jat-tyo@jat.co.jp

4th June, 2007

INSTRUCTION

In accordance with a request by the Contractor and pump supplier, we inform you of the revised design specification of pump as below. The extra cost due to this design modification shall be paid by the Contractor or pump supplier.

Due to the availability of pump and also the difficulty to remove impellers and assure the quality by supplier, the Contractor and supplier requested to select an available pump "Panelli/140PX13/24" without removal of impellers for both sites S-03 and D-08. So we verified the appropriateness of using this pump with hydraulic calculation, and confirmed that this pump can be used with some modifications of design specification.

Previous Design Specification

Code	Site Name	Unit	Pumping Rate (lit/sec)	Total Head (m)	Column Pipe (m)	Standby Pipe (m)
A-02	Jabal Al Taraf	Pumping Unit	4.4	166	44<45>	12
		Booster Unit	4.4	208	-	-
S-03	Al Kharaba	Pumping Unit	2.3	198	79<84>	12
D-08	Maesneat Abdul Aziz	Pumping Unit	2.0	210	100<102>	12

* Column pipe length is equal to pump suction (installation) depth from ground level.

Revised Design Specification

Code	Site Name	Unit	Pumping Rate (lit/sec)	Total Head (m)	Column Pipe (m)	Standby Pipe (m)
A-02	Jabal Al Taraf	Pumping Unit	4.4	166	44<45>	12
		Booster Unit	4.4	208	-	-
S-03	Al Kharaba	Pumping Unit	3.4	217	90	12
D-08	Maesneat Abdul Aziz	Pumping Unit	3.0	233	113<114>	12

* Column pipe length is equal to pump suction (installation) depth from ground level.

Thank you very much for your cooperation.

Akinori Miyoshi
Member of JICA Study Team
Japan Techno Co., Ltd.

بسم الله الرحمن الرحيم

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المركز الرئيسي : الجمهورية اليمنية
صنعاء – شارع القيادة
أمام نافورة وزارة الدفاع
ص . ب : ٨٦٤٧
تليفون : ٢٥٩٩٣٤ / ٢٥٣٦٥٨
فاكس : ٢٥٤٩٢٨
تلفون سيار : ٧٣٧٩٤٠٨٨

التاريخ : ١٥/ ٥ / ٢٠٠٧م

عرض سعر

المواصفات الفنية لوحدة الضخ الكهربائية الغاطسة

لمشروع مياه جبل الطرف المحويت والمكونة من وحدة ضخ عمودية صبره مع محرك ديزل

١

م	التفاصيل	الكمية	السعر الوحدة باليورو الأوربي	السعر الإجمالي باليورو الأوربي
١	مضخة كبراري موديل P6C/14 دورة المروحة ٢٦٥٠ د/د الإنتاجية عند ١٦٦متر – ٤,٤ لتر /ثانية	١		
٢	قصيب كبراري ٣هـ كاملة تركيب ٤٤ متر + ١٢ متر احتياط	١٩		
٣	راس صبره كبراري دورتين الاربع R26	١		
٤	محرك صبره ديزل MWM موديل D229-6	١		
٥	توابع خاصة بالمضخة مع أجور نقل وتركيب وتشغيل	١		
	الإجمالي ( )			

ع/ علي محمد أحمد السنيدار

APPROVED ON 29 MAY 2007
BY AKINORI MIYOSHI
JAPAN TECHNO CO., LTD.
RESID. PROJECT-ENGINEER

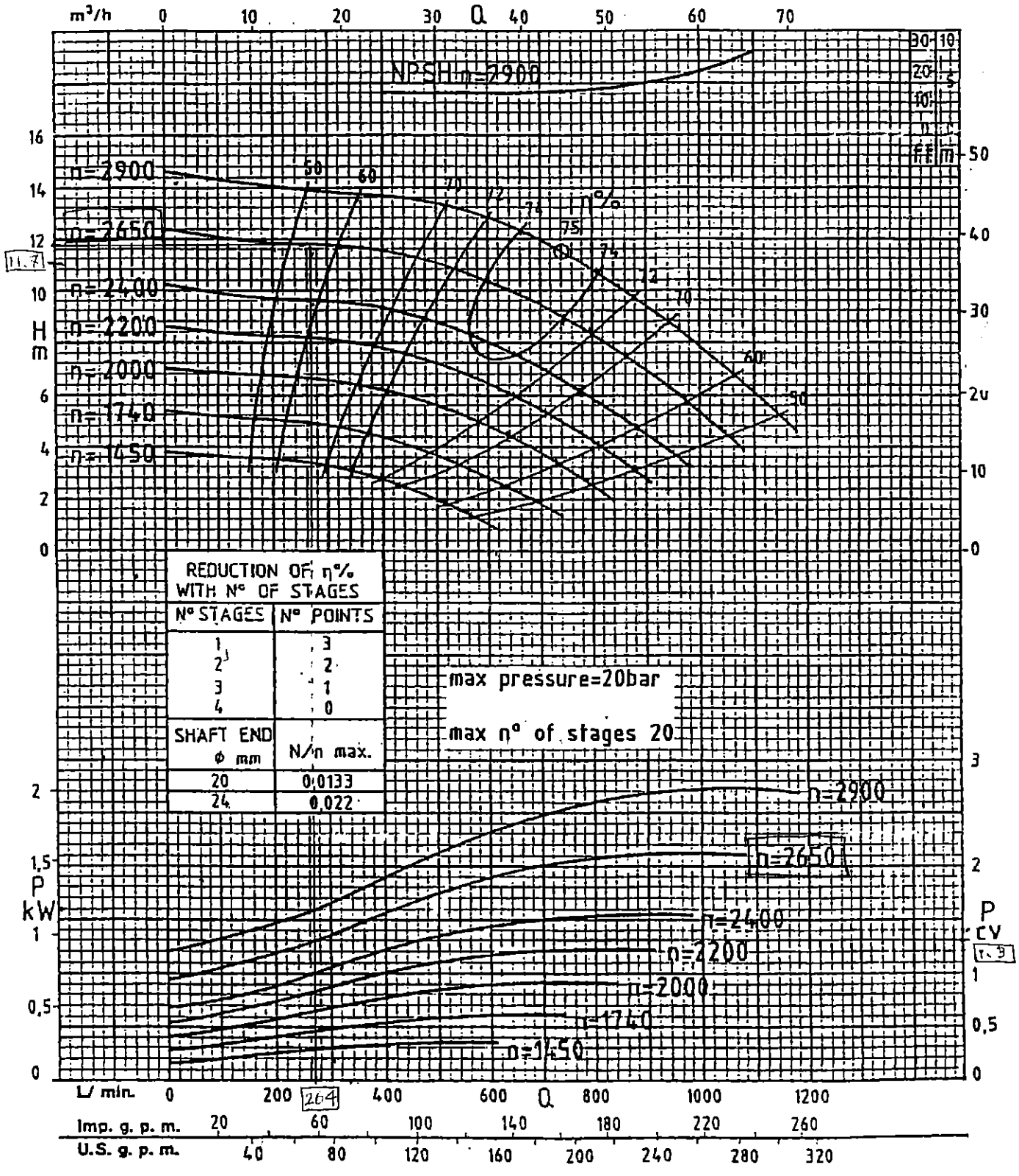
caprari
FABBRICA IT. POMPE SpA

TYPE
P6C

PERFORMANCE CURVES

IMPELLER A

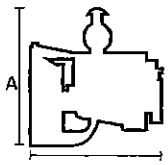
n = 1450 ÷ 2900

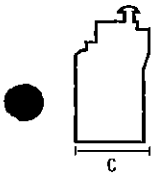


H = Prev. Man. Totale Hauteur manometrique totale Manometrische Förderhöhe Total manometric head	Q = Portata Débit Fördermenge Capacity	P = Potenza assorbita Puissance absorbée Kraftbedarf Input	η % Rendimento Rendement Wirkungsgrade Efficiency	n = Giri al min. Tours/min. Drehzahl u/min. r. p. m.	Tolleranze ISO 2548 Tolérances CLASSE C Zulassigen Abweichungen Tolerances

Special Applications Business Unit

MWM 10 SERIES



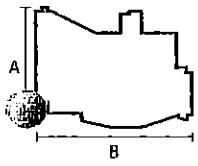


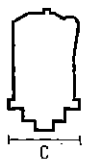
Engine Model			4.10TCA	6.10T	6.10TCA
Air Intake			Turbo Aftercooler	Turbo	Turbo Aftercooler
Disposition / Cylinders			L 4	L 6	L 6
Bore x Stroke		mm	103x129	103x129	103x129
Total Displacement		liter	4.3	6.45	6.45
Compression Ratio			16,3:1	16:1	16:1
Continuous Power	A 1500	kW (cv)	79 (108)	100 (136)	121 (165)
		kVA	#87	#114	#138
	A 1800	kW (cv)	96 (131)	121 (165)	143 (195)
		kVA	#104	#138	#163
	A 2500	kW (cv)	-	121 (164)	143 (195)
Fuel Stop Power	A 1500	kW (cv)	88 (120)	110 (150)	132 (180)
		kVA	#97	#125	#150
	A 1800	kW (cv)	107 (145)	132 (179)	158 (215)
		kVA	#116	#150	#180
	A 2500	kW (cv)	103 (140)*	132 (180)	158 (215)
Dry Weight		kg	515	631	649
Dimensions	Height (A)	mm	1160	1540	1540
	Length (B)	mm	1170	1513	1513
	Width (C)	mm	860	940	940

kVA: Reference Values * Under consult

According to DIN 6271 / ISO 3046

MWM D229





Engine model			D229-3	D229-4	D229-6	TD229-EC-6
Air Intake			Natural	Natural	Natural	Turbo
Disposition/ Cylinders			L 3	L 4	L 6	L6
Bore x Stroke		mm	102x120	102x120	102x120	102x120
Total Displacement		liter	2.94	3.92	5.88	5.88
Compression Ratio			17:1	17:1	17:1	15,9:1
Continuous Power	A 1500	kW (cv)	27 (37)	36 (49)	55 (75)	74 (101)
		kVA	#28	#39	#61	#83
	A 1800	kW (cv)	33 (45)	44 (60)	66 (90)	92 (125)
		kVA	#35	#48	#73	#103
	A 2500	kW (cv)	37 (50)	49 (67)	74 (100)	104 (141)
Fuel Stop Power	A 1500	kW (cv)	30 (41)	40 (54)	61 (83)	81 (110)
		kVA	#31	#43	#67	#91
	A 1800	kW (cv)	37 (50)	49 (67)	73 (99)	101 (137)
		kVA	#40	#54	#81	#114
	A 2500	kW (cv)	40 (55)	54 (73)	81 (110)	114 (155)
Dry Weight		kg	370	445	570	620
Dimensions	Height (A)	mm	907	938	1059	1134
	Length (B)	mm	964	1092	1351	1420
	Width (C)	mm	680	680	680	680

kVA: Reference Values

According to DIN 6271 / ISO 3046

DVE-1001/03

MOTORES

MWM

BRASIL

POWERFUL AND RELIABLE

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بسم الله الرحمن الرحيم

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المركز الرئيسي : الجمهورية اليمنية
صنعاء – شارع القيادة
أمام نافورة وزارة الدفاع
ص . ب : ٨٦٤٧
تليفون : ٢٥٩٩٣٤ / ٢٥٣٦٥٨
فاكس : ٢٥٤٩٢٨
تلفون سيار : ٧٣٧٩٤٠٨٨

التاريخ : ١٥/ ٥ / ٢٠٠٧م

عـــرض ســـعر

الأخ / أحمد علي مهدي المحترم

بعد التحية ،،،

المواصفـــات الفنيـــة لوحدة الضخ الأفقية المتكاملة مع المحرك الديزل

لمشروع مياه جبل الطرف المحويت

وحدة ضخ أفقية بنيلي إيطالية الصنع مع محرك ديزل وجميع التوابع بقدرة رفع ٢٠٨ متر وبإنتاجية ٤,٤ لتر / ثانية

١- مضخة أفقية ماركة بنيلي الإيطالية الصنع

الموديل	PMO40-65/8	مادة المراوح	حديد زهر	الكفاءة للمضخة	%60
قدرة الرفع الكلي المطلوب للمضخة	٢٠٨متر	الإنتاجية عند الرفع المطلوب	٤,٤لتر / ثانية	السرعة	٢٦٥٠ د/د
قدرة المضخة	٢٤ حصان	قطر المضخة	١٥٥ ملم		

٢- محرك صبره ديزل

مود يل المحرك	D229-6	ماركة المحرك	MWM	بلد الصنع	برازيلي
قدرة المحرك	١١٠ حصان	مزود بجير بوكس	1:1.5	نظام التبريد	مائي
دورة المحرك	١٨٠٠ د/د				

٣- الملحقات الخاصة بالمضخة : مع جميع التوابع الخاصة بالمضخة

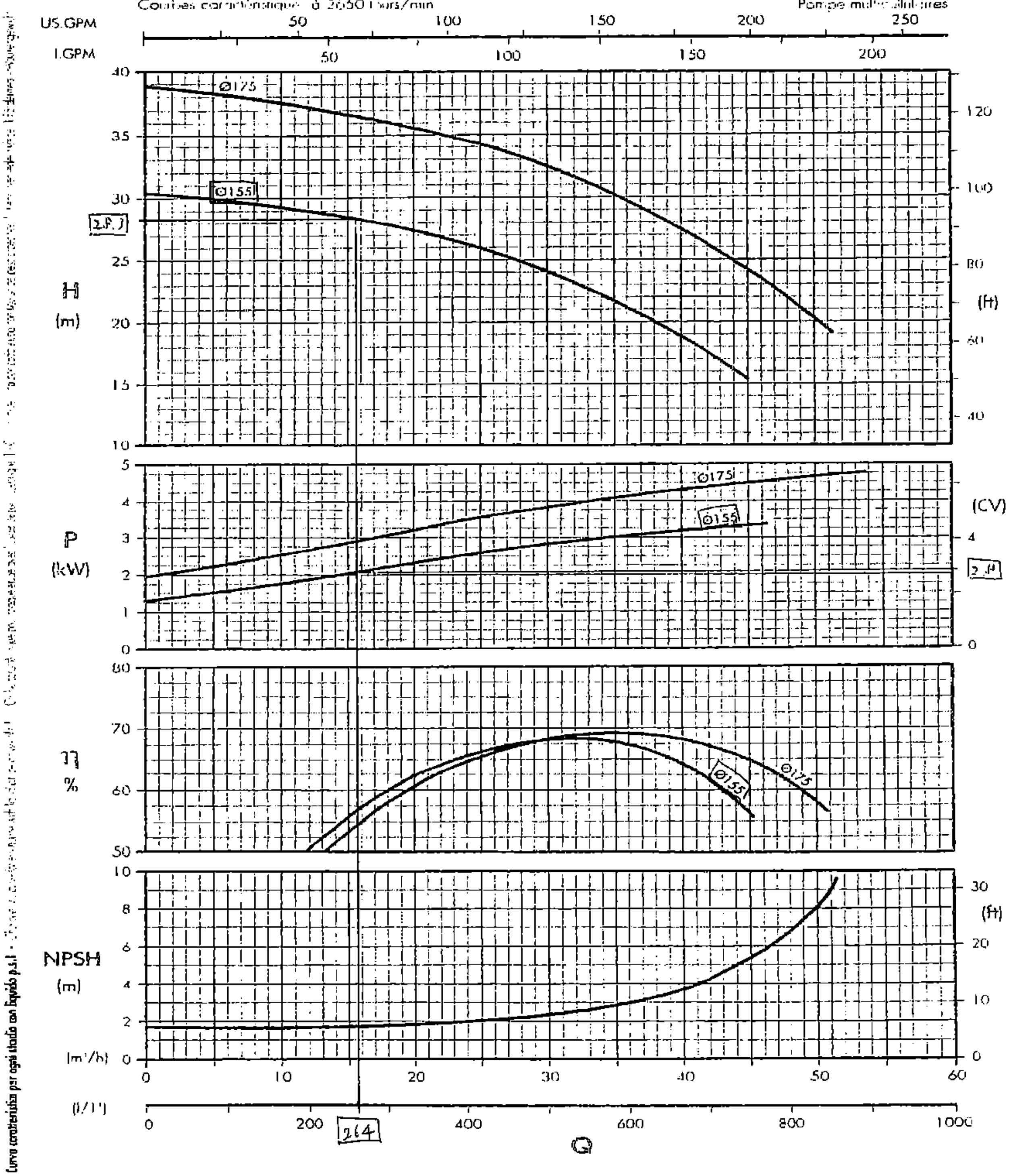
٤- قيمة العرض

	يورو أوربي	إجمالي القيمة

APPROVED ON 29 MAY 2007
BY AKINORI MIYOSHI
JAPAN TECHNO CO . LTD.
RESID.PROJECT-II ENGINEER

PANELLI **PMQ 40-65**

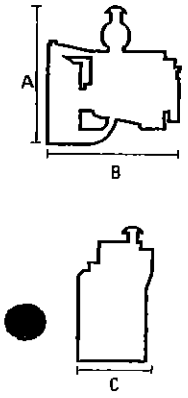
Curve caratteristiche a 2650 giri/min — **Pompa multicellulare**
Characteristic curves at 2650 r.p.m. — *Multistage pumps*
Courbes caractéristiques à 2650 tours/min — Pompes multicellulaires



PANELLI s.r.l.
Sede Legale e Operativa : Via Rana,63 – Zona Ind. D5 – 15047 Spinetta M.go (AL)
Phone: +39 0131.619506 r.a. – Fax: +39 0131.618593 – Fax Commercail Dept.: +39 0131 619017
E-mail: panelal@tin.it - www.panellipumps.it

Special Applications Business Unit

MWM 10 SERIES

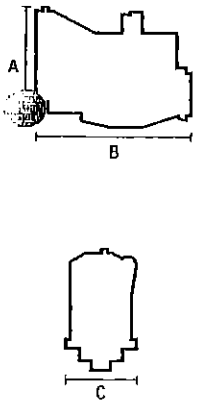


Engine Model			4.10TCA	6.10T	6.10TCA
Air Intake			Turbo Aftercooler	Turbo	Turbo Aftercooler
Disposition / Cylinders			L 4	L 6	L 6
Bore x Stroke		mm	103x129	103x129	103x129
Total Displacement		liter	4.3	6.45	6.45
Compression Ratio			16,3:1	16:1	16:1
Continuous Power	A 1500	kW (cv)	79 (108)	100 (136)	121 (165)
		kVA	#87	#114	#138
	A 1800	kW (cv)	96 (131)	121 (165)	143 (195)
		kVA	#104	#138	#163
	A 2500	kW (cv)	-	121 (164)	143 (195)
Fuel Stop Power	A 1500	kW (cv)	88 (120)	110 (150)	132 (180)
		kVA	#97	#125	#150
	A 1800	kW (cv)	107 (145)	132 (179)	158 (215)
		kVA	#116	#150	#180
	A 2500	kW (cv)	103 (140)*	132 (180)	158 (215)
Dry Weight		kg	515	631	649
Dimensions	Height (A)	mm	1160	1540	1540
	Length (B)	mm	1170	1513	1513
	Width (C)	mm	860	940	940

kVA: Reference Values * Under consult

According to DIN 6271 / ISO 3046

MWM 229



Engine model			D229-3	D229-4	D229-6	TD229-EC-6
Air Intake			Natural	Natural	Natural	Turbo
Disposition/ Cylinders			L 3	L 4	L 6	L6
Bore x Stroke		mm	102x120	102x120	102x120	102x120
Total Displacement		liter	2.94	3.92	5.88	5.88
Compression Ratio			17:1	17:1	17:1	15,9:1
Continuous Power	A 1500	kW (cv)	27 (37)	36 (49)	55 (75)	74 (101)
		kVA	#28	#39	#61	#83
	A 1800	kW (cv)	33 (45)	44 (60)	66 (90)	92 (125)
		kVA	#35	#48	#73	#103
	A 2500	kW (cv)	37 (50)	49 (67)	74 (100)	104 (141)
Fuel Stop Power	A 1500	kW (cv)	30 (41)	40 (54)	61 (83)	81 (110)
		kVA	#31	#43	#67	#91
	A 1800	kW (cv)	37 (50)	49 (67)	73 (99)	101 (137)
		kVA	#40	#54	#81	#114
	A 2500	kW (cv)	40 (55)	54 (73)	81 (110)	114 (155)
Dry Weight		kg	370	445	570	620
Dimensions	Height (A)	mm	907	938	1059	1134
	Length (B)	mm	964	1092	1351	1420
	Width (C)	mm	680	680	680	680

kVA: Reference Values

DVE-1031/03

According to DIN 6271 / ISO 3046

MOTORES MWM BRASIL

POWERFUL AND RELIABLE

Tel.: +55 113002.3453 www.mwm.com.br e-mail: mwm@mwm.com.br Av. Nações Unidas, 22.002 04795.915 São Paulo SP Brazil

بسم الله الرحمن الرحيم

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Facing. MOD Fountain
P. O. Box: 8647
Sana'a, Republic of Yemen
Tel. : 259934 / 253658
Fax. : 254928 – GSM : 73794088
E- mail : AMASNDR@Y.NET.YE

علي محمد أحمد السنيدار للتجارة العامة
المركز الرئيسي : الجمهورية اليمنية
صنعاء – شارع القيادة
امام نافورة وزارة الدفـــــــاع
ص . ب : ٨٦٤٧
تليفون : ٢٥٩٩٣٤ / ٢٥٣٦٥٨
فاكس : ٢٥٤٩٢٨
تلفون سيار : ٧٣٧٩٤٠٨٨

التـــاريخ : ٢٩/ ٥ / ٢٠٠٧م

عـــرض ســـعر

المواصفـــــات الفنيـــة لوحدة الضخ الكهربائية الغاطسة

لمشروع مياه الخرابة صنعاء والمكونة من وحدة ضخ غاطسة متكاملة مع جميع التوابع

١- مضخة :- نوع بنيلي الإيطالية الصنع

الموديل	140PX13/19 → 24	القطر الخارجي للمضخة	٦ بوصه	عدد المراوح	19 → 20
مادة المراوح	استنلس استيل				
قوة الرفع الكلي المطلوب للمضخة	١٩٨ متر → ± 17	الإنتاجية عند الرفع المطلوب	٢,٣ لتر / ثانية → 3.4	السرعة	٢٩٠٠ د/د

٢- المحرك :- نوع فرنكلين

قدرة المحرك	١٥خيل	نوع الحماية	IP68	الجهد والتردد	٣٨٠فولت/٥٠هرتز
سرعة المحرك	٢٩٠٠ د/د	القطر للمحرك	٦ بوصة	الكفاءة	%٩٠

٣- لوحة التحكم والتشغيل:- لوحة قدرة ١٥خيل إيطالية الصنع ومزودة بجميع أجهزة الحماية اللازمة والإشارات المنبهة لجميع حالات المضخة المختلفة مع أجهزة قياس والمفاتيح التي تضمن سلامة المضخة .

٤- القصـــيب :- سوف يتم تركيب ٧٩ متر + ١٢ متر احتياط

نوع القصيب	ابو صحن غير قابل للصدأ	طول القصيب	٦ متر
قطر القصيب	٣ هنش	عدد القصيب	١٦ → 17
مع الملحقات الخاصة بالقصيب			

٥- كيبل كهربائي:- إيطالي الصنع ، بطول ١٠٠ متر مساحة المقطع ٣×١٦ ملم٢ .

٦- كيبل حســاس:- إيطالي الصنع ١× ١,٥ملم٢ وبطول ١٠٠ متر .

٧- الملحقات الخاصة بالمضخة :-

صمام عدم رجوع ٣هـ - محبس بوابي ٣هـ - عداد ماء ٣هـ – ساعة قياس الضغط ٤٠بار

٨- المولـــــد الكهربـــــائي :-

نوع الدينمو الكهربائي	LEROY SOMER	موديل المولد	G51P	نظام التبريد	ماني
قدرة المولد	45KVA	الجهد الكهربائي والذبذبة	(400-230)V 50HZ	دورة المولد	1500RPM
نوع المحرك	PERKINS	موديل المحرك	1103A33TG1	الكفاءة	0.8
الشركة المجمعة	BRUNO ITALY	مع طبلون خاص بالمولد مزود بجميع الحمايات			

٩- قيمة العرض

	يورو أوربي	إجمالي القيمة

APPROVED ON 29 MAY 2007
BY AKINORI MIYOSHI
JAPAN TECHNO CO., LTD.
RESID. PROJECT-ENGINEER

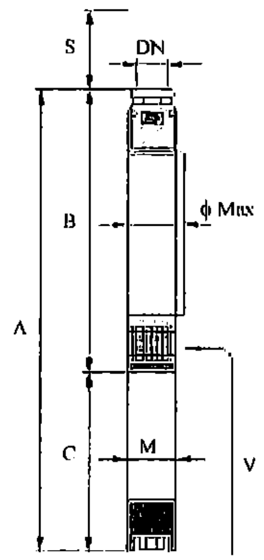
PANELLI — Elettropompe sommerse / Electric submersible pumps / Electropompes immergées

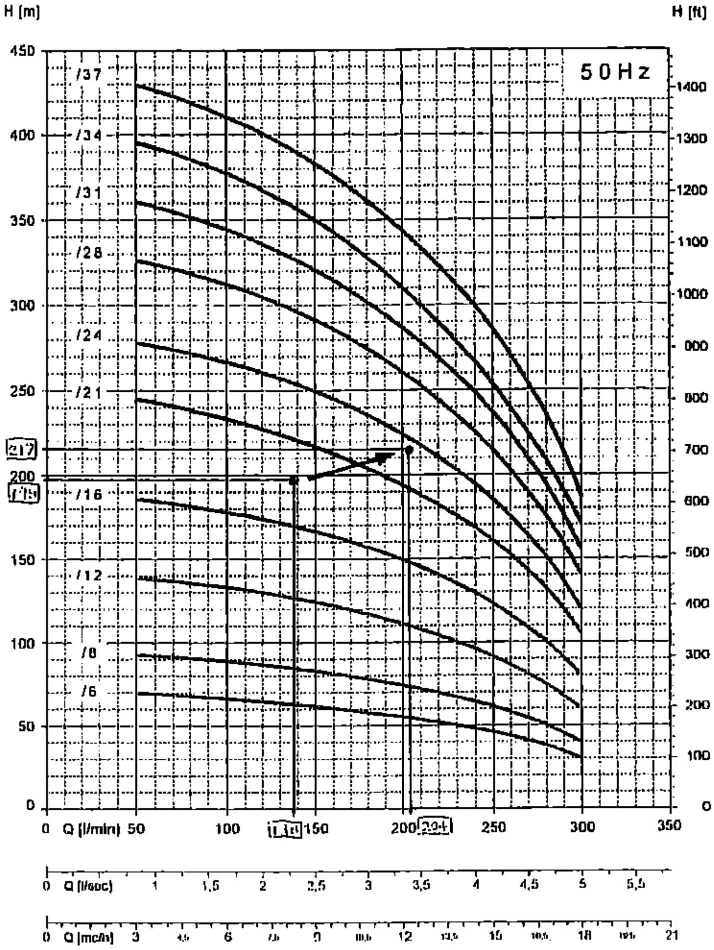
140 PX13

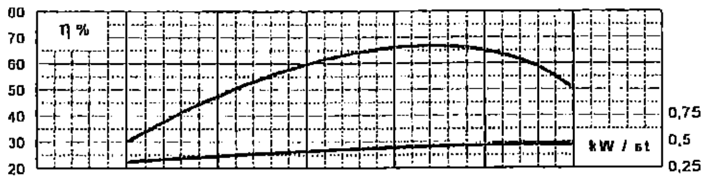
6" (150 mm)

CE Tolleranze secondo EN UNI-ISO 9906 - Tolerances according to EN UNI-ISO 9906 - Tolérances suivant EN UNI-ISO 9906

RADIALE







H = Prevalenza manometrica totale in m. Da 30 a 420 m
Q = Portata in l/min. Da 60 a 300 l/min
η %= Rendimento della pompa. Max 67%
kW/st = Assorbimento per stadio. Max 0,40
Massimo contenuto di sabbia in sospensione 250 g/mc
S = Battente minimo 1 m

H = *Total manometric head in m.* From 30 to 420 m
Q = *Capacity in l/min.* From 60 to 300 l/min
η %= *Pump efficiency.* Max 67%
kW/st = Stage Absorption. Max 0,40
Max suspension of sand contents 250 g/mc
S = Minimum head 1 m

H = Hauteur manométrique totale en m. De 30 à 420 m
Q = Débit en l/min. De 60 à 300 l/min
η %= Rendement de la pompe. Max 67%
kW/st = Absorption pour étage. Max 0,40
Contenu maxi de sable en suspension 250 g/mc
S = Niveau minimum 1 m

Dimensioni di ingombro e pesi Overall dimensions and weights Dimensions d'encombrement et poids								
Tipo Type	A mm	B mm	C mm	DN "	M mm	ϕ max mm	M kg	P kg
140 PX13 / 6	1310	690	623	2" 1/2	98	144	18,5	15
140 PX13 / 8	1340	775	565	2" 1/2	145	144	41	17
140 PX13 / 12	1520	930	590	2" 1/2	145	144	44	21
140 PX13 / 16	1700	1080	620	2" 1/2	145	144	48	26
140 PX13 / 21	2012	1282	730	2" 1/2	145	144	60	31
→ 140 PX13 / 24	2120	1390	730	2" 1/2	145	144	60	34
140 PX13 / 28	2404	1554	850	2" 1/2	145	144	72	38
140 PX13 / 31	2522	1672	850	2" 1/2	145	144	72	42
140 PX13 / 34	2698	1788	910	2" 1/2	145	144	78	45
140 PX13 / 37	2810	1900	910	2" 1/2	145	144	78	48

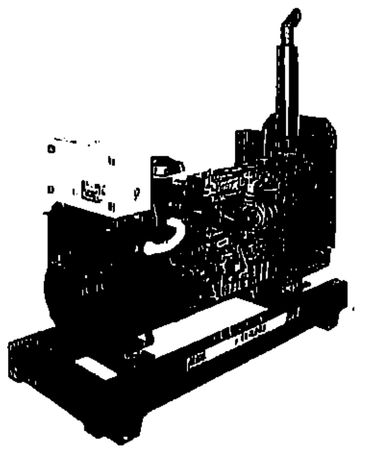
Tipo - Typo	Motore Motor Moteur V 380			Q = PORTATA - CAPACITY - DEBIT							
				l/min	0	50	100	150	200	250	300
				l/sec	0	0,8	1,7	2,5	3,4	4,2	5
	kw	HP	A	mc/h	0	3	6	9	12	15	18
140 PX13 / 6	3	4	6,7	H (m)	72	70	67	62	56	46	30
140 PX13 / 8	4	5,5	10	H (m)	96	93	89	83	74	61	40
140 PX13 / 12	5,5	7,5	12,5	H (m)	144	139	133	125	112	92	60
140 PX13 / 16	7,5	10	17	H (m)	192	186	178	166	149	122	80
140 PX13 / 21	11	15	24,5	H (m)	252	244	233	218	195	161	105
140 PX13 / 24	11	15	24,5	H (m)	288	278	266	250	223	184	120
140 PX13 / 28	15	20	32	H (m)	336	325	311	291	260	214	140
140 PX13 / 31	15	20	32	H (m)	372	360	344	322	288	237	155
140 PX13 / 34	18,5	25	40	H (m)	408	394	377	354	316	260	170
140 PX13 / 37	18,5	25	40	H (m)	444	429	411	385	344	283	185

From 2006

Strada Rana - Z.I. D5 - 15047 Spinetta M.go - Alessandria - ITALY - tel. +39 0131 619508 - fax +39 0131 619017 - E-mail: panelli@glin.it - www.panellipumps.it

MOTORI DIESEL RAFFREDDATI AD ACQUA – *WATER COOLED DIESEL ENGINES* – MOTEURS DIESEL REFROIDIS PAR EAU
1500 r.p.m. – 50 HZ – 5÷700 KVA – cos φ 0,8 – 400/230V
1800 r.p.m. – 60 HZ – 6,3÷750 KVA – cos φ 0,8 – TENSIONI A RICHIESTA – *VOLTAGE UPON REQUEST* – VOLTAGE SUR DEMANDE

powered by Perkins



Modello / *Model* / Modèle	50 Hz KVA max	50 Hz KVA cont.	60 Hz KVA max	60 Hz KVA cont.	Marca e Tipo / *Make and Type* / Marque et type	Regolatore / *Governor* / Régulateur	Cilindri / *Cylinders* / Cylindres	Aspirazione / *Aspiration* / Aspiration	cm³	kWm 1500 rpm	kWm 1800 rpm	Cons. 70% (l/h) 1500 rpm	Cons. 70% (l/h) 1800 rpm	Serbatoio / *Tank* / Réservoir Lt	Dimensioni / *Size* / Dimensions (LxWxH) cm	Peso / *Weight* / Poids Kg	Quadro standard / *Standard panel* / Coffret standard	Quadro automatico / *Automatic panel* / Coffret automatique (OPTION)
[illegible]	10	9	12	11	Perkins 403C-11 G	mec	3	N	1131	8,5	10,4	1,8	2,2	43	120x70x110	440	QM 120	Q 410S
[illegible]	14,5	13	17	15,5	Perkins 403C-15 G	mec	3	N	1496	12	14,4	2,6	3	43	120x70x110	450	QM 120	Q 410S
[illegible]	22	20	25	22,5	Perkins 404C-22 G	mec	4	N	2216	18,5	20,7	3,8	4,3	47	134x70x113	500	QM 120	Q 410S
[illegible]	33	30	38	35	Perkins 1103 A 33 G1	mec	3	N	3300	28,2	33,2	4,8	5,9	52	150x77x125	650	QM 120	Q 410S
51P	50	45	59	53	Perkins 1103 A 33 TG1	mec	3	T	3300	41,3	48,9	7,3	8,5	52	150x77x130	802	QM 120	Q 4400
[illegible]	66	60	75	68	Perkins 1103 A 33 TG2	mec	3	T	3300	53,8	61,2	9,5	10,7	67	150x77x130	850	QM 120	Q 4400
[illegible]	71,5	65	83,6	76	Perkins 1104 A 44 TG1	mec	4	T	4400	58,7	68,6	10,1	11,9	77	165x77x130	850	QM 120	Q 4400
[illegible]	88	80	100	90	Perkins 1104 A 44 TG2	mec	4	T	4400	71	80	12,5	15,1	85	185x77x130	860	QM 120	Q 4400
[illegible]	105	95	121	110	Perkins 1104 C 44 TAG2	ele	4	T	4400	89	100	15	18	85	185x77x130	930	QM 120	Q 4400
150P	150	136	165	150	Perkins 1006 TAG	ele	6	T	5990	121	134	20,1	24,4	100	230x77x144	1200	QM 120	Q 4400
165P	165	150	***	***	Perkins 1006 TAG2	ele	6	T	5990	129	***	23,2	***	100	230x77x144	1500	QM 120	Q 4400
220P	229	208	253	230	Perkins 1306C - E87 TAG3	ele	6	T	8700	180	201	30,4	34,5	230	250x95x160	1900	QM 120	Q 4400
275P	275	250	***	***	Perkins 1306C - E87 TAG6	ele	6	T	8700	210	***	37,8	***	250	260x95x170	2050	QM 120	Q 4400
400P	400	350	438	400	Perkins 2306C - E14 TAG2	ele	6	T	14600	304	348	51,8	64	295	300x110x195	2850	QM 120	Q 4400
451P	450	400	500	438	Perkins 2306C - E14 TAG3	ele	6	T	14600	344	376	57,5	70,1	302	308x110x197	2900	QM 120	Q 4400
501P	500	450	625	563	Perkins 2806C - E16 TAG1	ele	6	T	15800	387	478	66,8	79,4	470	340x138x210	3400	QM 120	Q 4400
551P	550	500	688	625	Perkins 2806C - E16 TAG2	ele	6	T	15800	430	532	73,2	85,3	470	340x138x210	3500	QM 120	Q 4400
[illegible]	630	550	750	687	Perkins 2806C - E18 TAG1	ele	6	T	18100	473	591	80,6	104,5	505	332x154x221	3750	QM 120	Q 4400
701P	700	650	***	***	Perkins 2806C - E18 TAG2	ele	6	T	18100	559	***	101	***	514	332x154x221	4000	QM 120	Q 4400

Gruppi elettrogeni non destinati ad utilizzo all'esterno. Rumorosità non conforme alla normativa 2000/14/CE.
Generating sets not for outside use. Noise level not compliant with european rule 2000/14/CE
Groupes électrogènes non prévus pour un usage en plein air à l'extérieur. Niveau sonore non conforme à la directive 2000/14/CE.

BRUNO

بسم الله الرحمن الرحيم

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علي محمد أحمد السنيدار للتجارة العامة
المركز الرئيسي : الجمهورية اليمنية
صنعاء – شارع القيادة
امام نافورة وزارة الدفـــــــاع
ص . ب : ٨٦٤٧
تليفون : ٢٥٩٩٣٤ / ٢٥٣٦٥٨
فاكس : ٢٥٤٩٢٨
تلفون سيار : ٧٣٧٩٤٠٨٨

التـــاريخ : ١٥/ ٥ / ٢٠٠٧م

عـــرض ســـعر

المواصفـــــات الفنيـــة لوحدة الضخ الكهربائية الغاطسة

لمشروع مياه مصنعه ذمار والمكونة من وحدة ضخ غاطسة متكاملة مع جميع التوابع

١- مضـخة :- نوع بانيللي **PANELLI** الإيطالية الصنع

الموديل	140PX13/20 (→24)	القطر الخارجي للمضخة	٦ بوصه	الكفاءة للمضخة	%٦٥
عدد المراوح	20	السرعة	٢٩٠٠ د/د		
قوة الرفع الكلي المطلوب للمضخة	٢١٠ متر (→ 233)	الإنتاجية عند الرفع المطلوب	٢ لتر / ثانية (→3)	المراوح	استنلس استيل

٢- المحرك :- نوع فرنكلين

قدرة المحرك	١٥خيل	نوع الحماية	IP68	الجهد والتردد	٣٨٠فولت/٥٠هرتز
سرعة المحرك	٢٩٠٠ د/د	القطر للمحرك	٦ بوصة	الكفاءة	%٩٠

٣- لوحة التحكم والتشغيل:- لوحة قدرة ١٥خيل إيطالية الصنع ومزودة بجميع أجهزة الحماية اللازمة والإشارات المنبهة لجميع حالات المضخة المختلفة مع اجهزة قياس والمفاتيح التي تضمن سلامة المضخة .

٤- القصـــيب :- سوف يتم تركيب ١٠٠ متر + ١٢ متر احتياط

نوع القصيب	ابو صحن غير قابل للصدأ	طول القصيب	٦ متر
قطر القصيب	٣ هنش	عدد القصيب	١٩ (→ 24)
مع الملحقات الخاصة بالقصيب			

٥- كيبل كهربائي:- إيطالي الصنع ، بطول ١٢٢ متر مساحة المقطع ٣×١٦ ملم٢ .

٦- كيبل حســاس:- إيطالي الصنع ١× ١,٥ملم٢ وبطول ١٢٢ متر .

٧- الملحقات الخاصة بالمضخة :-

صمام عدم رجوع ٣هـ - محبس بوابي ٣هـ - عداد ماء ٣هـ – ساعة قياس الضغط ٤٠بار

٨- المولـــــد الكهربـــــائي :-

نوع الدينمو الكهربائي	LEROY SOMER	موديل المولد	G51P	نظام التبريد	ماني
قدرة المولد	45KVA	الجهد الكهربائي والذبذبة	(400-230)V 50HZ	دورة المولد	1500RPM
نوع المحرك	PERKINS	موديل المحرك	1103A33TG1	الكفاءة	0.8
الشركة المجمعة	BRUNO ITALY	مع طبلون خاص بالمولد مزود بجميع الحمايات			

٩- قيمة العرض

	يورو اوربي	إجمالي القيمة

APPROVED ON 29 MAY 2007
BY AKINORI MIYOSHI
JAPAN TECHNO CO., LTD.
RESID. PROJECT ENGINEER

PANELLI

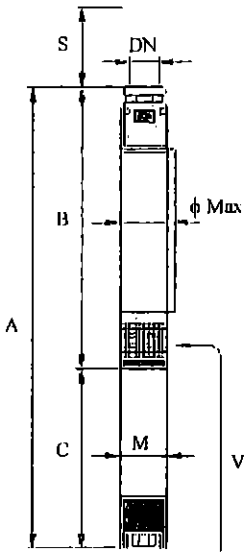
Elettropompe sommerse
Electric submersible pumps
Electropompes immergées

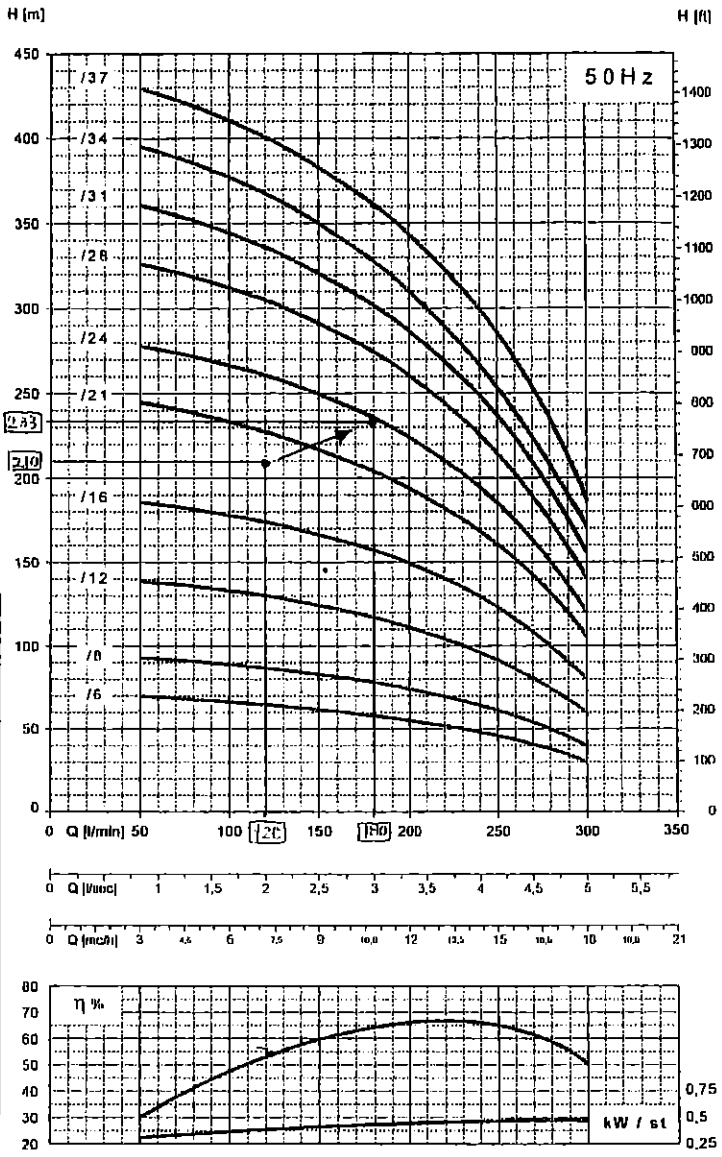
CE Tolleranze secondo EN UNI-ISO 9906 - Tolerances according to EN UNI-ISO 9906 - Tolérances suivant EN UNI-ISO 9906

140 PX13

6" (150 mm)

RADIALE





H = Prevalenza manometrica totale in m. Da 30 a 420 m
Q = Portata in l/min. Da 60 a 300 l/min
η %= Rendimento della pompa. Max 67%
kW/st = Assorbimento per stadio. Max 0,48
Massimo contenuto di sabbia in sospensione 250 g/mc
S = Battente minimo 1 m

H = *Total manometric head in m.* From 30 to 420 m
Q = *Capacity in l/min* From 60 to 300 l/min
η %= *Pump efficiency.* Max 67%
kW/st = Stage Absorption. Max 0,48
Max suspension of sand contained 250 g/mc
S = Minimum head 1 m

H = Hauteur manométrique totale en m. De 30 à 420 m
Q = Débit en l/min. De 60 à 300 l/min
η %= Rendement de la pompe. Max 67%
kW/st = Absorption pour étage. Max 0,48
Contenu maxi de sable en suspension 250 g/mc
S = Niveau minimum 1 m

Dimensioni di ingombro e pesi Overall dimensions and weights Dimensions d'encombrement et poids								
Tipo Type	A mm	B mm	C mm	DN "	M mm	ϕ max mm	M kg	P kg
140 PX13 / 6	1319	936	823	2" ½	90	144	18,5	15
140 PX13 / 8	1340	775	505	2" ½	145	144	41	17
140 PX13 / 12	1520	930	590	2" ½	145	144	44	21
140 PX13 / 16	1700	1086	620	2" ½	145	144	48	26
140 PX13 / 21	2012	1282	730	2" ½	145	144	60	31
140 PX13 / 24	2128	1398	730	2" ½	145	144	60	34
140 PX13 / 28	2404	1554	850	2" ½	145	144	72	38
140 PX13 / 31	2522	1672	850	2" ½	145	144	72	42
140 PX13 / 34	2698	1788	910	2" ½	145	144	78	45
140 PX13 / 37	2816	1906	910	2" ½	145	144	78	48

Tipo - Type	Motore Motor Moteur V 380 Caratteristiche a 2900 giri/min			Q = PORTATA - CAPACITY - DEBIT						
				l/min	0	50	100	150	200	250	300
				l/sec	0	0,8	1,7	2,5	3,4	4,2	5
	kw	HP	A	mc/h	0	3	6	9	12	15	18
140 PX13 / 6	3	4	6,7	H (m)	72	70	67	62	56	46	30
140 PX13 / 8	4	5,5	10		96	93	89	83	74	61	40
140 PX13 / 12	5,5	7,5	12,5		144	139	133	125	112	92	60
140 PX13 / 16	7,5	10	17		192	186	178	166	149	122	80
140 PX13 / 21	11	15	24,5		252	244	233	218	195	161	105
140 PX13 / 24	11	15	24,5		288	278	266	250	223	184	120
140 PX13 / 28	15	20	32		336	325	311	291	260	214	140
140 PX13 / 31	15	20	32		372	360	344	322	288	237	155
140 PX13 / 34	18,5	25	40		408	394	377	354	316	260	170
140 PX13 / 37	18,5	25	40		444	429	411	385	344	283	185

From 2006

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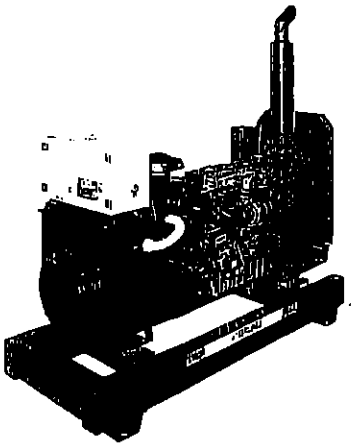

50 Hz KVA max	50 Hz KVA cont.	60 Hz KVA max	60 Hz KVA cont.	Marca e Tipo *Make and Type* Marque et type	Regolatore *Governor* Régulateur	Cilindri *Cylinders* Cylindres	Aspirazione *Aspiration* Aspiration	cm³	kWm 1500 rpm	kWm 1800 rpm	Cons. 70% (l/h) 1500 rpm	Cons. 70% (l/h) 1800 rpm	Serbatoio *Tank* Réservoir *l.t*	Dimensioni *Size* Dimensions *(LxWxH) cm*	Peso *Weight* Poids *Kg*	Quadro standard *Standard panel* Coffret standard	Quadro automatico *Automatic panel* Coffret automatique (IP10D)
10	9	12	11	Perkins 403C-11 G	mec	3	N	1131	8,5	10,4	1,8	2,2	43	120x70x110	440	QM 120	Q 410S
14,5	13	17	15,5	Perkins 403C-15 G	mec	3	N	1496	12	14,4	2,6	3	43	120x70x110	450	QM 120	Q 410S
22	20	25	22,5	Perkins 404C-22 G	mec	4	N	2216	18,5	20,7	3,8	4,3	47	134x70x113	500	QM 120	Q 410S
33	30	38	35	Perkins 1103 A 33 G1	mec	3	N	3300	28,2	33,2	4,8	5,9	52	150x77x125	650	QM 120	Q 410S
50	45	59	53	Perkins 1103 A 33 TG1	mec	3	T	3300	41,3	48,9	7,3	8,5	52	150x77x130	802	QM 120	Q 4400
66	60	75	68	Perkins 1103 A 33 TG2	mec	3	T	3300	53,8	61,2	9,5	10,7	67	150x77x130	850	QM 120	Q 4400
71,5	65	83,6	76	Perkins 1104 A 44 TG1	mec	4	T	4400	58,7	68,6	10,1	11,9	77	165x77x130	850	QM 120	Q 4400
88	80	100	90	Perkins 1104 A 44 TG2	mec	4	T	4400	71	80	12,5	15,1	85	185x77x130	860	QM 120	Q 4400
105	95	121	110	Perkins 1104 C 44 TAG2	ele	4	T	4400	89	100	15	18	85	185x77x130	930	QM 120	Q 4400
150	136	165	150	Perkins 1006 TAG	ele	6	T	5990	121	134	20,1	24,4	100	230x77x144	1200	QM 120	Q 4400
165	150	***	***	Perkins 1006 TAG2	ele	6	T	5990	129	***	23,2	***	100	230x77x144	1500	QM 120	Q 4400
229	208	253	230	Perkins 1306C - E87 TAG3	ele	6	T	8700	180	201	30,4	34,5	230	250x95x160	1900	QM 120	Q 4400
275	250	***	***	Perkins 1306C - E87 TAG6	ele	6	T	8700	218	***	37,8	***	250	260x95x170	2050	QM 120	Q 4400
400	350	438	400	Perkins 2306C - E14 TAG2	ele	6	T	14600	304	348	51,0	64	295	300x110x195	2050	QM 120	Q 4400
450	400	500	438	Perkins 2306C - E14 TAG3	ele	6	T	14600	344	376	57,5	70,1	302	308x110x197	2900	QM 120	Q 4400
500	450	625	563	Perkins 2806C - E16 TAG1	ele	6	T	15000	387	478	66,8	79,4	470	340x138x210	3400	QM 120	Q 4400
550	500	688	625	Perkins 2806C - E16 TAG2	ele	6	T	15600	430	532	73,2	85,3	470	340x138x210	3500	QM 120	Q 4400
630	550	750	687	Perkins 2806C - E18 TAG1	ele	6	T	18100	473	591	80,6	104,5	505	332x154x221	3750	QM 120	Q 4400
700	650	***	***	Perkins 2806C - E18 TAG2	ele	6	T	18100	559	***	101	***	514	332x154x221	4000	QM 120	Q 4400

Caratteristiche motore / *engine features* Caractéristique moteur

Gruppi elettrogeni non destinati all'utilizzo all'esterno. Rumorosità non conforme alla normativa 2000/14/CE.
Gensetting sets not for outside use. Noise level not compliant with european rule 2000/14/CE.
Groupes électrogènes non prévus pour un usage en plein air à l'extérieur. Niveau sonore non conforme à la directive 2000/14/CE.

BLACK AND HOT DIPPED GALVANISED STEEL PIPES
ASTM A-53 GRADE A & B (SCH 40)

NOMINAL BORE		OUTSIDE DIAMETER		WALL THICKNESS		WEIGHT						NO. OF PIECES PER BUNDLE
						BLACK PIPES PLAIN END			GALVANISED PIPES PLAIN END			
mm	inch	mm	inch	mm	inch	Kg/mtr	lbs/ft.	ft./ton	Kg/mtr	lbs/ft.	ft. ton	
15	½	21.3	0.840	2.77	0.109	1.27	0.85	2592	1.33	0.89	2457	120
20	¾	26.7	1.050	2.87	0.113	1.69	1.13	1945	1.77	1.18	1855	90
25	1	33.4	1.315	3.38	0.133	2.50	1.68	1311	2.61	1.75	1259	60
32	1¼	42.2	1.660	3.56	0.140	3.39	2.27	967	3.53	2.37	930	42
40	1½	48.3	1.900	3.68	0.145	4.05	2.72	810	4.20	2.82	780	36
50	2	60.3	2.375	3.91	0.154	5.44	3.65	603	5.63	3.79	583	28
65	2½	73.0	2.875	5.16	0.203	8.63	5.79	380	8.87	5.96	370	18
80	3	88.9	3.500	5.49	0.216	11.29	7.58	291	11.58	7.78	283	14
90	3½	101.6	4.000	5.74	0.226	13.57	9.11	242	13.90	9.34	236	12
100	4	114.3	4.500	6.02	0.237	16.07	10.79	204	16.44	11.05	200	10
125	5	141.3	5.560	6.55	0.258	21.77	14.62	151	22.23	14.94	148	8
150	6	168.3	6.625	7.11	0.280	28.26	18.97	116	28.82	19.37	114	7
200	8	219.1	8.625	8.18	0.322	42.55	28.55	77	43.28	29.05	76	5

Tolerances : THICKNESS : -12.5 %, WEIGHT : (±) 10%, DIAMETER : 1½" & below ± 1.64" (0.4mm)
2" & above ± 1%

TECHNICAL DATA OF BLACK STEEL PIPES TO DIN 2440

NOMINAL BORE		OUTSIDE DIAMETER	WALL THICKNESS	WEIGHT OF BLACK PIPES		PIPES PER BUNDLE
				PLAIN ENDED	SCREWED & SOCKETED	
Inch	mm	mm	mm	kg/mtr	kg/mtr	
½	15	21.3	2.65	1.22	1.23	127
¾	20	26.9	2.65	1.58	1.59	91
1	25	33.7	3.25	2.44	2.46	61
1¼	32	42.4	3.25	3.14	3.17	61
1½	40	48.3	3.25	3.61	3.65	37
2	50	60.3	3.65	5.10	5.17	37
2½	65	76.1	3.65	6.51	6.63	19
3	80	88.9	4.05	8.47	8.54	19
4	100	114.3	4.50	12.1	12.4	19
5	125	139.7	4.85	16.2	16.7	10
6	150	165.1	4.85	19.2	19.8	7

Tolerances : Thickness (-)12.5 %
Weight Single tube (±) 10%
10 Tons Consignment (±) 7.5%
Length 6m (–) 100 (-) 50mm
Galvanising According to DIN 2444

ZENITH LIMITED

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Mumbai-400 021, India. • Tel : 0091-22-2282 1122 • Fax : 0091-22-2285 5743
e-mail : exports@zenithsteelpipes.com • website : www.zenithsteelpipes.com

APPROVED on 02 MAY 2007
BY AKINORI MIYOSHI
JAPAN TECHNO CO., LTD.
RESID. PROJECT-ENGINEER

Product Catalogue

Hussein A. Al-Hababi & Bro . Co.

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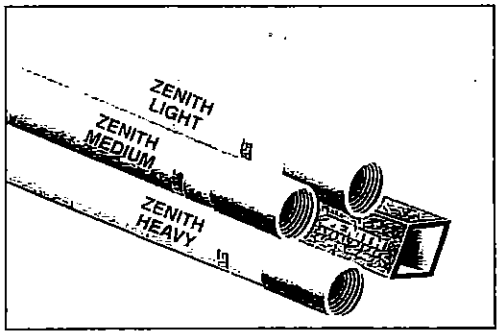

ZENITH
STEEL PIPES
Always the best !

ISO 9001:2000
CERTIFICATE NO: 13835-03
ENGINEERING DIVISION

ISO 14001

TECHNICAL DATA OF BLACK AND GALVANISED STEEL PIPES CONFORMING TO BS : 1387 OF 1985

CLASS	NOMINAL BORE		OUTSIDE DIAMETER				WALL THICKNESS		WEIGHT OF BLACK PIPES						WEIGHT OF GALVANISED PIPES (CALCULATED)						NO. OF PIPES PACKED PER STANDARD BUNDLE (1TONNE APPROX.)
			MAX.		MIN.				PLAIN ENDED			SCREWED & SOCKETED			PLAIN ENDED			SCREWED & SOCKETED			
	Inch	mm	Inch	mm	Inch	mm	Inch	mm	kg/mtr	mtr/ton	ft/ton	kg/mtr	mtr/ton	ft/ton	kg/mtr	mtr/ton	ft/ton	kg/mtr	mtr/ton	ft/ton	
LIGHT (A)	½	15	0.843	21.4	0.827	21.0	0.079	2.00	0.947	1056	3465	0.956	1046	3432	1.000	1000	3281	1.007	993	3258	160
	¾	20	1.059	26.9	1.039	26.4	0.091	2.30	1.380	725	2379	1.390	719	2359	1.440	694	2277	1.460	685	2247	110
	1	25	1.331	33.8	1.307	33.2	0.102	2.60	1.980	505	1657	2.000	500	1640	2.060	485	1591	2.090	478	1568	80
	1¼	32	1.673	42.5	1.650	41.9	0.102	2.60	2.540	394	1293	2.570	389	1276	2.640	379	1243	2.680	373	1224	61
	1½	40	1.906	48.4	1.882	47.8	0.114	2.90	3.230	310	1017	3.270	306	1004	3.350	298	978	3.400	294	965	51
	2	50	2.370	60.2	2.346	59.6	0.114	2.90	4.080	245	804	4.150	241	791	4.220	237	778	4.300	233	764	37
	2½	65	2.991	76.0	2.961	75.2	0.124	3.20	5.710	175	574	5.830	172	564	5.890	170	558	6.020	166	545	27
	3	80	3.492	88.7	3.461	87.9	0.124	3.20	6.720	149	489	6.890	145	476	6.930	144	472	7.100	141	463	24
	4	100	4.484	113.9	4.449	113.0	0.142	3.60	9.750	103	338	10.000	100	328	10.030	100	328	10.280	97	318	16
MEDIUM (B)	½	15	0.854	21.7	0.831	21.1	0.102	2.60	1.210	826	2710	1.220	820	2690	1.250	800	2625	1.260	794	2605	130
	¾	20	1.071	27.2	1.047	26.6	0.102	2.60	1.560	641	2103	1.570	637	2090	1.620	617	2024	1.640	610	2001	100
	1	25	1.346	34.2	1.315	33.4	0.124	3.20	2.410	415	1362	2.430	412	1352	2.490	402	1319	2.510	398	1306	65
	1¼	32	1.689	42.9	1.657	42.1	0.124	3.20	3.100	323	1060	3.130	319	1047	3.200	312	1024	3.230	310	1017	51
	1½	40	1.921	48.8	1.890	48.0	0.124	3.20	3.570	280	919	3.610	277	909	3.680	272	892	3.720	269	883	44
	2	50	2.394	60.8	2.354	59.8	0.142	3.60	5.030	199	653	5.100	196	643	5.170	193	633	5.250	190	623	30
	2½	65	3.016	76.6	2.969	75.4	0.142	3.60	6.430	156	512	6.550	153	502	6.610	151	495	6.730	149	489	24
	3	80	3.524	89.5	3.469	88.1	0.157	4.00	8.370	119	390	8.540	117	384	8.580	117	384	8.760	114	374	19
	4	100	4.524	114.9	4.461	113.3	0.177	4.50	12.200	82	269	12.500	80	262	12.480	80	262	12.690	79	259	14
	5	125	5.535	140.6	5.461	138.7	0.197	5.00	16.600	60	197	17.100	58	190	16.940	59	194	17.440	57	187	10
	6	150	6.539	166.1	6.461	164.1	0.197	5.00	19.700	51	167	20.300	49	161	20.100	50	164	20.710	48	157	7
HEAVY (C)	½	15	0.854	21.7	0.831	21.1	0.124	3.20	1.440	694	2277	1.450	690	2264	1.490	671	2202	1.500	667	2188	110
	¾	20	1.071	27.2	1.047	26.6	0.124	3.20	1.870	535	1755	1.880	532	1745	1.930	518	1700	1.950	513	1683	80
	1	25	1.346	34.2	1.315	33.4	0.157	4.00	2.940	340	1115	2.960	338	1109	3.010	332	1089	3.040	329	1079	55
	1¼	32	1.689	42.9	1.657	42.1	0.157	4.00	3.800	263	863	3.830	261	856	3.900	256	840	3.930	254	833	44
	1½	40	1.921	48.8	1.890	48.0	0.157	4.00	4.390	226	748	4.420	226	741	4.490	223	732	4.530	221	725	37
	2	50	2.394	60.8	2.354	59.8	0.177	4.50	6.190	162	531	6.260	160	525	6.330	158	518	6.400	156	512	27
	2½	65	3.016	76.6	2.969	75.4	0.177	4.50	7.930	126	413	8.050	124	407	8.110	123	404	8.230	121	397	20
	3	80	3.524	89.5	3.469	88.1	0.197	5.00	10.300	97	318	10.500	95	312	10.510	95	312	10.710	93	307	16
	4	100	4.524	114.9	4.461	113.3	0.213	5.40	14.500	69	226	14.800	68	223	14.770	68	223	14.990	67	220	12
	5	125	5.535	140.6	5.461	138.7	0.213	5.40	17.900	56	184	18.400	54	177	18.210	55	180	18.630	54	177	10
	6	150	6.539	166.1	6.461	164.1	0.213	5.40	21.300	47	154	21.900	46	151	21.680	46	151	22.220	45	148	7

Tolerances : **THICKNESS** Light Tube -6%, Medium and Heavy Tubes -10%. **WEIGHT** : Single Tube +10% & -8%, Quantity - 150 metres and above of one size & class ±4%. **LENGTH** . 6 metres ±0.05 metres

TECHNICAL DATA OF BLACK AND GALVANISED STEEL PIPESCONFORMING TO BS EN 39: 2001

SIZE		THICKNESS		NOMINAL MASS		METERS / TONNE		FEET / TONNE		NO. OF PIPES PER BUNDLE (1 TONNE APPROX.)
OUTSIDE DIAMETER				BLACK PLAIN END	GALVANISED PLAIN END	BLACK PLAIN END	GALVANISED PLAIN END	PLAIN BLACK END	PLAIN GALVANISED END	
MM	INCH	MM	INCH	KG/MTR	KG/MTR	METERS	METERS	FEET	FEET	
48.3	1.9	4.0	0.158	4.37	4.48	229	223	751	732	37
48.3	1.9	3.2	0.126	3.55	3.67	281	272	922	892	45

Standard length 6.40 meters +/- 0.05 meters or as per customers requirements

Tolerances :		
	Outside Diameter	± 0.5 mm
	Thickness	-10%
	Nominal mass	-7.5%

15. MINUTES OF HANDING OVER FOR PILOT PROJECT WATER SUPPLY SCHEMES

15.1 Water User Association of Jabal Al Taraf

15.2 Water User Association of Al Kharaba

15.3 Water User Association of Masneat Abdul Aziz

الجمهورية اليمنية
الهيئة العامة لمشاريع مياه الريف
....

بسم الله الرحمن الرحيم

محضر تسليم مشروع مياه .جبل الطرف

إلى جمعية مستخدمي مياه مشروع ..جبل الطرف

انه في يوم الاربعاء...... الموافق ٨ / ٨ /2007م تم تسليم مشروع مياه جبل الطرف..........

قرية جبل الطرف........ عزلة جبل الطرف...... مديرية المحويت...... محافظة المحويت......

والمكون من العناصر التالية :

م	مكونات المشروع	الجهة الممولة/ المساهمة
١ ـ	مضخه عموديه نوع كيراري	الحكومه اليابانيه
٢ ـ	محرك ديزل نوع MWM	" "
٣ـ	مضخه أفقيه	" "
٤ـ	محرك ديزل نوع MWM	" "

وقد تم تسليم المشروع متكاملا وسليما حسب المواصفات والدراسات من قبل شركة الدراسات التابع للحكومه اليابانيه إلى الجمعية ممثلة برئيسها الأخ / احمد أحمد الجمادي........ وبحضور ممثل المجلس المحلي الأخ / يحيى خريف................ ويعتبر هذا إقرار والتزام جهات الاستلام بعدم استعمال مياه المشروع لأي أغراض زراعية أو تجارية سوى كانت خاصة أو عامة وان لا تستعمل مياه المشروع إلا لإغراض الشرب والاستعمالات المنزلية وتزويد المرافق العامة مثل المساجد والمدارس والوحدات الصحية وبحسب إمكانية المشروع كما يعتبر هذا التزام على جمعية مستخدمي المياه المنتخبة من قبل السكان المستفيدين في المحل وعلى المجلس المحلي في المديرية الإشراف على إدارة المشروع وعلى الجمعية ضمانة التشغيل المستمر وتوفير قطع الغيار والصيانة اللازمة للمشروع وتحديد الموارد المالية له وبهذا يعتبر المشروع تحت تصرف ومسؤولية الجمعية ولن تتدخل الهيئة مستقبلا إلا إذا أخلت الجمعية بشروط سوء استعمال المياه وإدارة المشروع أو عند استغلاله لغير المصلحة العامة وعند ذلك يحق للمجلس المحلي التدخل لتغيير الإدارة وتكليف لجنة مؤقتة لإدارة المشروع لحين إجراء انتخابات جديدة .

والله ولي الهداية والتوفيق

رئيس جمعية مستخدمي المياه لمشروع جبل الطرف — المجلس المحلي في المديرية — مدير عام فرع الهيئة بالمحافظة

احمد احمد الجمادي — يحيى خريف

يعتمد

رئيس الهيئة العامة لمشاريع مياه الريف — رئيس المجلس المحلي بالمحافظة

Translation

Republic of Yemen
GARWSP

Minutes of handing over for Jabal Al-Taraf water supply scheme To water user association of Jabal Al-Taraf

On 8th August 2007 (Wednesday), water supply scheme for Jabal Al-Taraf village, Jabal Al-Taraf sub-district, Al-Mahweet District, Al-Mahweet Governorate was handed over, which consists of the following;

No.	Components	Financed by
1	Vertical Shaft Pump (caprari)	Japanese Government
2	Diesel Engine (MWM)	Japanese Government
3	Horizontal Pump	Japanese Government
4	Diesel Engine (MWM)	Japanese Government

The scheme was handed over completely according to specifications and studies performed by JICA study team, to the association represented by its chairman Mr. Ahmed Ahmed Al-Jemadi and by the attendance of local council representative Mr. Yahya Khudaif. This minutes stipulates obligations such that the residents can use water only for drinking, domestic use and supplying public facilities such as mosques, schools and clinics according to water source capacity, and cannot use water for irrigation or commercial purposes. And this minutes applies an obligation on the association selected by the residents and approved by local council to manage and supervise the scheme, and the association should guarantee the sustainability of the scheme and supply of all necessary spare parts for maintenance, and put budget limitation for expenditure. By this, the scheme is under control of the association and GARWSP shall not interrupt it unless the association applies a rule on water consumption.

WUA Chairman | District Local Council | Branch General Director of GARWSP

Chairman of GARWSP | Head of Local Council in Governorate

الجمهورية اليمنية

الهيئة العامة لمشاريع مياه الريف

.....

بسم الله الرحمن الرحيم

محضر تسليم مشروع مياه ..خرابه محيب..

إلى جمعية مستخدمي مياه مشروع ..خرابه محيب

انه في يوم ..السبت.. الموافق ٤ / ٨ /200٧م تم تسليم مشروع مياه ..خرابه محيب..

قرية ..الخرابه.. عزلة ..بني الراعي.. مديرية ..بني مطر.. محافظة ..صنعاء..

والمكون من العناصر التالية :

م	مكونات المشروع	الجهة الممولة/ المساهمة
١	خزان سعه ٥٠م٣	الحكومه اليابانيه
٢	خطوط ضخ وراساله مختلف الاقطار	" "
٣- ٤-	مضاهل عامه غرفه ضخ	" " " "
٥-	مضخات ضخ	" "
٦- ٧-	مضخه كهربائيه غاطسه مولد كهرباء	" " " "

وقد تم تسليم المشروع متكاملا وسليما حسب المواصفات والدراسات من قبل ..شركة الدراسه التابعه للوكاله اليابانيه للتعاون الدولي (جايكا)..

إلى الجمعية ممثلة برئيسها الاخ / ..عاضل صالح جابر البعجاني.. وبحضور ممثل المجلس المحلي الاخ /..وكيل محمد محمد المصري.. أمين عام المجلس المحلي ويعتبر هذا إقرار والتزام جهات الاستلام بعدم استعمال مياه المشروع لأي أغراض زراعية أو تجارية سوى كانت خاصة أو عامة وان لا تستعمل مياه المشروع إلا لإغراض الشرب والاستعمالات المنزلية وتزويد المرافق العامة مثل المساجد والمدارس والوحدات الصحية وبحسب إمكانية المشروع كما يعتبر هذا التزام على جمعية مستخدمي المياه المنتخبة من قبل السكان المستفيدين في المحل وعلى المجلس المحلي في المديرية الإشراف على إدارة المشروع وعلى الجمعية ضمانة التشغيل المستمر وتوفير قطع الغيار والصيانة اللازمة للمشروع وتحديد الموارد المالية له وبهذا يعتبر المشروع تحت تصرف ومسؤولية الجمعية ولن تتدخل الهيئة مستقبلا إلا إذا أخلت الجمعية بشروط سوء استعمال المياه وإدارة المشروع أو عند استغلاله لغير المصلحة العامة وعند ذلك يحق للمجلس المحلي التدخل لتغيير الإدارة وتكليف لجنة مؤقتة لإدارة المشروع لحين إجراء انتخابات جديدة .

والله ولي الهداية والتوفيق

رئيس جمعية مستخدمي مياه المشروع ..خرابه محيب.. المجلس المحلي في المديرية مدير عام فرع الهيئة بالمحافظة

رئيس الهيئة العامة لمشاريع مياه الريف رئيس المجلس المحلي بالمحافظة

Translation

Republic of Yemen
GARWSP

Minutes of handing over for Al-Kharaba water supply scheme To water user association of Al-Kharaba

On 4th August 2007 (Saturday), water supply scheme for Al-Kharaba village, Bani Al-Ra'ee sub-district, Bani Matar District, Sana'a Governorate was handed over, which consists of the following:

No.	Components	Financed by
1	Water Storage Tank (50m³)	Japanese Government
2	Pumping and Distribution Main Pipeline	Japanese Government
3	Public Taps	Japanese Government
4	Pump House	Japanese Government
5	Pumping Unit - Submersible Motor Pump - Engine Generator	Japanese Government

The scheme was handed over completely according to specifications and studies performed by JICA study team, to the association represented by its chairman Mr. Fadhil Saleh Jarallah Awadh and by the attendance of local council representative Mr. Bakil Yahya Mohammed Al-Matari. This minutes stipulates obligations such that the residents can use water only for drinking, domestic use and supplying public facilities such as mosques, schools and clinics according to water source capacity, and cannot use water for irrigation or commercial purposes. And this minutes applies an obligation on the association selected by the residents and approved by local council to manage and supervise the scheme, and the association should guarantee the sustainability of the scheme and supply of all necessary spare parts for maintenance, and put budget limitation for expenditure. By this, the scheme is under control of the association and GARWSP shall not interrupt it unless the association applies a rule on water consumption.

WUA Chairman | District Local Council | Branch General Director of GARWSP

Chairman of GARWSP | Head of Local Council in Governorate

الجمهورية اليمنية

الهيئة العامة لمشاريع مياه الريف

.....

بسم الله الرحمن الرحيم

محضر تسليم مشروع مياه .....

إلى جمعية مستخدمي مياه مشروع .....

انه في يوم ..... الموافق ٣١ / ٧ / 2007م تم تسليم مشروع مياه .....

قرية ..... عزلة ..... مديرية ..... محافظة .....

والمكون من العناصر التالية :

م	مكونات المشروع	الجهة الممولة/ المساهمة
١	خزان ارضي سعة ٥٠ م٣	الهيئة
٢	خطوط ضخ وانابيب مختلفة الاقطار	الحكومة اليابانية
٣	غرفة ضخ	
٤	وحدات ضخ ولوحة كهربائية	الحكومة اليابانية
٥	مناهل عامة عدد ٢	الحكومة اليابانية

وقد تم تسليم المشروع متكاملا وسليما حسب المواصفات والدراسات من قبل ..... إلى الجمعية ممثلة برئيسها الأخ / ..... وبحضور ممثل المجلس المحلي الأخ / ..... ويعتبر هذا إقرار والتزام جهات الاستلام بعدم استعمال مياه المشروع لأي أغراض زراعية أو تجارية سوى كانت خاصة أو عامة وان لا تستعمل مياه المشروع إلا لإغراض الشرب والاستعمالات المنزلية وتزويد المرافق العامة مثل المساجد والمدارس والوحدات الصحية وبحسب إمكانية المشروع كما يعتبر هذا التزام على جمعية مستخدمي المياه المنتخبة من قبل السكان المستفيدين في المحل وعلى المجلس المحلي في المديرية الإشراف على إدارة المشروع وعلى الجمعية ضمانة التشغيل المستمر وتوفير قطع الغيار والصيانة اللازمة للمشروع وتحديد الموارد المالية له وبهذا يعتبر المشروع تحت تصرف ومسؤولية الجمعية ولن تتدخل الهيئة مستقبلا إلا إذا أخلت الجمعية بشروط سؤ استعمال المياه وإدارة المشروع أو عند استغلاله لغير المصلحة العامة وعند ذلك يحق للمجلس المحلي التدخل لتغيير الإدارة وتكليف لجنة مؤقتة لإدارة المشروع لحين إجراء انتخابات جديدة .

والله ولي الهداية والتوفيق

رئيس جمعية مستخدمي المياه لمشروع ..... المجلس المحلي في المديرية ..... مدير عام فرع الهيئة بالمحافظة

رئيس الهيئة العامة لمشاريع مياه الريف ..... رئيس المجلس المحلي بالمحافظة

Translation

Republic of Yemen
GARWSP

Minutes of handing over for Masneat Abdul Aziz water supply scheme To water user association of Masneat Abdul Aziz

On 31st July 2007 (Tuesday), water supply scheme for Masneat Abdul Aziz village, Zabid sub-district, Mayfa'at Ans District, Dhamar Governorate was handed over, which consists of the following:

No.	Components	Financed by
1	Ground Water Storage Tank (25m³)	GARWSP
2	Pumping and Distribution Main Pipeline	Japanese Government
3	Pump House	Village
4	Pumping Unit - Submersible Motor Pump - Engine Generator	Japanese Government
5	Public taps (2)	Japanese Government

The scheme was handed over completely according to specifications and studies performed by JICA study team, to the association represented by its chairman Mr. Naser Ali Jabran Al-Ansi and by the attendance of local council representative Mr. Bakil Yahya Mohammed Al-Matari. This minutes stipulates obligations such that the residents can use water only for drinking, domestic use and supplying public facilities such as mosques, schools and clinics according to water source capacity, and cannot use water for irrigation or commercial purposes. And this minutes applies an obligation on the association selected by the residents and approved by local council to manage and supervise the scheme, and the association should guarantee the sustainability of the scheme and supply of all necessary spare parts for maintenance, and put budget limitation for expenditure. By this, the scheme is under control of the association and GARWSP shall not interrupt it unless the association applies a rule on water consumption.

WUA Chairman | District Local Council | Branch General Director of GARWSP

Chairman of GARWSP | Head of Local Council in Governorate

16. COLLECTED DATA

16.1 Existing Drilling Data

16.2 Meteorological Data

16.3 Hydrological Data

16.1 Existing Drilling Data

(Based on available documents from GARWSP)

Well Code: A – 01

Republic of Yemen
Local Council – Mahwit Governorate
Engineering Unit

Report on specifications & works completed

Project name:- Al-Sha'afel Drinking water Project
District name:- Al-Khabat Governorate: Mahawat
Type of Project: Drilling of a deep well Total depth: (190)

Ser	Description	Unit	Qty executed	remarks
1	Surface drilling with dia (17½) inches	Meter	99	
2	Surface casing with dia (12¾) inches	" " "	99.5	
3	Experimental drilling with dia (8⅝) inches	" " "	91	
4	Widening the drilling with dia (12¼) inches	" " "	91	
5	Install blank casing with dia (8⅝) inches	" " "	118	
6	Install screen casing with dia (8⅝) inches	" " "	72	
7	Discharge	Cu.m/sec	19.02	
8	SWL	Meter	27	
9	DWL	Meter	177	

Well Code: A - 02
Detailed report on supervision of drinking water well

General Electricity and Rural Water Authority
General Administration for Water Projects
Drilling Department

Technical specifications of the well at: **Jabel Al-Taref , Mahawait** Disrict
Mahawait Governorate

First: Well Description:-

1- Total Depth:- 165m (one hundred sixty-five meters)
2- Drilling depth & diameters

25 m	Dia 17″
--	Dia 13″
248 m	Dia 12¼″
33 m	Dia 7⅞″

3- Casing (dia. & length)

	Dia 12¾″
	Dia 10″
	Dia 8⅝

4- Screen

	Dia 8⅝″

5- Water levels:

	By drilling machine	Pump
S.W.L.	40 m	26.70 m
D.W.L.	60 m	54 m
Discharge	70 g/min	100 g/min

6- Time of filtering by the drilling machine: (30) hrs.
7- Time of pumping test : (24) hrs.
8- Proposed depth for pump installation: (123) m
Remarks:-
It should be taken into consideration that when designing and executing civil works, that filters should be put on tanks to clean the water through out the experimental drilling

Drilling supervising Engineer: Osman Gasem

Well Code: A - 04
Detailed report on supervision of drinking water well

General Electricity and Rural Water Authority
General Administration for Water Projects
Drilling Department

Technical specifications of the well at: **Khamees Beni Saad , Beni Saad** Disrict **Mahawait** Governorate
Drilling started 31/07/2001 finished on 08/08/2001

First: Well Description:-

6- Total Depth:- 92 m (ninety-two meters)
7- Drilling depth & diameters

5 m	Dia 17″
85	Dia 13″
2 m	Dia 7⅞″

8- Casing (dia. & length)

5	Dia 14″
32	Dia 10″
60	Dia 10

9- Screen

	Dia 8⅝″

10- Water levels:

	By drilling machine	Pump
S.W.L.	12 m	65 m
D.W.L.	12 m	65 m
Discharge	80 g/min	80 g/min

6- Time of filtering by the drilling machine: (24) hrs.
7- Time of pumping test : (24) hrs.
8- Proposed depth for pump installation: (72) m
Remarks:-
It should be taken into consideration that when designing and executing civil works, that filters should be put on tanks to clean the water through out the experimental drilling

Drilling supervising Engineer: Saeed Anam

Well Code: S -01/1

Project's name: Bani Waleed Water Project | District: Al-Haima Al-Kharigia
Project's No. | Directorate: Sana'a

Water Resources

Type: Artesian well
Discharge: 50 g/m - 3.155 l/sec (by pump)
S.W.L.: 85 m
D.W.L.: 210 m
Total Depth: 348 m
Casing dia: 8⅝″
Financing Authority: GARWP
Drilling date: 24/05/2005
Supervising Engineer: Shamsan Ahmed Mohammed
Drilled by: Mabkhoot Kayed Al-Brogi
Testing supervisor: Eng./ Shamsan + Eng./ Ibrahim Al-Gaberi
Testing date: /05/2005
Testing hrs: 34 hrs
Assumed guaranteed discharge: 45 g/m
Pump installation depth: 210 m
Results of water analysis: potable

Well Code: S -01/2

Project's name: Al-Asbor Water Project | District: Al-Haima Al-Kharigia
Project's No. | Directorate: Sana'a

Water Resources

Type: Artesian well
Discharge: 99 g/m - 6.246 l/sec (by pump)
S.W.L.: 85 m
D.W.L.: 120 m
Total Depth: 300 m
Casing dia: 8⅝″
Financing Authority: GARWP
Drilling date: 11/05/2005
Supervising Engineer: Shamsan Ahmed Mohammed
Drilled by: Mabkhoot Kayed Al-Brogi
Testing supervisor: Eng./ Shamsan + Eng./ Ibrahim Al-Gaberi
Testing date: /05/2005
Testing hrs: 27 hrs
Assumed guaranteed discharge: 80 g/m
Pump installation depth: 246 m
Results of water analysis: potable

Well Code: S- 02

General Authority for Rural Water Projects
Water Projects General Administration
Drilling Department

Well's Technical Specifications

Site: Jarban District: Hamdan Directorate: Sana'a
Executing company: Mojahed Al-Lahim
Drilling date: 10/11/2004 up to 04/02/2005 Well design:
Well Description:-

1- Total Depth:- 450 m (four hundred fifty meters)
2- Drilling depth & diameters

2 M	17″
388 m	Dia 15″
52	Dia 13″
	Dia 12¼″
8 m	Dia 7⅞″

3- Casing (dia. & length)

2 M	Dia 15″
352	Dia 10″
	Dia 8⅝

4- Screen

88 m	Dia 8⅝″

5- Water levels:

	By drilling machine	Pump
S.W.L.	None	340
D.W.L.	None	390*
Discharge		55 g/m

* Depth of testing pump
6- Time of filtering by the drilling machine: (60) hrs.
7- Time of pumping test : (24) hrs.
8- Assumed guaranteed discharge: 55 g/m due to weakness of testing pump, the supervising engineer thinks that the result could be greater than this.
9- Proposed depth for pump installation: 430 m
10- Results of water analysis: potable
11- Drilling supervising Engineer: Bassel Ba-Khattar

Remarks:- Gravel wrapper has been made around the casing and also concrete terrace around the well opening.

Competent Engineer
(signed)

Director of Studies, Supervision & follow- up
(signed)

Well Code: S-02
Detailed report on supervision of drinking water well

General Electricity and Rural Water Authority
General Administration for Water Projects
Drilling Department

Technical specifications of the well at: Jarban**, Hamden** District
Sana'a Governorate

Well Description:-

1- Total Depth:-450m (four hundred & fifty meters)
2- Drilling depth & diameters

2 m	Dia 17 ″
388m	Dia 10 ″
52m	Dia 13 ″
8 m	Dia $7\,^{7}/_{8}$ ″

3- Casing (Dia. & length)

2m	Dia $10\,^{3}/_{4}$ ″
354m	Dia 10 ″
9m	Dia 10 "

4- Screen

m - 9 m	Dia 10 ″

5- Water levels:

	By drilling machine	Pump
S.W.L.	340m	340m
D.W.L.	-m	390m
Discharge	g/min	55g/min

6- Time of filtering by the drilling machine: (60) hrs.
7- Time of pumping test : (24) hrs.
8- Proposed depth for pump installation: (435) m

Remarks:-
**Complete data provided.*
T.D.S 280 mg/l, E.C 400ms, PH 7.3, Temp. 22
Fluoride (F) 0.74 acceptable limit 0.5-1.5,

Drilling supervising Engineer: **Nash wan AbdulNur**

Well Code: S -03

Studies & Designs Department

Project's name: Al-Kharaba Water Project District: Bani Matar
Project's No. Directorate: Sana'a

Water Resources

Type: Artesian well
Discharge: 72 g/m - 4.58 l/sec
S.W.L.: ? m
D.W.L.: 130 m
Total Depth: 150 m
Casing dia: 8⅝″
Type of casing material:
Drilled by:
Test supervising Engineer:
Testing date: Pursuant to information from inhabitants
Testing hrs: 27 hrs
Assumed guaranteed discharge: g/m
Proposed enhancement to the resource:
Deepening:
Cleaning:
Internal casing:
Resource improvement;
Upper cover:
Others:

Well Code: S -04

Studies & Designs Department

Project's name: Qamlan Water Project District: Bani Matar

Project's No. Directorate: Sana'a

Water Resources

Type: Artesian well
Discharge: 72 g/m - 4.50 l/sec
S.W.L.: 35 m
D.W.L.: 100 m
Total Depth: 145 m
Casing dia: 8⅝″
Type of casing material:
Drilled by:
Test supervising Engineer:
Testing date:
Testing hrs:
Assumed guaranteed discharge: 40 g/m
Proposed enhancement to the resource:
Deepening:
Cleaning:
Internal casing:
Resource improvement;
Upper cover:
Others:

Well Code: S- 05

Republic of Yemen
General Authority for Rural Water Projects

Sana'a Branch Date: / /

Tender No. ( ) Form

Studies, Supervision & Follow-up Department

Project name:	A'afesh	**W. resource**	Artesian well	**Total depth**	Project's data (m)
District	Blad Alroos	**Casing dia**	8⅝″	**Discharge**	g/m
Governorate	Sana'a	**Resource temp**	C°	**S.W.L**	
				D.W.L	
				Inst. Depth	270 m
				Network dia	3″

(2) Electrical submerging pump description

Discharge	300 g/m		%	casing material	
Total raising	290 m	Max pump/motor dia	″	Type of pump	
Speed not exceed	2900 c/m	Fan material			

(3) Pipes & cable description

Number of pipes	45	Pipe thickness	5 mm	Cable cross-section	2 mm
Pipe dia	3″	Pipe material	CPV	Insulator material	
Pipe length	6 m	Cable length	290 m	Shape of cable	

(4) Dynamo descriptions

Capacity	80 KVA	Power	220/380	Type	
Speed	(c/m)	Freq.	50 hertz		
Cooling system	Cap Factor	0.8			

The Motor should be provided with the following :-
Measuring devices (pressure – temperature – motor speed) – light alarm – protective automatic disconnection – it is also required a control board equipped with all protections + AT

Basic accessories after the supply:-

1- Test certificates endorsed by factory's stamp.
2- Catalogues that show the following :- (components – necessary data – operation and maintenance)
3- Leaflet of the motor's spare parts.
4- Necessary kit according to the catalogue.
5- Installation accessories – fixing the base – pressure gauge – valves – centrifugal pipe

Engineer Technical Affairs Director of Studies, Supervision & Follow-up Department

Approved by

Branch General Manager

Well Code: S- 06

General Authority for Rural Water Projects
Water Projects General Administration
Drilling Department

Well's Technical Specifications

Site: Al- Lejam District: Kholan Directorate: Sana'a
Executing company: Ali Sarhan Al-Dudaibi
Drilling date: 05/06/1996 up to 20/07/1996 Well design:
Well Description:-

1-Total Depth:- 300 m (three hundred meters)
2-Drilling depth & diameters

3.5 m	Dia 15″
	Dia 13″
296.5 m	Dia 12¼″
	Dia 7⅞″

3-Casing (dia. & length)

3.5 m	Dia 12¼″
……	Dia 10″
228 m	Dia 8⅝

4-Screen

72 m	Dia 8⅝″

5-Water levels:

	By drilling machine	Pump
S.W.L.	60 m	
D.W.L.	180 m	
Discharge	80 g/m	

6- Time of filtering by the drilling machine: (24) hrs.
7- Time of pumping test : (/) hrs.
8- Proposed depth for pump installation: 220 m
9- Drilling supervising Engineer: Ali A'atia

Remarks:-

Competent Engineer (signed)

Director of Drilling Department (signed)

Well Code: S-08.
Detailed report on supervision of drinking water well

General Electricity and Rural Water Authority
General Administration for Water Projects
Drilling Department

Technical specifications of the well at: **Daja & Sarfa, Bani Bah lulu & Sanhan,** District **Sana'a** Governorate

First: Well Description:-

1- Total Depth:- **672**m (six hundred seventy two_ meters)
2- Drilling depth & diameters

52m	Dia 17 ″
620m	Dia 13 ″

3- Casing (10 $^{3}/_{4}$." & 500m)

52m	Dia 14 ″
492m	Dia 10 ^{¾} ″

4- Screen

180m	Dia 10 $^{3}/_{4}$ ″

5- Water levels:

	By drilling machine	Pump
S.W.L.	530m	m
D.W.L.	550m	m
Discharge	130g/min	g/min

6- Time of filtering by the drilling machine: (24) hrs.
7- Time of pumping test : (36) hrs.
8- Proposed depth for pump installation: (667) m

Remarks:-
Turbidity (unit): high, PH: 8.5, T.D.S: 630.5mg/l, E.C 970($_{\mu}$s/cm), Temp.42c^{0}
Fluorides: 4 (P.P.M) accepted limit 1-1.5, Alkalinity; 240 accepted limit 100-200.

Drilling supervising Engineer: **Ibrahim AlJabri**

Well Code: S- 09

Republic of Yemen
General Authority for Rural Water Projects — No.:
Sana'a Branch — Date: / /
Projects Administration
Drilling & Survey Section

Report of Well Receipt

Dear/ General Manager,

Please find below a detailed report about receipt of the the well of ***Ruhm- Bani Bahalool*** District, which has been executed by ***YEC*** Corporation, in which the well's description and results of the final tests had been carried out, as follows:-

1- Site name:- Upper & Lower Ruhm District: Sanhan Governorate: Sana;a

2- Total depth: 470 m (four hundred seventy meters only).

3-Drilling depth & diameters

53 m	Dia 17″
	Dia 13″
397 m	Dia 12¼″
20	Dia 7⅞″

4-Casing (dia. & length)

53 m	Dia 12¼″
……	Dia 10″
360 m	Dia 8⅝

5-Screen

90 m	Dia 8⅝″

6-Water levels:

	By drilling machine	Pump
S.W.L.	159	158
D.W.L.	240	250
Discharge	80 g/m	116 g/m

7- Time of filtering by the drilling machine: (24) hrs.

8- Time of pumping test : (36) hrs.

9- Results of water analysis: potable

10- Date of drilling: 04/03/2004 – 20/04/2004

11- Date of testing:0/06/2994

Remarks:-

Supervising Engineer — Director of Drilling Department
(signed) — (signed)

Well Code: S- 10

General Authority for Rural Water Projects
Water Projects General Administration
Drilling Department

Well's Technical Specifications

Site: Tawaer District: Al-Hasn Directorate: Sana'a
Executing company: Mojahed Al-Lahim
Drilling date: 11/07/2004 up to 09/08/2004 Well design:
Testing date: 12/08/2004 – 14/08/2004
Well Description:-

1-Total Depth:- 310 m (three hundred and ten meters)
2-Drilling depth & diameters

10 m	Dia 17″
300 m	Dia 12″
	Dia 12¼″
	Dia 7⅞″

3-Casing (dia. & length)

10 m	Dia 12¼″
……	Dia 10″
214 m	Dia 8⅝

4-Screen

96 m	Dia 8⅝″

5-Water levels:

	By drilling machine	Pump
S.W.L.	65 m	50 m
D.W.L.	100 m	120 m
Discharge	90 g/m	110 g/m

6- Time of filtering by the drilling machine: (24) hrs.
7- Time of pumping test : (/) hrs.
8- Proposed depth for pump installation: 220 m
9- Drilling supervising Engineer: Ali A'atia

Remarks:-

Competent Engineer Director of Drilling Department
(signed) (signed)

Well Code: S- 11

General Authority for Rural Water Projects
Water Projects General Administration
Drilling Department

Well's Technical Specifications

Site: Al-Hasen Al-Abiadh District: Jahana Directorate: Sana'a
Executing company: Mahadi Rashed Abu Ali
Drilling date: 15/02/2005 up to 20/03/2005 Well design:
Well Description:-

1-Total Depth:- 350 m (three hundred and fifty meters)
2-Drilling depth & diameters

18 m	Dia 15″
	Dia 13″
332	Dia 12¼″
	Dia 7⅞″

3-Casing (dia. & length)

	Dia 12 ¾″
18 m	Dia 10″
260 m	Dia 8⅝

4-Screen

96 m	Dia 8⅝″

5-Water levels:

	By drilling machine	Pump
S.W.L.	180 m	135 m
D.W.L.	250 m	270 m
Discharge	80 g/m	87 g/m

6- Time of filtering by the drilling machine: (24) hrs.
7- Time of pumping test : (24) hrs.
8- Well's guaranteed discharge: (75) g/m
9- Proposed depth for pump installation: (300) m
10- Results of water analysis: potable
11- Drilling supervising Engineer: Ibrahim Al-Gaberi

Remarks:-

Competent Engineer Director of Studies, Supervision & Follow-up
(signed) (signed)

Well Code: S -12

Project's name: Mahdah Water Project | District: Jahanah
Project's No. | Directorate: Sana'a

Water Resources

Type: Artesian well
Well ownership: The Authority
Total depth: (350) m
Discharge: 80 g/m
S.W.L.: 150 m
D.W.L.: 270 m
Casing dia: 8⅝″
Financing Authority: GARWSP
Drilling date: / /
Supervising Engineer: Shamsan Ahmed Mohammed
Drilled by:
Testing supervisor: Eng./ Shamsan
Testing date: / /
Testing hrs: 24 hrs
Assumed guaranteed discharge: g/m
Pump installation depth: m
Results of water analysis:

Well Code: S-13
Detailed report on supervision of drinking water well

General Electricity and Rural Water Authority
General Administration for Water Projects
Drilling Department

Technical specifications of the well at: **_Al Jarah, Al-Tyal_-Kholan** District **Sana'a** Governorate

Well Description:-

1- Total Depth:-840m (eight hundred forty meters)
2- Drilling depth & diameters

6m	Dia 17 ″
834m	Dia 13 ″
m	Dia ″
m	Dia ″

3- Casing (Dia. & length) AP 1.5L

6m	Dia 14″
510m	Dia 10 ¾″
	Dia

4- Screen

m - 330 m	Dia 10 ¾″

5- Water levels:

	By drilling machine	Pump
S.W.L.	550m	m
D.W.L.	650m	m
Discharge	g/min	g/min

6- Time of filtering by the drilling machine: (24) hrs.
7- Time of pumping test : (36) hrs.
8- Proposed depth for pump installation: (800) m
Remarks:-
*Most data not clear; as a result of bad copying.
T.D.S: 620mg/l, E.C 900 µs/cm, PH: 8.5, Temp. 46

Drilling supervising Engineer: **Ibrahim Al Jabri**

Well Code: S-14

Project's name: Al-Ghail | District: Nehm
Project's No. | Directorate: Sana'a

Water Resources

Type: Artesian well
Discharge: 40 g/m - 2.52 l/s
S.W.L.: 130 m
D.W.L.: 160 m
Total depth: (185) m
Casing dia:
Financing Authority: GARWP
Drilling date: / /
Supervising Engineer:
Drilled by:
Testing supervisor:
Testing date: / /
Testing hrs: 24 hrs
Assumed guaranteed discharge: 40 g/m
Pump installation depth: m
Results of water analysis:

* Well's specifications has been taken from Projects Administration Archive.

Well Code: D-01

Project's name: Elow Al-Miklaf District: Jabal Al-Sharq
Project's No. Directorate: Dhamar

Water Resources

Type: Artesian well
Well ownership: The Authority
Total depth: (272) m
Surface casing dia: 12 ¾″
Inner casing dia.: 8⅝″
Type of casing material:
S.W.L.: 150 m
D.W.L.: 220 m
Discharge: 80 g/m
Drilled by: Authority by the drilling machine of Contractor: Abdulkhaleq Al-Gooli
Supervising Engineer: Aref Saeed Mohsen
Testing date: / /
Testing hrs: 24 hrs
Assumed guaranteed discharge: g/m
Pump installation depth: m
Results of water analysis: potable
Proposed enhancement to the resource:
Deepening: …….
Cleaning: ……
Internal casing: ……..
Resource improvement: …….
Upper cover: …….
Others:
……
……
……
……

Well Code: D-02

Project's name: Hamel Bait Al-Jabel District: Jabal Al-Sharq
Project's No. Directorate: Dhamar

Water Resources

Type: Artesian well
Discharge: g/m - l/s
S.W.L.: 180 m
D.W.L.: 260 m
Total depth: (310) m
Casing dia:
Type of casing material:
Drilled by: The Authority
Testing was carried by: The Authority
Testing date: / /
Testing hrs:
Assumed guaranteed discharge: g/m
Deepening: …….
Cleaning: ……
Internal casing: ……..
Resource improvement: …….
Upper cover: …….
Others:
……

Well Code: D-03

Project's name: Hegrat Al Asham | District: Jabal Al-Sharq
Project's No. | Directorate: Dhamar

Water Resources

Type: Artesian well
Well ownership: The Authority
Total depth: (320) m
Surface casing dia:
Inner casing dia.:
Type of casing material:
S.W.L.: 225 m
D.W.L.: 270 m
Discharge: 79 g/m
Drilled by: the drilling machine of Contractor: Abdulkhaleq Al-Gooli
Supervising Engineer: Aref Saeed Mohsen
Testing date: 28 /11 / 1999
Testing hrs: 24 hrs
Assumed guaranteed discharge: g/m
Pump installation depth: m
Results of water analysis: potable
Proposed enhancement to the resource:
Deepening: …….
Cleaning: ……
Internal casing: ……..
Resource improvement: …….
Upper cover: …….
Others:
……
……
……
……

Well Code: D- 04

General Authority for Rural Water Projects
Water Projects General Administration
Drilling Department

Well's Technical Specifications

Site: Al-kuob District: Anes (Duran) Directorate: Dhamar
Executing company: Mahdi Rashed Abu Ali
Drilling date: 19/04/1999 up to 28/04/1999 Well design:
Well Description:-

1- Total Depth:- 152 m (One hundred fifty meters)
2- Drilling depth & diameters

5 m	Dia 15″
147 m	Dia 12″
	Dia 8″

3- Casing (dia. & length)

2 m	Dia 15″
	Dia 10″
104 m	Dia 8⅝

4- Screen

48 m	Dia 8⅝″

5- Water levels:

	By drilling machine	Pump
S.W.L.		90 m
D.W.L.		120 m
Discharge		3.7 l/s

6- Time of filtering by the drilling machine: (24) hrs.
7- Time of pumping test : (24) hrs.
8- Proposed depth for pump installation: 125 m
9- Drilling supervising Engineer: Abdulghani

Remarks:-

Well Code: D-06

Project's name: Wardasan | District: Anes
Project's No. | Directorate: Dhamar

Water Resources

Type: Artesian well
Well ownership: The community
Total depth: (22) m
Surface casing dia:
Inner casing dia.:
Type of casing material:
S.W.L.: 30 m
D.W.L.: 120 m
Discharge: 84 g/m
Supervising Engineer: Abdulghani
Testing date: 09 /04 / 2004 -10/04/204
Testing hrs: 24 hrs
Assumed guaranteed discharge: g/m
Pump installation depth: m
Results of water analysis
Proposed enhancement to the resource:
Deepening: …….
Cleaning: ……
Internal casing: ……..
Resource improvement: …….
Upper cover: …….
Others:
……
……
……
……

Well Code: D-07

Project's name: Al-Asakera | District: Mayfa'a
Project's No. | Directorate: Dhamar

Water Resources

Type: Artesian well
Discharge: 70 g/m
S.W.L.: 230 m
D.W.L.: 260 m
Total depth: (304) m
Casing dia: 27 / 12 ¾″ - 204 / 8⅝ - Screen 60 m
Type of casing material:
Drilled by: The Authority
Supervising Engineer: Abdulghani
Testing date: / /
Testing hrs: Has not been tested
Assumed guaranteed discharge: g/m
Pump installation depth: m
Results of water analysis:
Deepening: …….
Cleaning: ……
Internal casing: ……..
Resource improvement: …….
Upper cover: …….
Others:
……
……

Well Code: D-08

Project's name: Masneat Abdulaziz District: Mayfa'a
Project's No. Directorate: Dhamar

Water Resources

Type: Artesian well
Well ownership: Puplic
Total depth: (268) m
Surface casing dia: 12 ¾″
Inner casing dia.: 8⅝
Type of casing material: iron
S.W.L.: 70 m
D.W.L.: 200 m
Discharge: 87 g/m
Driiled by: Authority
Supervising Engineer: A'aref Al-Hamadi
Testing date:
Testing hrs: 24 hrs
Assumed guaranteed discharge: 70 g/m
Pump installation depth: m
Results of water analysis potable
Proposed enhancement to the resource:
Deepening: …….
Cleaning: ……
Internal casing: ……..
Resource improvement: …….
Upper cover: …….
Others:
……
……
……
……

Well Code: I - 01
Detailed report on supervision of drinking water well

Dear/ Branch Manager,
Please find below a detailed report about drilling the well of ***Al-Sana Beni Saba*** Sub-district, ***Al-Qafer*** District, ***IBB*** Governorate, which has been executed by ***Abdul Khaleg Al-Goly*** Co./ Est. The drilling was carried out from 08/08 /2005 to 30/08/2005.

Well Description:-

1- Total Depth:- 305 m (three hundred five meters)
2- Drilling depth & diameters

24 m	Dia 15″
--	Dia 13″
248 m	Dia 12¼″
33 m	Dia 7⅞″

3- Casing (dia. & length)

	Dia 12¾″
	Dia 10″
	Dia 8⅝

4- Screen

	Dia 8⅝″

5- Water levels:

	By drilling machine	Pump
S.W.L.	180 m	180 m
D.W.L.	220 m	210 m
Discharge	50 g/min	60 g/min

6- Time of filtering by the drilling machine: (24) hrs.
7- Time of pumping test : (24) hrs.
8- Proposed depth for pump installation: 220 m
Remarks:-
A concrete foundation has been built around the well's opening 1 m X 1 m X 50 cm

Drilling supervising Engineer: Osman Gasem

Well Code: I - 02
Detailed report on supervision of drinking water well

Dear/ Branch Manager,
Please find below a detailed report about drilling the well of ***Al-Sana Najed Saheb*** Sub-district, ***Al-Makhader*** District, ***IBB*** Governorate, which has been executed by ***Abdul Khaleg Al-Goly*** Co./ Est. The drilling was carried out from 02/04 /2005 to 27/04/2005.

Well Description:-

1- Total Depth:- 272 m
2- Drilling depth & diameters

20	Dia 17″
--	Dia 15″
--	Dia 13″
250	Dia 12¼″
2	Dia 7⅞″

3- Casing (dia. & length)

20 --	Dia 13 ″
--	Dia 12¾″
--	Dia 10
151 --	Dia 8⅝

4- Screen

120 --	Dia 8⅝

5- Water levels:

	By drilling machine	Pump
S.W.L.		39 m
D.W.L.		201 m
Discharge		66 g/min

6- Time of filtering by the drilling machine: (24) hrs.
7- Time of pumping test : (36) hrs.
8- Proposed depth for pump installation: - (210 m)
Remarks:- Test was done before widening.
A concrete foundation has been built around the well's opening 1 m X 1 m X 50 cm

Drilling supervising Engineer: - Yaser Ahmed Kayed

Well Code: I - 03
Detailed report on supervision of drinking water well

Dear/ Branch Manager,
Please find below a detailed report about drilling the well of ***Mumsa Al-Mergab*** Sub-district, ***Al-Makhader*** District, ***IBB*** Governorate, which has been executed by ***Abdul Khaleg Al-Goly*** Co./ Est. The drilling was carried out from 23/03/2005 to 01/04/2005.

Well Description:-

1- Total Depth:-
2- Drilling depth & diameters

36 --	Dia 17″
---	Dia 15″
---	Dia 13″
39 --	Dia 12¼″
3 --	Dia 7⅞″

3- Casing (dia. & length)

36 --	Dia 13 ″
----	Dia 12¾″
---	Dia 10
29	Dia 8⅝

4- Screen

	Dia

5- Water levels:

	By drilling machine	Pump
S.W.L.	35 m	30 m
D.W.L.	45 m	45 m
Discharge	100 g/min	120 g/min

6- Time of filtering by the drilling machine: (24) hrs.
7- Time of pumping test : (36) hrs.
8- Proposed depth for pump installation: - (60 m)
Remarks:-
A concrete foundation has been built around the well's opening 1 m X 1 m X ½ m

Drilling supervising Engineer: - Yaser Ahmed Kayed

Well Code: I - 04

Detailed report on supervision of drinking water well

Dear/ Branch Manager,

Please find below a detailed report about drilling the well of ***Al-Mishraq*** Sub-district, ***Ibb*** District, ***IBB*** Governorate, which has been executed by ***Al-Hubaish*** Co./ Est. The drilling was carried out from 13/02 /2005 to 23/02/2005.

Well Description:-

1- Total Depth:- 305 m (three hundred five meters)

2- Drilling depth & diameters

3 m	Dia 15″
--	Dia 13″
297 m	Dia 12¼″
	Dia 7⅞″

3- Casing (dia. & length)

3	Dia 12¾″
--	Dia 10″
195	Dia 8⅝

4- Screen

105	Dia 8⅝″

5- Water levels:

	By drilling machine	Pump
S.W.L.	139,5 m	70 m
D.W.L.	140,7 m	150 m
Discharge	70 g/min	4,4 L/min

6- Time of filtering by the drilling machine: (8) hrs.

7- Time of pumping test : (24) hrs.

8- Proposed depth for pump installation: 180 m

Remarks:-

……
……
……

Drilling supervising Engineer: Abdul-Mogeni Albasheri

Well Code: T- 02

Detailed report on supervision of drinking water well

Dear/ Branch Manager,

Please find below a detailed report about drilling the well of ***Bani Al-Suror*** Sub-district, ***Al-Ma'afer { (Al-Mawaset)- Al-Nashema}*** District, ***Taiz*** Governorate, which has been executed by ***Abdul Khaleg Al-Goly*** Co./ Est. The drilling was carried out from 08/08 /2005 to 30/08/2005.

Well Description:-

1- Total Depth:- 90 m (ninety meters)

2- Drilling depth & diameters

Surface digging	
Experimental digging	
Widening the Experimental digging	

3- Casing (dia. & length)

Surface casing	
(final) casing	

4- Screen

5- Water levels:

	By drilling machine	Pump
S.W.L.	180 m	180 m
D.W.L.	220 m	210 m
Discharge	50 g/min	60 g/min

6- Time of filtering by the drilling machine: (24) hrs.

7- Time of pumping test : (24) hrs.

8- Proposed depth for pump installation: 220 m

Remarks:-

A concrete foundation has been built around the well's opening 1 m X 1 m X 50 cm

Drilling supervising Engineer: Osman Gasem

Well Code: T-02/4

Republic of Yemen
General Authority for Rural Water Supply Projects
Taiz – Branch

Project Name: ***Al-Nashema***
Sub-district:- ***Al-Mawaset***
District: ***Al-Ma'afer***
Governorate: **Taiz**

Well Pumping Test Data

Site: **Wadi Sadeem**
Measuring instrument: Measurement carried by: Testing Pump Date: 10/07/1998
Type of Test:-

a- STEP TEST
b- CONSTANT DISCHARGE TEST (Yes)
c- RECOVERY TEST

Time Data				Water Level Data				Discharge Data			
Pumping started: 30/11/05 03:10 pm Pumping stopped: 01/12/05 03:10 pm Test time: 24 hrs Return: 1 hr				Static water level: 14.34 m Point of measurement (PM):- … Height of b(PM):- 60 cm				Method of measurement: Static Pumping Depth/Air line 156 m Previous pumping? Yes No Period/ Expiration/			
DATE	CLOCK TIME	PUMP START	PUMP STOP	RECOVERY	CORRECTION OR TRANSFER	DRAW DOWN	DIFFERENCE	DISCHARGE G/M	Q (L/S)	EC (Ms/cm)	Temp. C°
10/07/98	03:22	0	-	139.50			-	-	-	-	=
		1		140.42			0..92		4.66		
		2		140.42			0..92		4.41		
		3		140.42			0..92		4.41		
		4		140.42			0..92		4.41		
		5		140.42			0..92		4.41		
		10		140.43			0..93		4.41		
		15		140.43			0..93		4.41		
		20		140.43			0..93		4.41		
		25		140.44			0..94		4.41		
		30		140.45			0..95		4.41		
		45		140.46			0..96		4.41		
	4.22	60		140.47			0..97		4.41		
	5.22	120		140.50			1.00		4.45		
	6.22	180		140.51			1.01		4.41		
	7.22	240		140.53			1.03		4.41		
	8.22	300		140.55			1.05		4.41		
	9.22	360		140.58			1.08		4.41		
	10.22	420		140.60			1.10		4.38		
	11.22	480		140.62			1.12		4.41		
		540		140.64	-		1.14		4.48	-	=
		600		140.64			1.14		4.41		
		660		140.64			1.14		4.41		
		720		140.65			1.15		4.41		
		780		140.65			1.15		4.41		
		840		140.65			1.15		4.41		
		900		140.65			1.15				
		960		140.66			1.16		4.41		
		1020		140.68			1.18		4.41		
		1080		140.69			1.19		4.41		
		1140		140.70			1.20		4.36		
		1200		140.70			1.20		4.41		
		1260		140.70			1.20		4.41		
		1320		140.70			1.20		4.49		
		1380		140.70			1.20				
		1440		140.70			1.20		4.33		
					11/07/1998						

#) S: DRAWDOWN= 1.2 m
S: RESIDUAL DRAWDOWN = 0.95
Total discharge: 380872.8 L
Q/S = 1.2 T ---- lagon equation
T= 249.9 m³/day where (T) Transitivity

T- 02/ Additional

Al-Nashema Well Discription

Site : Wadi Al-Nashema

1- Total Depth: 253 m

2- Drilling depth & diameters

6 m	Dia 15″
145 m	Dia 12¼″
92	Dia 7⅞″

3- Casing (dia. & length)

16 m	Dia 12 ¾″
120 m	Dia 7⅞″

4- Water levels:

S.W.L.	111,5
D.W.L.	124.5 m
Discharge	63 g/m

5- Pump installation depth: 162.5 m

6- Drilling date: 01/04/1997 up to 18/04/1997

Supervising Engineer: (signed)

Well Code: T- 03/1

Detailed report on supervision of drinking water well

Dear/ Branch Manager,

Please find below a detailed report about drilling the well of ***Showeb Hamran*** Sub-district, ***Al-Ma'afer*** District, ***Taiz*** Governorate, which has been executed by ***Rejam for General Contracts*/ *Est.*** The drilling was carried out from 10/10 /2005 to 30/11/2005.

Well Description:-

1- Total Depth:- 400 m (four hundred meters)
2- Drilling depth & diameters

Surface digging 6 m	Dia 12¾″
Experimental digging	Dia 8⅝
Widening the Experimental digging	Dia 12″

3- Casing (dia. & length)

Surface casing	Dia 12¾″
(final) casing	Dia 10″
	Dia 8⅝

4- Screen

60 m	Dia 8⅝″

5- Water levels:

	By drilling machine	Pump
S.W.L.		14,34m
D.W.L.		29,14 m
Discharge		4.4L/sec

6- Time of filtering by the drilling machine: (24) hrs.
7- Time of pumping test : (24) hrs.
8- Proposed depth for pump installation: 325m

Remarks:-

A concrete foundation has been built around the well's opening 1 m X 1 m X 50 cm

Drilling supervising Engineer: Osman Gasem

Well Code: T-03 /1

Republic of Yemen
General Authority for Rural Water Supply Projects
Taiz – Branch

Project Name: ***Showeb Hamran***
Sub-district:- ***Al-Showeba***
District: ***Al-Ma'afer***

Well Pumping Test Data

Studies, Supervision & Follow-up Department
Supervision & Follow-up Section

Governorate: **Taiz**
Well No. (2)

Site: Wadi Al-Zubair (Al-Jah)
Measuring instrument: Measurement carried by: Testing Pump Date: 30/11/2005
Type of Test:-

a- STEP TEST
b- CONSTANT DISCHARGE TEST (x)
c- RECOVERY TEST

Time Data				Water Level Data				Discharge Data			
Pumping started: 30/11/05 03:10 pm Pumping stopped: 01/12/05 03:10 pm Test time: 24 hrs Return: 1 hr				Static water level: 14.34 m Point of measurement (PM):- … Height of b(PM):- 60 cm				Method of measurement: Static Pumping Depth/Air line 156 m Previous pumping? Yes No Period/ Expiration/			
DATE	CLOCK TIME	PUMP START	PUMP STOP	RECOVERY	CORRECTION OR TRANSFER	DRAW DOWN	DIFFERENCE	DISCHARGE G/M	Q (L/S)	EC (Ms/cm)	Temp. C°
30/11/05	03:10 pm	0	-	-	-	14.34	-	-	-	-	=
	03:11	1				15.28	0.94	79.37	5.00		
	03:12	2				15.80	1.46	75.56	4.76		
	03:13	3				16.05	1.71	74.13	4.67		
	03:14	4				16.21	1.87	72.70	4.58		
	03:15	5				16.43	2.09	72.22	4.55		
	03:20	10				16.82	2.48	72.22	4.55		
	03:25	15				17.03	2.69	72.06	4.54		
	03:30	20				17.19	2.85	72.06	4.54		
	03:35	25				17.42	3.08	71.90	4.53		
	03:40	30				17.54	3.20	71.90	4.53		
	03:45	40				17.84	3.50	71.75	4.52		
	03:50	50				18.12	3.78	71.75	4.52		
	04:00	60				18.50	4.16	71.75	4.52		
	05:10	120				19.79	5.45	71.43	4.50		
	06:10	180				21.59	7.25	71.11	4.48		
	07:10	240				23.59	9.25	7079	4.46		
	08:10	300				24.69	10.35	70.48	4.44		
	09:10	360				25.43	11.09	70.48	4.44		
	10:10	420				26.00	11.66	70.48	4.44		
	11:10	480				26.43	12.09	70.32	4.43		
30/11/05	12:10	540	60	17.65		26.77	12.43	70.32	4.43		
01/12/05	01:10	600	50	18.59		27.05	12.71	70.32	4.43		
	02:10	660	40	18.72		27.34	13.00	70.32	4.43		
	03:10	720	30	19.59		27.58	13.24	70.16	4.42		
	04:10	780	15	21.72		27.80	13.46	70.16	4.42		
01/12/05	05:10	840	10	23.53		28.05	13.71	70.16	4.42		
01/12/05	06:10 am	900	9	24.00	-	28.18	13.84	70.16	4.42	-	=
	07:10	960	8	24.40		28.30	13.96	70.16	4.42		
	08:10	1020	7	24.80		28.40	14.06	70.16	4.42		
	09:10	1080	6	25.27		28.50	14.16	70.00	4.41		
	10:10	1140	5	25.79		28.60	14.26	70.00	4.41		
	11:10	1200	4	26.30		28.70	14.36	70.00	4.41		
	12:10	1260	3	26.75		28.80	14.46	70.00	4.41		
	01:10	1320	2	27.20		28.92	14.58	70.00	4.41		
	02:10	1380	1	28.10		29.03	14.69	70.00	4.41		
	03:10	1440	0	29.14		29.14	14.80	70.00	4.41		

#) S: DRAWDOWN
S: RESIDUAL DRAWDOWN
Take sample of the water: (Yes) (No)
Total of water pumped: 384340 (liter)
Discharge 4.45 l/s 70.63 g/m
MAX DRAWDOWN: 29.14 (meter)

Supervising Engineer: Eng./ Akram M Thabet
Date: 02/12/2005
Signature:- (signed)

Well Code: T- 04
Detailed report on supervision of drinking water well

Sub-district: ***Al-Showooba*** District: ***Al-Mawaset*** Site: ***Yafeg Beni Hamad***
Drilling started on 12/10/2005 finished on 21/11/2005
Well Description:-

1-Total Depth:- 400 m (four hundred meters)
2-Drilling depth & diameters

6 m	Dia 15″
--	Dia 13″
m	Dia 12¼″
m	Dia 7⅞″

3-Casing (dia. & length)

7m	Dia 12¾″
	Dia 10″
	Dia 8⅝

4- Screen

	Dia 8⅝″

5- Water levels:

	By drilling machine	Pump
S.W.L.	21m	60 m
D.W.L.	320 m	80
Discharge	70 g/min	60 g/min

6- Time of filtering by the drilling machine: (24) hrs.
7- Time of pumping test : (24) hrs.
8- Proposed depth for pump installation: 90 m
Remarks:-
A concrete foundation has been built around the well's opening 1 m X 1 m X 50 cm

Drilling supervising Engineer: Osman Gasem

Drilling supervising Engineer: Abdulwahid Hassan Ali

Well Code: T-06
Detailed report on supervision of drinking water well

Sub-district: ***Al-Wazah*** District: ***Al-Wazah*** Site: ***Al-Khunah***
Drilling started on …… finished on …….
Well Description:-

1- Total Depth:- 200 m (two hundred meters)
2- Drilling depth & diameters

m	Dia 15″
--	Dia 13″
m	Dia 12¼″
m	Dia 7⅞″

3- Casing (dia. & length)

m	Dia 12¾″
	Dia 10″
	Dia 8⅝

4- Screen

	Dia 8⅝″

5- Water levels:

S.W.L.	Zero	60 m
D.W.L.	6.36m	80
Discharge	139.7g/min	8.8 /sec

6- Time of filtering by the drilling machine: (24) hrs.
7- Time of pumping test : (24) hrs.
8- Proposed depth for pump installation: 90 m
Remarks:-
……
……..

Drilling supervising Engineer: (signed)

16.2 Meteorological Data

Monthly Rainfall, Period 1978-2004

Governorate	Al Mahweet	StationName	KHAMIS-A	StationType	RainFall	Location:	UTM_N_Map	1679280	UTM_E_Map	340240
							Longitude	43.51	Latitude	15.18

Year	Jan	Feb	March	April	May	June	July	Aug	Sep	Oct	Nov	Dec	Total
1978			0.0	62.0	29.4	7.9	87.3	20.2	76.7	0.0	0.0	0.0	283.5
1979	0.0	0.0	2.2	11.1	99.2	14.5	37.5	37.7	37.0				239.2
1984		0.0	1.4	31.0	154.3	20.9	67.4	46.7	104.8	0.0	0.0	0.0	426.5
1985	0.0	0.0	5.9	96.7	52.2	14.5	30.8	37.6	58.2	0.0	0.0	0.0	295.9
1986	0.0	3.7	19.2	45.1	61.8	32.1	64.2	72.3	23.8	0.1	3.6	0.7	326.6
1987	0.0	0.0	4.5	24.5	33.0	25.0	26.0	177.5	10.5	0.5	0.0	10.5	312.0
1988	0.0	0.0	0.0	22.0	5.0	60.5	92.0	93.0	55.5	6.0	0.0	0.0	334.0
1989	10.5	8.0	2.0	127.0	31.5	80.0	65.0	94.0	40.5	0.5	0.0	37.5	496.5
1990	0.0	31.0	0.0	32.0	8.0	48.5	92.0	112.5	35.5	0.0	0.0	0.0	359.5
1991	0.5	20.5	11.5	21.0	83.0	1.0	11.0	20.5	47.5	48.0	0.0	0.0	264.5
1992	0.5	0.0	0.5	50.5	32.5	1.0	60.0	195.5	30.5	8.0	15.0	6.5	400.5
1993								34.5	33.0	9.5	0.0	0.0	77.0
1995								15.0	15.5	1.0	0.0	0.0	31.5
1996	13.0	0.0	4.0	51.5	70.0	6.5	0.0	3.5	5.5	0.0	1.5	5.0	160.5
1997	8.0	12.0	9.0	1.5	6.0	9.0	2.5	4.5	4.0	8.5	38.0	0.0	103.0
1998	0.0	0.0	27.5	30.5	13.0	53.0	76.0	5.5		7.5			213.0
1999		1.0	25.5	30.5	13.0	53.0	76.0	84.0	31.5	4.0	0.0	0.0	318.5
2000	0.0	0.0	0.0	10.5	26.0	18.5	53.5	79.0	31.5	4.0	2.5		225.5
2001						6.0	115.5	78.5	43.5	10.0	3.0	8.0	264.5
2002	0.0	4.0	1.0	33.5	3.0	23.0	31.5	104.0	76.0	4.0	0.0	0.0	280.0
2003	0.0	19.0	1.0	4.5	19.0	3.0	0.0	36.0	0.5	3.0	4.0	2.5	92.5
2004	1.5		2.0	102.5	14.5	15.5	120.5	101.0	32.0	9.5			399.0
Av.	2.1	5.8	6.2	41.5	39.7	24.7	55.4	66.0	37.8	5.9	3.6	3.9	292.6
Min.	0.0	0.0	0.0	1.5	3.0	1.0	0.0	3.5	0.5	0.0	0.0	0.0	
Max.	13.0	31.0	27.5	127.0	154.3	80.0	120.5	195.5	104.8	48.0	38.0	37.5	496.5

Source: GARWSP

Monthly Rainfall, Period 1984-2005

Governorate	Al Mahweet	StationName	KHAMLU-A	StationType	Rainfall	Location:	UTM_N_Map	1692340	UTM_E_Map	330321
							Longitude	43.42	Latitude	15.30

Year	Jan	Feb	March	April	May	June	July	Aug	Sep	Oct	Nov	Dec	Total
1984		0.0	0.0	0.0	81.6	0.0	35.9	43.5	53.9	0.0	0.0	4.9	219.8
1985	0.0	0.0	0.0	85.3	11.0	0.0	51.4	15.8	98.6	0.0	0.0	0.0	262.1
1986	0.0	15.8	41.6	56.7	92.0	43.6	10.2	72.9	29.6	4.0	15.7	0.0	382.1
1987							2.5	180.0	11.0	18.5	0.0	24.5	236.5
1988	0.0	0.0	0.0	17.0	15.5	22.0	26.0	199.0	47.0	0.0	0.0	0.0	326.5
1989	4.0	0.0	1.0	69.5	9.0	81.5	52.0	91.0	13.5	2.0	0.0	16.5	340.0
1990	0.0	18.5	1.0	13.5	12.0	25.0	26.5	97.5	36.5	6.5	0.0	0.0	237.0
1991	0.0	21.0	1.5	41.5	111.5	0.0	5.5	1.0	12.5	3.0	2.0	0.0	199.5
1992	5.5	0.0	0.0	2.5	89.0	8.0	86.0	132.5	27.5	32.5	10.5	19.0	413.0
1993								0.0	0.0	0.0	0.0	0.0	0.0
1994	0.0	0.0	3.0	28.5	43.5	0.5	3.5	33.0					112.0
1995	0.0	0.0	0.0	0.5	0.0	0.0	2.0	1.0	0.0	0.0	0.0	0.0	3.5
1996							0.0	81.0	50.0	0.0	8.0	0.0	139.0
1997	0.5	0.5	1.0	21.0	28.5	45.5	61.5	41.5	75.0	143.5	33.0	0.0	451.5
1998	0.0	0.0	4.5				0.0	0.0	0.0	2.5	0.0	0.0	7.0
1999	0.0	0.5	31.0	5.5	5.0	48.0	15.5	57.5	44.5	1.5	1.5	1.0	211.5
2000	0.0	0.0	0.0	23.0	79.5	11.5	79.5				1.5	1.0	196.0
2001			1.5	52.5	42.5	2.0	0.0	84.5	9.5	0.0	9.0	0.0	201.5
2002	0.0	0.0	1.5	14.5	0.0	0.5	19.5	84.0	35.5	4.5	7.0	28.5	195.5
2003	0.5	9.5	29.0	14.5	0.0	0.5	19.5	84.0	35.5	0.0	0.0	1.5	194.5
2004	0.0	0.0	1.0										
2005		1.0	5.0	119.0	78.5	1.5							
Av.	0.7	3.7	6.5	33.2	41.1	17.1	26.2	68.4	32.2	12.1	4.6	5.1	250.9
Min.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Max.	5.5	21.0	41.6	119.0	111.5	81.5	86.0	199.0	98.6	143.5	33.0	28.5	451.5

Source: GARWSP

Monthly Rainfall, Period 1984-2006

Governorate	Al Mahweet	StationName	ZUHAIF-A	StationType	Rainfall	Location:	UTM_N_Map	1692341	UTM_E_Map	329441
							Longitude	43.41	Latitude	15.30

Year	Jan	Feb	March	April	May	June	July	Aug	Sep	Oct	Nov	Dec	Total
1984		0.0	0.0	40.1	178.8	29.4	57.2	60.9	84.2	0.5	0.2	2.4	453.7
1985	0.1	2.3	49.9	171.2	114.9	15.0	46.4	37.2	71.9	0.0	65.0	0.0	573.9
1986	0.0	20.7	45.6	205.4	134.1	0.0	52.5	71.8	77.8	31.1	12.2	0.0	651.2
1987	0.0	0.0	13.3	45.8	82.8	39.9	19.6	195.0	5.0	20.5	2.0	47.0	470.9
1988	0.5	3.0	0.0	13.0	53.0	170.5	59.0	157.0	73.0	1.5	0.0	0.0	530.5
1989	17.0	27.0	19.0	87.0	44.0	19.0	107.5	176.5	13.0	14.5	0.0	34.0	558.5
1990	0.5	34.5	0.5	32.0	18.0	23.5	24.5	61.0	46.0	0.5	0.5	0.0	241.5
1991	1.5	27.5	36.0	34.0	44.5	0.0	51.0	5.0	4.0	62.0	10.0	0.0	275.5
1992	59.5	3.5	2.0	4.0	61.5	18.5	64.5	187.0	48.0	29.5	32.5	38.0	548.5
1993								8.5	83.5	57.5	0.0	0.0	149.5
1994	0.0	0.5	22.0	54.0	18.0	0.0	0.0	8.5	83.5	57.5	0.0	0.0	244.0
1995	0.0	0.5	22.0	54.0	18.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	94.5
1996			0.0	0.0	0.0	0.0	0.0	0.0					0.0
1999								42.0	78.5	38.5	1.0	18.0	178.0
2000	1.0	0.0	0.0	565.5	0.0	0.0	0.0	6.0	1.5				574.0
2001			1.5		1.0	1.0		142.5	78.0	16.0	18.5	1.0	259.5
2002	0.0	0.0	0.5	11.5	15.5	18.0	10.0	23.5	8.0	39.5	0.0	2.5	129.0
2003	0.0	2.5	2.0	0.0	9.0	2.0	0.0	109.0	32.0	6.0	5.5	0.5	168.5
2004	33.5	16.0											49.5
2005		0.5	5.5	51.5	108.5	10.0	11.0	118.0	85.5	2.0	50.5	0.0	443.0
2006	0.0												0.0
Av.	7.6	8.7	12.9	85.6	53.0	20.4	31.4	74.2	48.5	22.2	11.6	8.4	384.6
Min.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Max.	59.5	34.5	49.9	565.5	178.8	170.5	107.5	195.0	85.5	62.0	65.0	47.0	651.2

Source: GARWSP

Monthly Rainfall, Period 1984-2000

Governorate	Al Mahweet	StationName	GHAMR-A	StationType	Rainfall	Location:	UTM_N_Map	1695351	UTM_E_Map	344621
							Longitude	43.55	Latitude	15.33

Year	Jan	Feb	March	April	May	June	July	Aug	Sep	Oct	Nov	Dec	Total
1984		0.0	31.7	21.7	91.0	40.3	54.8	34.1	33.4	0.3	0.1	0.2	307.6
1985	0.1	0.0	94.7	162.0	109.7	32.1	19.0	68.5	51.5	0.0	60.5	0.0	598.1
1986	0.0	5.1	16.0	105.0	108.5	3.0	58.6	65.7	3.1	5.3	0.0	5.1	375.4
1987							22.0	118.0	5.5	7.0	6.0	22.0	180.5
1988	0.5	9.0	0.0	56.5	15.0	40.0	29.0	135.0	50.0	1.0	0.0	0.0	336.0
1989	0.0	10.0	18.5	150.0	10.0	51.5	31.5	61.0	23.5	7.0	0.0	20.0	383.0
1990	0.0	24.0	31.0	25.5	22.5	24.5	29.0	45.5	36.0	0.0	3.0	0.0	241.0
1991	0.0	13.5	19.0	34.0	30.0	1.0	5.0	21.0	29.5	69.5	0.0	0.0	222.5
1992	22.5	0.0	26.5	39.0	152.5	16.0	54.5	82.5	24.0	19.5	31.0	18.5	486.5
1993							54.5	82.5	21.0	22.5	26.0		206.5
1994								7.5	30.5	35.0	10.5	0.0	83.5
1995	0.0	0.0	25.5	82.5	1.5								109.5
1997					53.0	84.5	18.0	95.0	15.0	132.0	47.0	0.0	444.5
1998	0.5	0.0	19.0							26.0	47.0	0.0	92.5
1999	0.5	0.0	19.0					59.5	80.0	13.5	0.0	8.0	180.5
2000	0.5	0.0	0.0	66.0	25.0								91.5
Av.	2.2	5.1	25.1	74.2	56.2	32.5	34.2	67.4	31.0	24.2	16.5	5.7	374.4
Min.	0.0	0.0	0.0	21.7	1.5	1.0	5.0	7.5	3.1	0.0	0.0	0.0	
Max.	22.5	24.0	94.7	162.0	152.5	84.5	58.6	135.0	80.0	132.0	60.5	22.0	598.1

Source: GARWSP

Monthly Rainfall, Period 1984-2006

Governorate	Al Mahweet	StationName	MAYAN-A	StationType	Rainfall	Location:	UTM_N_Map	1709120	UTM_E_Map	381500
							Longitude	43.90	Latitude	15.46

Year	Jan	Feb	March	April	May	June	July	Aug	Sep	Oct	Nov	Dec	Total
1984		0.0	20.7	16.1	127.1	16.8	25.5	15.8	1.8	0.0	0.0	10.9	234.7
1985	9.5	0.9	24.5	118.0	28.8	14.6	19.0	27.3	6.0	0.0	3.5	6.3	258.4
1986	0.0	6.6	46.1	86.2	22.6	4.8	57.0	97.4	3.8	0.0			324.5
1987		4.4	30.5	46.5	20.0	1.5	4.0	4.5	8.0	0.5	0.0	45.5	165.4
1988	0.5	1.5	0.5	99.5	0.0	2.5	62.5	28.0	1.0	0.0	0.0	0.0	196.0
1989	0.5	5.0	19.0	167.5	11.0	7.5	12.0	86.5	0.0	0.0	0.0	11.0	320.0
1990	0.0	33.0	19.5	33.5	14.5	1.0	36.0	16.5	0.0	0.0	0.0	0.5	154.5
1991	0.0	42.0	36.0	13.5	30.5	1.0	33.0	30.0	1.0	0.5	0.5	0.0	188.0
1992	5.5	0.0	5.5	23.5	38.0	1.0	26.5	161.0	7.0	40.5	25.5	12.5	346.5
1993								0.5	1.0	4.0	0.0	0.0	5.5
1994	0.0	0.0	49.0	12.0	1.0	1.0	0.5						63.5
1995						2.5	70.5	65.5	0.5	0.0	0.5	0.0	139.5
1996	4.0	8.5	55.0	51.0	36.0	94.0	49.0	69.5	0.5	0.0	4.5	40.0	412.0
1997	8.0	0.0	0.0				190.0	31.0	0.5			155.5	385.0
1998					21.0	21.0	48.0	29.5	2.0	0.0	0.0	0.0	121.5
1999	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.5	4.0	31.0	8.0	45.5
2000	0.0	4.0	1.5	23.0	15.0	1.5	15.0	3.0	4.5		1.5	9.0	78.0
2001		4.0	15.5			5.5	130.0	127.5	5.0	2.0	1.0	1.0	291.5
2002	0.0	0.0	0.5	73.0	6.0	3.0	37.0	33.5	2.0	1.5	0.5	2.0	159.0
2003	16.0	0.5	23.5	0.0	10.0	1.0	0.0	6.0	0.0	1.0	1.0	2.5	61.5
2004	4.5	1.0	6.0										11.5
2005		2.0	21.5	52.5	42.5	1.0	66.0	30.0	8.0	0.0	2.0	0.0	225.5
2006	0.0												0.0
Av.	3.0	6.0	19.7	51.0	24.9	9.5	44.1	43.2	2.8	3.0	4.0	16.0	227.2
Min.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Max.	16.0	42.0	55.0	167.5	127.1	94.0	190.0	161.0	8.0	40.5	31.0	155.5	412.0

Source: GARWSP

Monthly Rainfall, Period 1984-2003

Governorate	Al Mahweet	StationName	RUJUM-A	StationType	Rainfall	Location	UTM_N_Map	1709590	UTM_E_Map	353320
							Longitude	43.63	Latitude	15.46

Year	Jan	Feb	March	April	May	June	July	Aug	Sep	Oct	Nov	Dec	Total
1984		0.0	16.1	11.8	128.7	25.9	49.0	63.3	79.4	0.0	0.0	0.1	374.3
1985	3.9	0.0	35.9	85.3	122.3	53.2	54.3	205.7	146.2	0.5	4.4	0.0	711.7
1986	0.0	2.0	33.1										35.1
1987				56.5	76.0	28.0	18.5	181.5	39.5	2.0	1.0	25.0	428.0
1988	0.5	2.0	0.0	132.5	0.5	87.5	168.5	483.5	96.0	0.0	0.5	0.5	972.0
1989	1.5	10.0	13.5	147.5	29.0	57.5	126.5	105.0	1.0	4.0	1.0	10.0	506.5
1990	0.0	35.0	87.0	27.0	32.5	41.0	104.0	214.5	38.0	0.0	0.0	2.0	581.0
1991	2.0	18.5	29.0	28.0	31.0	3.0	68.0	43.5	26.0	28.0	2.0	6.0	285.0
1992	1.0	0.5	4.5	35.5	49.0	22.5	34.0	15.5	4.5	13.0	3.5	35.0	218.5
1993	0.0	0.0	0.0	0.0	0.0	0.0	34.0	33.0	56.5	32.0	1.5	2.0	159.0
1994	1.5	1.0	35.5	130.5	4.5			0.0	0.0	0.0	0.0	0.0	173.0
1995	11.0	0.0	3.0	102.5	0.0	0.0	0.0	94.5	19.5	0.0	1.5	0.0	232.0
1996	11.0	0.0	3.5	102.0	0.0	0.0	0.0	92.0	19.5	0.0	1.5	0.0	229.5
1997	11.0	0.0	3.0	102.5	0.0	0.0	0.0	92.0	19.5	7.5	37.0	2.5	275.0
1998	0.5	0.0	10.0				0.0	330.5	83.5	2.5	53.5		480.5
1999		16.0	16.5	5.5	36.5	139.0	20.5	0.0	0.0	0.0	0.0	2.0	236.0
2000	0.0	0.5	3.0	2.0	19.0	24.0	153.5				0.5	1.0	203.5
2001	6.5	0.0	29.0			3.5	171.0	77.5	41.0	62.5	0.0	18.0	409.0
2002	3.0	0.0	0.5	15.0	6.5	2.0	14.5	90.0	34.5	0.0	1.0	1.5	168.5
2003	5.0	1.5	2.0										8.5
Av.	3.4	4.6	17.1	61.5	33.5	30.4	59.8	124.8	41.4	8.9	6.1	6.2	397.8
Min.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Max.	11.0	35.0	87.0	147.5	128.7	139.0	171.0	483.5	146.2	62.5	53.5	35.0	972.0

Source: GARWSP

Monthly Rainfall, Period 1986-2002

Governorate	SANA'A	StationName	NGLSAM-A	StationType	Rainfall	Location:	UTM_N_Map	1647590	UTM_E_Map	475840
							Longitude	44.78	Latitude	14.90

Year	Jan	Feb	March	April	May	June	July	Aug	Sep	Oct	Nov	Dec	Total
1986											0.0	2.5	2.5
1987	0.0	5.0	29.5	57.0	5.5	3.0	0.0	26.0	3.5	0.0	0.0	12.5	142.0
1988	0.0	24.0	5.0	58.5	1.0	0.0	52.5	22.5	5.5	0.0	0.0	0.0	169.0
1989	0.0	0.5	32.5	112.5	2.5	1.0	10.5	5.0	1.0	0.0	0.0	0.5	166.0
1990	0.0	52.0	8.5	67.5	0.0	0.0	52.0	5.0	1.5	0.0	0.0	0.0	186.5
1991	0.0	0.0	2.5	28.5	0.0	0.0	2.0	19.0	0.0	0.0	0.0	0.5	52.5
1992	5.0	0.0											5.0
1999						0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.5
2000	0.0	0.0	0.0	0.0			0.0	22.0	0.0	3.0	4.5	0.0	29.5
2001	0.0	0.0	53.0	2.0	0.0	0.0	23.5	34.0	0.0	0.0	0.0	0.0	112.5
2002	4.0	0.0	2.0	4.5	0.0	0.0	3.0	0.5	3.0	0.0			17.0
Av.	1.0	9.1	16.6	41.3	1.3	0.5	15.9	14.9	1.6	0.3	0.5	1.8	104.9
Min.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Max.	5.0	52.0	53.0	112.5	5.5	3.0	52.5	34.0	5.5	3.0	4.5	12.5	186.5

Monthly Rainfall, Period 1978-1980

Governorate	SANA'A	StationName	MANAKHAH	StationType	1	Location:	UTM_N_Map	1666800	UTM_E_Map	364700
							Longitude	43.74	Latitude	15.07

Year	Jan	Feb	March	April	May	June	July	Aug	Sep	Oct	Nov	Dec	Total
1978			0.0	33.9	46.9	12.9	72.1	42.4	53.7	1.0	10.0	3.5	276.4
1979	0.5	0.0	12.0	21.0	81.2	6.8	66.5	113.0	12.0	0.0	0.0	0.0	313.0
1980	0.0	0.0	0.0										0.0
Av.	0.3	0.0	4.0	27.4	64.1	9.9	69.3	77.7	32.8	0.5	5.0	1.8	292.7
Min.	0.0	0.0	0.0	21.0	46.9	6.8	66.5	42.4	12.0	0.0	0.0	0.0	
Max.	0.5	0.0	12.0	33.9	81.2	12.9	72.1	113.0	53.7	1.0	10.0	3.5	313.0

Source: GARWSP

Monthly Rainfall, Period 1986-2006

Governorate	SANA'A	StationName	ASAL-A	StationType	Rainfall	Location:	UTM_N_Map	1669620	UTM_E_Map	455460
							Longitude	44.59	Latitude	15.10

Year	Jan	Feb	March	April	May	June	July	Aug	Sep	Oct	Nov	Dec	Total
1986											0.0	8.5	8.5
1987	0.0	0.0	28.0	99.0	1.5	1.5	0.0	18.0	14.0	0.0	0.0	11.0	173.0
1988	0.0	37.0	5.5	75.5	0.0	0.0	79.5	9.0	21.5	0.0	0.0	0.0	228.0
1989	0.0	0.5	0.0	137.0	0.5	1.5	14.0	7.5	0.0	0.0	0.0	3.5	164.5
1990	0.0	1.5	5.5	40.0	0.0	0.0	27.0	7.5	1.5	0.0	0.0	0.0	83.0
1991	0.0	4.0	74.0	4.5	0.0	0.0	9.5	25.0	2.0	0.0	0.0	0.0	119.0
1992	0.0	0.0	14.0	6.5	10.5	0.0	0.0	66.5	1.0	82.0	2.0	0.5	183.0
1993	16.0	8.0											24.0
2000								1.0	30.0	2.0	1.0	0.0	34.0
2001	0.5	0.0	71.5	2.0	6.5	0.0	0.0	68.0	15.5	0.0	0.0	0.0	164.0
2002	3.5	0.0	9.0	6.0	0.0	0.0	5.0	15.5	13.0	0.0	0.0	0.0	52.0
2003	0.0	1.0	1.5	0.0	0.0	0.0	23.5	49.0	20.0	1.0	29.5	19.5	145.0
2004	0.0	0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0	0.0	0.0
2005	1.0	1.0	38.0	42.5	0.5	0.0	49.5	27.5	0.0	0.0	0.5	0.0	160.5
2006	0.0												0.0
Av.	1.6	4.4	22.5	37.5	1.8	0.3	18.9	26.8	10.8	7.1	2.5	3.3	137.5
Min.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	
Max.	16.0	37.0	74.0	137.0	10.5	1.5	79.5	68.0	30.0	82.0	29.5	19.5	228.0

Source: GARWSP

Monthly Rainfall, Period 1984-2006

Governorate	SANA'A	StationName	MAFHAQ-A	StationType	Rainfall	Location:	UTM_N_Map	1670260	UTM_E_Map	382810
							Longitude	43.91	Latitude	15.11

Year	Jan	Feb	March	April	May	June	July	Aug	Sep	Oct	Nov	Dec	Total
1984		0.0	21.7	4.5	110.0	0.7	21.1	3.9	5.9	2.3	0.0	11.5	181.6
1985	0.5	0.0	12.8	160.2	50.5	0.6	13.1	35.7	9.0	3.1	17.5	0.0	303.0
1986	0.0	13.9	49.9	45.1	24.5	29.5	72.4	101.3	2.1	0.8	3.3	8.9	351.7
1987	0.0	0.0	41.1	115.5	28.0	0.0	4.5	58.5	36.5	4.0	5.5	14.0	307.6
1988	0.0	6.0	0.0	86.0	0.0	29.5	77.0	77.5	23.5	0.0	0.0	0.0	299.5
1989	0.0	5.0	22.5	83.0	2.5	12.0	29.0	20.5	6.0	0.0	0.0	7.5	188.0
1990	0.0	35.0	23.5	38.5	2.0	2.0	36.5	49.5	50.0	4.5	0.0	0.0	241.5
1991	0.0	6.5	21.5	46.0	23.0	0.0	15.0	15.0	1.5	0.0	0.0	0.0	128.5
1992	0.0	1.0	27.0	35.5	32.0	1.5	4.5	198.0	21.5	13.0	3.5		337.5
1993	0.0	0.0	0.0	100.0	38.5	16.0	49.5	61.5	1.5	3.0	0.0	0.0	270.0
1994	0.0	0.0	16.0	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	19.0
1995						2.0	66.0	88.0	14.5	0.0	0.5	18.5	189.5
1996	22.0		14.0	60.0			0.5	51.0	3.5	0.0	2.0	0.0	153.0
1997	0.0	0.0	0.0	0.0	0.0		27.5	19.0	8.0	113.5	45.5	7.0	220.5
1998					1.0	2.0	103.5	134.0	20.5	8.5	0.0	0.0	269.5
1999	0.0	67.0	5.0	1.0	2.5	0.0	0.0	0.0	0.0	0.0	1.0	10.0	86.5
2000	0.0	0.0	1.0	21.5	0.0	0.0	1.5		1.0	0.5		1.0	26.5
2001	1.0		107.5	11.0			136.5	97.5	2.0	0.5	4.5	4.5	365.0
2002	0.5	0.0	15.0	48.0	10.0	58.0	55.5	42.0	8.5	1.0			238.5
2003	0.0	0.0	0.0	22.5	25.5	1.0	33.5	6.0	0.0	0.0			88.5
2004			0.5	56.0	1.0	1.5							59.0
2005		0.5	77.5	29.0	89.0	0.5	46.0	49.5	5.5	0.0	0.5	0.0	298.0
2006	0.0												0.0
Av.	1.3	7.9	22.8	48.3	23.2	8.3	37.8	55.4	10.5	7.4	4.7	4.6	232.2
Min.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Max.	22.0	67.0	107.5	160.2	110.0	58.0	136.5	198.0	50.0	113.5	45.5	18.5	365.0

Source: GARWSP

Monthly Rainfall, Period 1984-2003

Governorate	SANA'A	StationName	QADAM-A	StationType	Rainfall	Location:	UTM_N_Map	1671861	UTM_E_Map	351970
							Longitude	43.62	Latitude	15.12

Year	Jan	Feb	March	April	May	June	July	Aug	Sep	Oct	Nov	Dec	Total
1984		0.0	7.2	25.5	199.3	35.6	95.0	47.2	20.0	0.0	0.0	0.0	429.8
1986	0.0	0.0	217.9	335.5	27.8	33.9	101.9	39.8	30.6	19.3	0.0	3.1	809.8
1987	0.0	0.0	5.5				9.0	135.5	44.5	4.5	0.5	21.0	220.5
1988	0.0	0.0	2.0	15.0	0.0	4.5	81.0	71.5	51.5	1.5	0.0	0.0	227.0
1989	0.0	7.0	7.0	104.0	16.0	55.0	87.5	38.0	15.0	1.5	0.0	5.0	336.0
1990	0.0	21.5	4.0	50.5	56.0	3.5	72.5	68.0	19.5	0.0	0.0	0.0	295.5
1991	0.0	16.5	24.0	29.5	23.0	1.5	1.5	76.0	24.0	82.5	20.5	8.0	307.0
1992	2.0	1.0	4.5	42.0	9.0	16.5	30.0	35.0	1.0	0.5	0.0		141.5
1993								0.0	0.0	0.0	0.0	0.0	0.0
1994	1.0	0.0	4.0	51.5	52.0	0.0	0.0	51.5					160.0
1996								54.5	12.0	0.0	2.5	0.0	69.0
1997	1.0	0.0	4.0	51.5	139.0	0.0	0.0	0.0	0.0	35.5	44.0	0.0	275.0
1998	1.5	0.0	3.5				121.0	303.0	27.0	25.0			481.0
1999	1.5		0.5	35.5	78.5	21.5	19.0	143.0	23.0		0.0	0.0	322.5
2000	0.0	0.0	0.0	11.5	77.5	2.5	31.5				2.5	4.5	130.0
2001	0.5		12.5			5.0	3.5	144.0	78.0	139.5	78.0	0.0	461.0
2002	0.0	0.0	0.5	73.0	6.0	3.0	36.0	143.0	23.0	0.5	0.0	0.0	285.0
2003	0.0	10.0	0.0	1.5									11.5
Av.	0.5	4.0	18.6	63.6	57.0	14.0	46.0	84.4	24.6	22.2	9.9	3.0	347.6
Min.	0.0	0.0	0.0	1.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Max.	2.0	21.5	217.9	335.5	199.3	55.0	121.0	303.0	78.0	139.5	78.0	21.0	809.8

Monthly Rainfall, Period 1986-2000

Governorate	SANA'A	StationName	SHERWB-A	StationType	Rainfall	Location:	UTM_N_Map	1683090	UTM_E_Map	497800
							Longitude	44.98	Latitude	15.22

Year	Jan	Feb	March	April	May	June	July	Aug	Sep	Oct	Nov	Dec	Total
1986											0.0	3.5	3.5
1987	0.0	1.5				0.0	0.0	7.0	3.5	0.0	0.0	19.0	31.0
1988	0.0	20.0	0.5	66.0	0.0	0.0	37.5	12.0	25.5	0.0	0.0	0.0	161.5
1989	0.0	0.0	9.5	69.5	0.0	3.0	5.0	1.5	0.0	0.0	0.5	0.0	89.0
1990	0.5	53.5	0.0	32.5	0.0	0.0	13.5	15.0	1.5	0.0	0.0	0.0	116.5
1991	0.0	0.0	48.0	1.0	8.0	1.5	9.5	22.0	0.0	0.0	0.0	0.0	90.0
1992	2.0	0.0	4.0	1.0	0.5		0.5	55.0	1.5	40.0	0.5	0.0	105.0
2000				1.0	1.5	0.0	0.0						2.5
Av.	0.4	12.5	12.4	28.5	1.7	0.8	9.4	18.8	5.3	6.7	0.1	3.2	74.9
Min.	0.0	0.0	0.0	1.0	0.0	0.0	0.0	1.5	0.0	0.0	0.0	0.0	2.5
Max.	2.0	53.5	48.0	69.5	8.0	3.0	37.5	55.0	25.5	40.0	0.5	19.0	161.5

Source: GARWSP

Monthly Rainfall, Period 1978-2006

Governorate	SANA'A	StationName	ASSALF-A	StationType	Rainfall	Location:	UTM_N_Map	1683400	UTM_E_Map	385800
							Longitude	43.94	Latitude	15.22

Year	Jan	Feb	March	April	May	June	July	Aug	Sep	Oct	Nov	Dec	Total
1978			19.0	22.5	82.5	47.5	244.0	55.9	26.7	0.0	0.0	37.0	535.1
1979	28.5	1.0	62.5	44.0	0.0	0.0	160.0	293.5	78.5				668.0
1980	0.0	4.5	49.7	93.4	7.0	16.2	149.4	112.7	0.0	23.0	19.0		474.9
1981		5.0	235.5	130.3	60.5	3.5	37.0						471.8
1984		0.0	27.0	25.3	175.6	9.1	41.1	40.7	3.2	0.0	2.0	43.5	367.5
1985	8.7	4.5	28.2	198.9	97.1	6.2	66.9	91.0	8.1	0.0	24.8	0.7	535.1
1986	0.0	19.0	74.1	231.0	25.3	12.3	55.6	128.1	19.0	0.3	0.0	4.4	569.1
1987	0.0	0.0	32.0	106.0	52.0	4.5	19.5	138.0	12.5	1.0	0.0	45.0	410.5
1988	1.0	8.0	8.0	292.0	0.0	2.0	200.0	152.5	16.0	0.0	1.5	0.0	681.0
1989	12.0	7.0	21.0	190.0	22.0	20.5	27.0	127.0	0.0	3.5	0.5	40.5	471.0
1990	10.0	20.0	25.0	47.0	16.5	8.0	22.5	19.0	44.5	0.0	0.0	0.0	212.5
1991	0.0	47.5	29.0	3.0	3.0	2.5	20.0	26.5	1.5	4.5	19.5	0.0	157.0
1992	4.5	1.0	0.0	0.0	0.0	0.0	60.5	250.5	8.0	61.5	24.0		410.0
1993								12.0	1.5	7.0			20.5
1995						13.0	232.0	106.5			0.0	0.0	351.5
1996	12.0	2.0	68.5	124.5	44.0	86.0	104.0	100.5	4.5	0.0	21.5	26.0	593.5
1997	0.0	2.0	7.0	87.5	6.0	0.5	0.0		1.5	94.5	72.5	0.0	271.5
1999	11.5		32.5	40.0	6.0	1.0	8.5	85.5	39.0	3.5	0.5	21.0	249.0
2000	0.0	0.0	28.5	68.0	21.0	0.0	81.5	147.5	56.5	1.0	38.0	2.0	444.0
2001	0.0	0.0	0.0	31.0	21.0	0.0	81.5	147.5	56.5	1.0	38.0	21.0	397.5
2002	0.0	0.0	28.5	37.0	0.5	2.0	102.0	43.0			1.0	0.0	214.0
2003	16.5	0.5	1.0	31.0	31.0	1.0	64.0	6.0	0.0	1.0	1.0	2.5	155.5
2004	1.5	0.0	2.5	70.0	4.5	19.5	14.5						112.5
2005		1.0	56.5	98.0	91.0	7.0	62.5	27.5	0.0	0.0	0.5	0.0	344.0
2006	0.0												0.0
Av.	5.6	6.1	38.0	89.6	34.8	11.4	80.6	100.5	18.9	10.6	13.2	13.5	422.9
Min.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.0	0.0	0.0	0.0	0.0	
Max.	28.5	47.5	235.5	292.0	175.6	86.0	244.0	293.5	78.5	94.5	72.5	45.0	681.0

Source: GARWSP

Monthly Rainfall, Period 1984-2002

Governorate	SANA'A	StationName	YUSUF-A	StationType	Rainfall	Location:	UTM_N_Map	1685400	UTM_E_Map	373350
							Longitude	43.82	Latitude	15.24

Year	Jan	Feb	March	April	May	June	July	Aug	Sep	Oct	Nov	Dec	Total
1984							9.1	174.7	34.8	0.0	0.0	15.1	233.7
1985	1.0	0.0	21.1	103.7	88.5	61.1	49.0	100.7	42.3	0.0	0.9	0.0	468.3
1986	0.0	3.6	39.5	67.6	94.0	58.0	251.4	109.0	59.7	4.0	8.6	2.9	698.3
1987	0.0	0.0	10.8	81.5	51.5	9.5	63.5	166.6	61.0	24.5	1.5	16.5	486.9
1988	4.5	0.0	0.0	113.0	5.0	45.5	207.5	180.5	53.5	4.5	0.5	0.0	614.5
1989	0.0	0.0	15.5	106.0	45.0	74.5	71.5	90.0	16.0	5.0	0.5	8.0	432.0
1990	4.0	10.5	37.5	33.0	61.5	20.5	80.5	72.0	1.5	0.0	0.0	0.0	321.0
1991	0.0		11.0	74.5	51.5	6.0	15.0	59.5	29.0	6.0	17.5	1.5	271.5
1992	1.5	0.0	0.0	6.5	114.0	113.0	76.0	163.5	57.5	7.5	13.0		552.5
1993				0.0	0.0	0.0	76.0	156.5					232.5
1996	9.0	0.0	15.0	67.5	96.0	127.0	97.0	20.0	8.0	1.0	2.5	0.0	443.0
1997	0.0	22.0	1.0	120.0	99.0	98.5	1.5		15.5	85.0	68.0	0.0	510.5
2002							0.0	0.0	0.0	0.0			0.0
Av.	2.0	4.0	15.1	70.3	64.2	55.8	76.8	107.7	31.6	11.5	10.3	4.4	453.6
Min.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Max.	9.0	22.0	39.5	120.0	114.0	127.0	251.4	180.5	61.0	85.0	68.0	16.5	698.3

Monthly Rainfall, Period 1987-2006

Governorate	SANA'A	StationName	QARWAH-A	StationType	Rainfall	Location:	UTM_N_Map	1689375	UTM_E_Map	447785
							Longitude	44.51	Latitude	15.28

Year	Jan	Feb	March	April	May	June	July	Aug	Sep	Oct	Nov	Dec	Total
1987							1.0	19.0	9.0	0.0	0.0	44.0	73.0
1988	0.5	9.5	2.5	54.5	0.5	0.0	37.5	5.5	12.5	0.0	0.0	0.0	123.0
1989	0.0	0.0	11.5	43.5	3.0	2.0	2.5	11.5	0.0	0.0	0.0	8.5	82.5
1990	0.5	15.5	2.5	31.0	1.0	0.0	7.0	0.5	0.5	0.0	0.0	0.0	58.5
1991	0.0	0.0	2.0	0.0	1.0	10.0	15.5	12.0	0.0	0.0	0.0	10.5	51.0
1992	1.5	53.5	112.0	12.0	19.0	0.0	13.5	159.5	4.0	14.5	0.0	0.0	389.5
1993	0.0	0.0											0.0
1999					0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.5	2.5
2000	0.0	0.0	0.0	1.0	0.0	0.0	10.0	1.5	38.5	3.5	1.5	0.0	56.0
2001	0.5	0.0	85.5	11.0	16.0	20.5	78.0	48.5	0.0	0.0	1.0	0.0	261.0
2002	1.0	0.0	13.5	35.5	0.0	0.0	14.0	14.0	16.0	0.0	0.0	0.0	94.0
2003	0.0	2.0	2.5	0.0	0.0	0.0	24.0	54.0	0.0	0.5	20.0	21.0	124.0
2004	0.0	0.0	0.0	0.0	0.0	0.0	15.5	10.0	1.0	12.5	10.5	0.0	49.5
2005	1.5	1.0	85.5	106.5	0.5	0.0	0.0	0.0	0.5	1.0	40.5	4.0	241.0
2006	0.0												0.0
Av.	0.4	6.8	28.9	26.8	3.4	2.7	16.8	25.8	6.3	2.5	5.7	7.0	133.1
Min.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Max.	1.5	53.5	112.0	106.5	19.0	20.5	78.0	159.5	38.5	14.5	40.5	44.0	389.5

Source: GARWSP

Monthly Rainfall, Period 1976-1982

Governorate	SANA'A	StationName	WADIZHAR	StationType	Rainfall	Location:	UTM_N_Map	1707350	UTM_E_Map	406150
							Longitude	44.13	Latitude	15.44

Year	Jan	Feb	March	April	May	June	July	Aug	Sep	Oct	Nov	Dec	Total
1976						0.0	35.7	13.4	0.0	0.0	14.3	0.0	63.4
1977	19.0	0.0	1.0	2.8	0.0	0.0	8.3	65.4	0.0	0.0	0.0	0.0	96.5
1980	0.0	0.0	2.5	21.0	0.0	0.0	0.0	88.0	0.0	0.0	6.0	0.0	117.5
1981	0.0	0.0	11.3	2.4	2.3	0.5	0.0	7.0	0.0	0.0	0.0	0.0	23.5
1982	0.0	0.0	0.0	0.8	0.7	0.0			0.0	0.0	0.0	0.0	1.5
Av.	4.8	0.0	3.7	6.7	0.8	0.1	11.0	43.4	0.0	0.0	4.1	0.0	74.6
Min.	0.0	0.0	0.0	0.8	0.0	0.0	0.0	7.0	0.0	0.0	0.0	0.0	
Max.	19.0	0.0	11.3	21.0	2.3	0.5	35.7	88.0	0.0	0.0	14.3	0.0	117.5

Monthly Rainfall, Period 1972-1979, 2003-2005

Governorate	SANA'A	StationName	DARWAN	StationType	Rainfall	Location:	UTM_N_Map	1719800	UTM_E_Map	401000
							Longitude	44.08	Latitude	15.55

Year	Jan	Feb	March	April	May	June	July	Aug	Sep	Oct	Nov	Dec	Total
1972	0.0	0.0	10.8	49.5	12.6	0.2	36.4	41.2	4.4	2.0	11.6	3.0	171.7
1973	4.6	0.0	0.0	40.6	10.0	4.8	84.0	146.8	14.4	0.0	0.0	0.0	305.2
1974	13.4	3.0	56.0	0.0	98.0	4.8	1.8	112.2	7.0	0.0	0.0	0.0	296.2
1975	0.0	0.0	0.0	36.8	0.6	0.0	0.0	50.4	0.0	57.0	0.0	0.0	144.8
1976	0.0	4.4	0.0	0.0	137.0	0.0	100.0	0.0	0.0	0.0	0.0	0.0	241.4
1978	0.0	0.0	0.0	30.5	3.4	11.2		22.6	4.4	0.0	5.6	13.6	91.3
1979	10.8	0.0	0.0	59.4	27.0	10.0	43.2	49.4	0.0	0.0	0.0	0.0	199.8
2003					1.3	2.3	8.3	11.8	0.3	0.0	0.0	0.3	24.0
2004	0.0									9.0	23.0	3.3	35.3
2005	9.0	10.3	34.8	1.8	19.0	14.8	2.5	2.3	0.8	1.0	1.5	14.5	112.0
Av.	4.2	2.2	12.7	27.3	34.3	5.3	34.5	48.5	3.5	6.9	4.2	3.5	187.1
Min.	0.0	0.0	0.0	0.0	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Max.	13.4	10.3	56.0	59.4	137.0	14.8	100.0	146.8	14.4	57.0	23.0	14.5	305.2

Source: GARWSP

Monthly Rainfall, Period 2003-2005

Governorate	SANA'A	StationName	MEND-A	StationType	Rainfall	Location:	UTM_N_Map	1690005	UTM_E_Map	399550
							Longitude	44.06	Latitude	15.28

Year	Jan	Feb	March	April	May	June	July	Aug	Sep	Oct	Nov	Dec	Total
2003					1.0	1.3	0.0	12.5					14.8
2004	0.8	0.3	1.0	0.3	0.0	0.0	0.0	0.0	1.8	0.0	0.0	0.0	4.0
2005				0.0	1.0	3.0	0.0	0.0	0.0				4.0
Av.	0.8	0.3	1.0	0.1	0.7	1.4	0.0	4.2	0.9	0.0	0.0	0.0	9.3
Min.	0.8	0.3	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Max.	0.8	0.3	1.0	0.3	1.0	3.0	0.0	12.5	1.8	0.0	0.0	0.0	

Monthly Rainfall, Period 2003-2005

Governorate	SANA'A	StationName	MAQUALAH-A	StationType	Rainfall	Location:	UTM_N_Map	1675200	UTM_E_Map	430100
							Longitude	44.35	Latitude	15.15

Year	Jan	Feb	March	April	May	June	July	Aug	Sep	Oct	Nov	Dec	Total
2003					0.3	1.8	0.0	0.0					2.0
2004	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2005	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0				0.0
Av.	0.0	0.0	0.0	0.0	0.1	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.7
Min.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Max.	0.0	0.0	0.0	0.0	0.3	1.8	0.0	0.0	0.0	0.0	0.0	0.0	

Source: GARWSP

Monthly Rainfall, Period 1986-2006

Governorate	DHAMAR	StationName	TAWBAN-A	StationType	Rainfall	Location:	UTM_N_Map	1632000	UTM_E_Map	462550
							Longitude	44.65	Latitude	14.76

Year	Jan	Feb	March	April	May	June	July	Aug	Sep	Oct	Nov	Dec	Total
1986											0.0	2.5	2.5
1987	0.0	9.0	41.5	84.0	3.0	2.5							140.0
1988			0.0	88.0	7.5	0.0	51.0	17.5	3.5	0.0	0.0	0.0	167.5
1989	0.5	0.0	0.5	0.0	0.5	7.0							8.5
1990			8.0	30.0	0.0	4.5	0.0	10.5	0.0	0.0	0.0	0.0	53.0
1991	0.0	6.5	56.5	0.5	12.5	17.5	3.0	15.0	0.0	0.0	0.0	0.0	111.5
1992	2.0	4.5	52.5	2.0	29.0	0.0	0.0						90.0
1999						0.0	0.0	0.0	0.0	0.0	0.0	1.0	1.0
2000	0.0	0.0	0.0	0.5	4.0	0.0	6.0	36.0	0.5	0.5	1.0	0.5	49.0
2001	0.0	0.0	24.0	1.0	4.0	0.0	22.0	27.5	1.0	0.0	0.0	0.0	79.5
2002	7.5	0.0	2.5	5.5	0.0	0.0	3.0	1.0	4.0	0.0	0.0	0.0	23.5
2003	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2004	0.0	0.0	0.0	14.5	0.0	1.5	15.0	13.0	0.0	0.0			44.0
2005					0.0	8.0	21.5	20.5	0.5	0.0	0.0	0.0	50.5
2006	0.0												0.0
Av.	1.0	2.2	16.9	20.5	5.0	3.2	11.0	14.1	1.0	0.1	0.1	0.4	75.5
Min.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Max.	7.5	9.0	56.5	88.0	29.0	17.5	51.0	36.0	4.0	0.5	1.0	2.5	167.5

Source: GARWSP

Monthly Rainfall, Period 1997-2006

Governorate	IBB	StationName	GADIYA	StationType	Rainfall	Location:	UTM_N_Map	1530786	UTM_E_Map	396420
							Longitude	44.04	Latitude	13.84

Year	Jan	Feb	March	April	May	June	July	Aug	Sep	Oct	Nov	Dec	Total
1997	0	0	0	0	0	0	41.5	255	163	290	61.5	1	812.0
1998	0	1.5	25.5	0	0	0	0	0	14.5	1.5	0	0	43.0
1999	0	0	21	27	119.5	222.5	89	246	352	153.5	14	39	1283.5
2000	0	0	0	137	161.5	37.5	108.5	179.5	227.5	112.5	60.5	0.5	1025.0
2001	0	0	82.5	31	315.5	89.5	222.5	202.9	166	102	54	55	1320.9
2002	47	0	50	30.5	151.5	113	143	294.5	153	70.5	4	18	1075.0
2003	15	14	21	71	28.5	121.5	0.5	189.5	252	143.5	10	5	871.5
2004	223.5	1.8	0	170.5	93.5	218	195	64	243.5	105.5	16.5	0	1331.8
2005	83.5	0	32.5	84.5	122.5	124.5	108	242	226.5	119	62.5	29	1234.5
2006	3.5	3.5	35.5		26.5	6	61.5	3.5	3		1.5	24.5	169.0
Av.	37.3	2.1	26.8	61.3	101.9	93.3	97.0	167.7	180.1	122.0	28.5	17.2	934.9
Min.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0	1.5	0.0	0.0	
Max.	223.5	14.0	82.5	170.5	315.5	222.5	222.5	294.5	352.0	290.0	62.5	55.0	1331.8

Monthly Rainfall, Period 1997-2005

Governorate	IBB	StationName	SAHLAH	StationType	1	Location:	UTM_N_Map	1523024	UTM_E_Map	398444
							Longitude	44.06	Latitude	13.77

Year	Jan	Feb	March	April	May	June	July	Aug	Sep	Oct	Nov	Dec	Total
1997	21.5	20.5	23.5	46.5	5.5							0.0	117.5
1998	0.0	0.0	0.0	0.0	13.5	146.0	104.5	237.0	94.5	78.0	23.0	0.0	696.5
1999	0.0	1.5	11.5	5.5	109.0	88.5	88.5	65.5	141.5	130.0	3.0	18.5	663.0
2000	5.0	0.0	0.0	66.0	53.5	14.5	68.0	114.5	105.5	65.5	99.0	0.0	591.5
2001	0.0	0.0	69.0	25.0	157.0	38.0	127.1	154.4	100.8	43.0	9.5	0.0	723.8
2002	13.0	0.0	18.5	30.5	92.0	60.0	78.0	211.2	34.5	21.5	0.0	1.5	560.7
2003	0.0	2.0	2.0	30.5	39.0	111.0	10.5	131.5	39.5	0.0	0.0	0.0	366.0
2004	0.0	0.0	16.5	21.5	4.6	62.0	219.0	154.5	79.5	38.5	0.0	0.0	596.1
2005	0.0	0.0	11.0	37.5	26.5	114.5	54.5	155.5	151.0	70.0	35.0	21.0	676.5
Av.	4.4	2.7	16.9	29.2	55.6	79.3	93.8	153.0	93.3	55.8	21.2	4.6	609.8
Min.	0.0	0.0	0.0	0.0	4.6	14.5	10.5	65.5	34.5	0.0	0.0	0.0	
Max.	21.5	20.5	69.0	66.0	157.0	146.0	219.0	237.0	151.0	130.0	99.0	21.0	723.8

Source: GARWSP

Monthly Rainfall, Period 1997-2003

Governorate	TAIZ	StationName	ORESIMA	StationType	Rainfall	Location:	UTM_N_Map	1494985	UTM_E_Map	438255
							Longitude	44.43	Latitude	13.52

Year	Jan	Feb	March	April	May	June	July	Aug	Sep	Oct	Nov	Dec	Total
1997												0.0	0.0
1998	0.0	0.0	0.0	0.0	0.0	0.0	97.7	179.6	34.4	15.5	0.3	1.0	328.4
1999	2.8	1.8	8.7	0.0	8.2	14.2	104.9	132.8	43.8	68.7	0.8	2.0	388.6
2000	2.0	0.3	0.0	17.4	3.0	25.9	43.4	114.1	105.1	26.4	45.3	10.0	392.8
2001	4.0	1.3	3.0	0.0	153.4	8.7	0.0	0.0	0.0				170.4
2002			8.2	53.3	114.6	17.7	109.3	86.9	25.9	0.3	0.0	41.6	457.8
2003	8.3	3.0	0.8	25.1	0.3	1.3	3.3	0.0	0.0				41.9
Av.	3.4	1.3	3.4	16.0	46.6	11.3	59.7	85.6	34.9	27.7	11.6	10.9	312.3
Min.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	
Max.	8.3	3.0	8.7	53.3	153.4	25.9	109.3	179.6	105.1	68.7	45.3	41.6	457.8

Monthly Rainfall, Period 1997-2006

Governorate	TAIZ	StationName	QURF	StationType	Rainfall	Location:	UTM_N_Map	1507648	UTM_E_Map	401732
							Longitude	44.09	Latitude	13.64

Year	Jan	Feb	March	April	May	June	July	Aug	Sep	Oct	Nov	Dec	Total
1997							3.0	120.5	101.5	34.0	24.5	0.0	283.5
1998	4.0	7.5	10.0	14.0	65.5	53.5	61.0	159.0	71.0	78.5	0.0	1.0	525.0
1999	0.0	5.5	52.0	28.0	53.5	63.0	79.5	90.0	78.5	113.0	0.0	1.5	564.5
2000	0.5	1.0	1.0	83.5	20.5	34.5	91.5	109.5	106.5	137.5	27.5	19.5	633.0
2001	0.5	0.0	84.5	56.5	171.5	0.0	75.0	65.0	71.0	32.0	0.0	0.0	556.0
2002	13.0	0.0	21.0	44.0	58.8	18.0	47.0	139.4	63.6	45.3	0.0	2.3	452.4
2003	13.0	30.0	60.0	0.0	6.0	220.5	36.0	53.5	29.5	0.0	0.0	0.0	448.5
2004	0.0	0.0	31.1	82.0	93.4	40.9	4.8	3.5	213.0	51.3	0.0	0.0	520.0
2005	0.0	0.0	30.5	62.5	78.0	38.5	19.5	141.5	119.0	41.5	15.0	0.0	546.0
2006	209.5		22.0		20.5	4.5	19.5	34.0					310.0
Av.	26.7	5.5	34.7	46.3	63.1	52.6	43.7	91.6	94.8	59.2	7.4	2.7	528.4
Min.	0.0	0.0	1.0	0.0	6.0	0.0	3.0	3.5	29.5	0.0	0.0	0.0	
Max.	209.5	30.0	84.5	83.5	171.5	220.5	91.5	159.0	213.0	137.5	27.5	19.5	633.0

Source: GARWSP

Monthly Rainfall, Period 1997-2005

Governorate	TAIZ	StationName	MIQAB	StationType	1	Location:	UTM_N_Map	1495661	UTM_E_Map	396200
							Longitude	44.04	Latitude	13.53

Year	Jan	Feb	March	April	May	June	July	Aug	Sep	Oct	Nov	Dec	Total
1997							1.0	185.0	181.0	36.5	115.0	0.0	518.5
1998	13.5	114.5	45.0	90.0	113.0	134.5	153.5	137.0	66.5	174.0	0.5	0.5	1042.5
1999	0.0	0.0	107.0	38.5	67.0	88.5	88.5	130.5	130.0	207.0	6.5	0.5	864.0
2000	0.0	0.0	0.0	191.0	124.0	57.5	93.0	101.0	195.0	289.5	9.5	1.5	1062.0
2001	0.0	0.0	106.5	51.0	161.5	35.8	82.5	209.8	168.3	146.1	19.0	16.0	996.5
2002	46.0	0.0	32.0	92.0	97.0	74.4	148.0	268.6	92.2	34.3	0.0	2.5	886.9
2003	17.0	40.0	69.5	5.5	3.0	205.5	24.0	175.0	158.0	52.5	4.0	0.0	754.0
2004	0.0	0.0	28.0	76.3	82.0	111.0	0.0	245.5	217.0	85.5	2.0	0.0	847.3
2005	25.0	44.5	91.5	104.5	136.0	63.5	17.5	216.5	167.0	15.5	62.0	0.0	943.5
Av.	12.7	24.9	59.9	81.1	97.9	96.3	67.6	185.4	152.8	115.7	24.3	2.3	920.9
Min.	0.0	0.0	0.0	5.5	3.0	35.8	0.0	101.0	66.5	15.5	0.0	0.0	
max.	46.0	114.5	107.0	191.0	161.5	205.5	153.5	268.6	217.0	289.5	115.0	16.0	1062.0

Monthly Rainfall, Period 1997-2001

Governorate	TAIZ	StationName	KHUZAH	StationType	Rainfall	Location:	UTM_N_Map	1519295	UTM_E_Map	401236
							Longitude	44.09	Latitude	13.74

Year	Jan	Feb	March	April	May	June	July	Aug	Sep	Oct	Nov	Dec	Total
1997	0.0	0.0	0.0	0.0	0.0	0.0	3.0	126.0	43.0	3.0	31.5	0.0	206.5
1998	3.5	6.0	28.0	16.0	67.0	74.5	55.0	84.5	83.5	77.0	0.0	0.5	495.5
1999	3.0	2.0	19.5	1.5	54.0	35.5	4.5	15.0	22.0	54.5	1.0	5.5	218.0
2000	0.5	0.0	1.0	34.5	36.0	47.0	49.0	69.0	92.0	39.0	2.0	0.0	370.0
2001	0.0	0.0	0.0										
Av.	1.4	1.6	9.7	13.0	39.3	39.3	27.9	73.6	60.1	43.4	8.6	1.5	319.3
Min.	0.0	0.0	0.0	0.0	0.0	0.0	3.0	15.0	22.0	3.0	0.0	0.0	
Max.	3.5	6.0	28.0	34.5	67.0	74.5	55.0	126.0	92.0	77.0	31.5	5.5	495.5

Source: GARWSP

Monthly Rainfall, Period 1997-2005

Governorate	TAIZ	StationName	MANUM	StationType	Rainfall	Location:	UTM_N_Map	1490260	UTM_E_Map	379860
							Longitude	43.89	Latitude	13.48

Year	Jan	Feb	March	April	May	June	July	Aug	Sep	Oct	Nov	Dec	Total
1997						0.0	19.5	156.0	77.5	29.5	113.5	2.5	398.5
1998	21.0	0.5	63.5	51.0	106.5	175.0	126.0	18.0	125.0	151.5	49.0	0.0	887.0
1999	0.0	0.0	35.0	49.5	108.0	115.5	43.0	70.5	195.5	88.5	12.0	2.5	720.0
2000	0.0	0.0	0.0	87.5	120.0	62.0	79.0	71.0	216.5	92.0	6.0	0.0	734.0
2001	0.0	0.0	66.5	86.0	197.0	57.5	66.9	125.0	81.5	36.0	3.6	0.0	720.0
2002	21.0	0.0	29.0	39.5	95.7	61.4	106.0	246.9	58.6	23.8	0.0	2.5	684.4
2003	0.0	0.0	33.0	169.0	40.0	203.0	46.0	173.5	140.5	44.5	0.0	2.5	852.0
2004	0.0	6.0	2.0	98.5	62.0	58.5	139.5	104.0	242.5	91.8	1.0	0.0	805.8
2005	0.0	0.0	4.5	69.0	169.5	74.5	10.5	200.1	196.0	55.0	54.5	0.0	833.6
Av.	5.3	0.8	29.2	81.3	112.3	89.7	70.7	129.4	148.2	68.1	26.6	1.1	762.7
Min.	0.0	0.0	0.0	39.5	40.0	0.0	10.5	18.0	58.6	23.8	0.0	0.0	
Max.	21.0	6.0	66.5	169.0	197.0	203.0	139.5	246.9	242.5	151.5	113.5	2.5	887.0

Monthly Rainfall, Period 1997-2005

Governorate	TAIZ	StationName	LUGBA	StationType	Rainfall	Location:	UTM_N_Map	1510628	UTM_E_Map	378835
							Longitude	43.88	Latitude	13.66

Year	Jan	Feb	March	April	May	June	July	Aug	Sep	Oct	Nov	Dec	Total
1997							0.0	0.0	0.0	32.5	63.0	0.5	96.0
1998	18.5	0.0	22.0	17.0	91.0	57.0	30.0	54.0	82.5	54.0	0.0	12.0	438.0
1999	0.0	0.0	5.0	2.0	27.0	61.5	48.0	28.0	104.0	44.0	41.5	1.0	362.0
2000	0.0	0.0	20.0	158.5	77.5	36.5	58.0	13.0	119.5	81.5	11.5	0.5	576.5
2001	6.0	0.0	64.0	89.5	141.0	25.5	27.0	47.0	20.0	0.0	0.0	0.0	420.0
2002	0.0	0.0	13.0	55.5	76.0	0.0	82.0	131.0	44.0	18.5	0.0	0.0	420.0
2003	0.0	0.0	1.0	79.5	39.5	57.5	1.0	36.5	82.5	137.0	7.5	0.0	442.0
2004	0.0	0.0	0.0	108.0	115.5	83.5	17.5	13.5	157.3	24.9	0.0	0.0	520.2
2005	0.0	0.0	20.0	19.0	88.5	24.5	21.0	151.0	135.5	69.5	28.0	0.0	557.0
Av.	3.1	0.0	18.1	66.1	82.0	43.3	31.6	52.7	82.8	51.3	16.8	1.6	425.7
Min.	0.0	0.0	0.0	2.0	27.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	96.0
Max.	18.5	0.0	64.0	158.5	141.0	83.5	82.0	151.0	157.3	137.0	63.0	12.0	576.5

Source: GARWSP

Monthly Rainfall, Period 1997-2005

Governorate	TAIZ	StationName	HUSSEIN	StationType	Rainfall	Location:	UTM_N_Map	1516397	UTM_E_Map	382964
							Longitude	43.92	Latitude	13.71

Year	Jan	Feb	March	April	May	June	July	Aug	Sep	Oct	Nov	Dec	Total
1997										5.5	0.5	0.0	6.0
1998	0.0	0.0	0.0	0.0	0.5	0.0	1.5	3.5	0.0	0.0	0.0	0.0	5.5
1999	0.0	0.0	2.0	38.0	60.5	92.0	12.0	2.0	0.5	19.0	12.0	6.0	244.0
2000	0.0	0.0	0.0	15.5	24.0	62.8	44.3	69.3	120.5	107.5	19.0	0.0	462.8
2001	0.0	0.0	56.0	96.5	108.0	28.5	0.0	35.0	30.0	8.0	0.0	0.0	362.0
2002	0.0	0.0	13.5	41.5	46.0	50.0	51.5	64.5	26.0	5.0	0.0	0.0	298.0
2003	0.0	0.0	1.0	0.0	84.5	66.0	10.0	34.0	91.0	90.0	5.0	0.0	381.5
2004	0.5	1.5	10.0	90.5	0.0	37.0	35.0	54.5	73.5	21.8	0.0	0.0	324.3
2005	0.0	0.0	11.5	54.5	0.0	37.0	35.0	45.5	82.0	1.0	28.0	36.5	331.0
Av.	0.1	0.2	11.8	42.1	40.4	46.7	23.7	38.5	52.9	28.6	7.2	4.7	296.8
Min.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0	
Max.	0.5	1.5	56.0	96.5	108.0	92.0	51.5	69.3	120.5	107.5	28.0	36.5	462.8

Monthly Rainfall, Period 1998-2006

Governorate	TAIZ	StationName	JABA	StationType	Rainfall	Location:	UTM_N_Map	1490356	UTM_E_Map	392480
							Longitude	44.01	Latitude	13.48

Year	Jan	Feb	March	April	May	June	July	Aug	Sep	Oct	Nov	Dec	Total
1998	0.0	0.0	0.0	0.0	0.0	68.7	83.5	98.2	141.5	96.9	0.3	0.0	489.14
1999	0.5	0.0	32.7	27.6	36.1	91.6	61.5	75.7	69.8	0.0	0.0	0.0	395.62
2000	0.0	0.0	0.0	80.9	138.4	71.9	90.5	129.8	191.0	330.9	1.3	0.0	1034.62
2001	0.0	0.0	8.9	66.5	163.2	48.7	43.8	153.7	124.6	111.4	0.0	0.0	720.75
2002	31.3	8.0	0.0	0.0	22.5	12.7	150.5	154.5	128.1	7.5	0.0	0.0	515.25
2003	6.0	7.0	50.0	77.0	166.8	151.0	9.0	177.5	55.0	45.0	0.0	2.0	746.25
2004	3.7	0.0	22.3	42.5	98.9	133.7	33.9	83.9	83.9	34.2	0.0	0.0	537.03
2005	7.0	0.0	17.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24.75
2006	0.0	1.0	34.3										35.25
Av.	5.4	1.8	18.4	36.8	78.2	72.3	59.1	109.2	99.2	78.2	0.2	0.3	559.1
Min.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Max.	31.3	8.0	50.0	80.9	166.8	151.0	150.5	177.5	191.0	330.9	1.3	2.0	1034.6

Source: GARWSP

Monthly Rainfall, Period 1998-2006

Governorate	TAIZ	StationName	AKAMAH	StationType	Rainfall	Location:	UTM_N_Map	1490130	UTM_E_Map	390877
							Longitude	43.96	Latitude	13.48

Year	Jan	Feb	March	April	May	June	July	Aug	Sep	Oct	Nov	Dec	Total
1998	0.0	0.0	0.0	0.0	0.0	52.6	125.8	96.9	129.5	95.4	4.5	0.0	504.8
1999	0.8	0.0	24.4	35.4	94.6	160.9	67.5	98.1	165.4	258.5	33.1	2.0	940.8
2000	0.0	0.0	0.0	104.9	167.4	65.9	80.5	111.8	179.7	311.0	2.0	0.0	1023.1
2001	0.0	0.0	8.8	66.5	165.1	75.2	79.8	242.8	150.3	130.8	0.0	0.0	919.1
2002	18.4	4.5	0.0	0.0	17.5	57.0	158.5	204.6	173.9	5.7	17.4	0.0	657.6
2003	5.0	4.0	3.0	125.8	160.3	142.1	3.0	84.5	17.0	0.0	0.0	0.0	544.8
2004	0.0	0.0	34.6	112.6	63.0	58.2	45.1	83.0	19.0	21.8	0.0	0.0	437.2
2005	7.8	0.0	21.8	5.8	10.3	48.8	71.4	190.3	236.0	12.9	57.0	0.0	661.9
2006	0.0	1.0	34.2										35.2
Av.	3.5	1.1	14.1	56.4	84.8	82.6	78.9	139.0	133.8	104.5	14.3	0.2	713.2
Min.	0.0	0.0	0.0	0.0	0.0	48.8	3.0	83.0	17.0	0.0	0.0	0.0	
Max.	18.4	4.5	34.6	125.8	167.4	160.9	158.5	242.8	236.0	311.0	57.0	2.0	1023.1

Monthly Rainfall, Period 1998-2000

Governorate	TAIZ	StationName	BIRAYN	StationType	Rainfall	Location:	UTM_N_Map	1483859	UTM_E_Map	387837
							Longitude	43.96	Latitude	13.42

Year	Jan	Feb	March	April	May	June	July	Aug	Sep	Oct	Nov	Dec	Total
1998	0.0	0.0	0.0	0.0	0.0	24.0	83.1	119.7	138.8	109.2	2.0	0.0	476.8
1999	0.3	0.0	11.4	5.0	7.3	113.9	3.4	20.5	145.1	74.9	0.0	0.0	381.9
2000	0.0	0.0	0.0	76.0	0.0	21.6	45.6	67.6	119.5	262.0	2.0	0.0	594.3
Av.	0.1	0.0	3.8	27.0	2.4	53.2	44.0	69.3	134.5	148.7	1.3	0.0	484.3
Min.	0.0	0.0	0.0	0.0	0.0	21.6	3.4	20.5	119.5	74.9	0.0	0.0	381.9
Max.	0.3	0.0	11.4	76.0	7.3	113.9	83.1	119.7	145.1	262.0	2.0	0.0	594.3

Source: GARWSP

Monthly Rainfall, Period 1998-1999

Governorate	TAIZ	StationName	AZIR	StationType	Rainfall	Location:	UTM_N_Map	1483067	UTM_E_Map	379948
							Longitude	43.89	Latitude	13.41

Year	Jan	Feb	March	April	May	June	July	Aug	Sep	Oct	Nov	Dec	Total
1998	0.0	0.0	0.0	0.0	0.0	16.3	51.6	67.7	138.1	71.7	0.7	0.3	346.4
1999	0.3	0.5	0.3										1.0
Av.	0.1	0.3	0.1	0.0	0.0	16.3	51.6	67.7	138.1	71.7	0.7	0.3	346.9
Min.	0.0	0.0	0.0	0.0	0.0	16.3	51.6	67.7	138.1	71.7	0.7	0.3	
Max.	0.3	0.5	0.3	0.0	0.0	16.3	51.6	67.7	138.1	71.7	0.7	0.3	

Monthly Rainfall, Period 1998-1999

Governorate	TAIZ	StationName	KADAHA	StationType	Rainfall	Location:	UTM_N_Map	1475919	UTM_E_Map	375215
							Longitude	43.85	Latitude	13.35

Year	Jan	Feb	March	April	May	June	July	Aug	Sep	Oct	Nov	Dec	Total
1998						15.8	61.1	64.8	84.4	32.7	2.5	9.1	270.4
1999	24.6	15.3	3.7	0.0									43.5
Av.	24.6	15.3	3.7	0.0		15.8	61.1	64.8	84.4	32.7	2.5	9.1	313.9
Min.	24.6	15.3	3.7	0.0		15.8	61.1	64.8	84.4	32.7	2.5	9.1	
Max.	24.6	15.3	3.7	0.0		15.8	61.1	64.8	84.4	32.7	2.5	9.1	

Monthly Rainfall, Period 1998-2006

Governorate	TAIZ	StationName	NASHMA	StationType	Rainfall	Location:	UTM_N_Map	1479687	UTM_E_Map	388739
							Longitude	43.97	Latitude	13.38

Year	Jan	Feb	March	April	May	June	July	Aug	Sep	Oct	Nov	Dec	Total
1998						6.7	77.3	108.4	91.9	112.1	0.0	0.5	396.9
1999	0.0	0.0	26.7	22.2	103.8	0.0	0.0	0.0	84.9	112.9	5.5	1.8	357.7
2000	0.0	0.0	0.0	79.3	47.1	75.0	59.5	65.9	166.3	177.4	2.3	0.3	673.0
2001	0.0	0.0	44.5	31.0	80.5	82.5	6.0		51.0	53.0	12.0	0.0	360.5
2002	19.1	0.0	26.9	60.4	33.5	28.1	35.5	101.8	93.6	5.0	0.0	0.0	403.8
2003	2.0	2.0	5.0	13.5	28.5	75.3	9.5	52.0	72.0	15.5	0.0	0.0	275.3
2004	0.0	0.0	16.9	38.5	4.0	10.5	21.6	40.8	28.5	0.0	0.0	0.0	160.8
2005	0.0	0.0	0.0										0.0
2006	6.9	6.6	1.0	18.3									32.7
Av.	3.5	1.1	15.1	37.6	49.6	39.7	29.9	61.5	84.0	68.0	2.8	0.4	393.2
Min.	0.0	0.0	0.0	13.5	4.0	0.0	0.0	0.0	28.5	0.0	0.0	0.0	
Max.	19.1	6.6	44.5	79.3	103.8	82.5	77.3	108.4	166.3	177.4	12.0	1.8	673.0

Source: GARWSP

Monthly Rainfall, Period 1998-2005

Governorate	TAIZ	StationName	ALUM	StationType	Rainfall	Location:	UTM_N_Map	1479416	UTM_E_Map	398663
							Longitude	44.06	Latitude	13.38

Year	Jan	Feb	March	April	May	June	July	Aug	Sep	Oct	Nov	Dec	Total
1998	0.0	0.0	0.0	0.0	0.0	36.9	89.0	122.1	247.2	169.1	0.0	1.0	665.4
1999	1.5	0.0	30.1	15.6	98.9	106.4	51.4	80.8	129.0	156.8	0.0	0.8	671.1
2000	0.0	0.0	0.0	40.0	85.1	182.1	90.1	110.2	170.2	214.7	2.5	6.3	901.0
2001	0.0	0.0	66.5	21.5	142.4	41.0	54.5	66.8	48.0	79.3	3.0	0.0	523.0
2002	0.0	0.0	10.5	109.3	9.0	20.8	100.6	140.0	46.1	7.3	0.0	1.7	445.4
2003	0.0	0.0	15.3	55.5	22.0	163.3	23.3	135.3	108.3	9.5	0.0	0.0	532.3
2004	0.0	0.0	2.3	12.5	32.5	17.3	17.0	37.8	8.8	0.0	0.0	0.0	128.2
2005	0.0	0.0	0.0										0.0
Av.	0.2	0.0	15.6	36.3	55.7	81.1	60.8	99.0	108.2	90.9	0.8	1.4	550.1
Min.	0.0	0.0	0.0	0.0	0.0	17.3	17.0	37.8	8.8	0.0	0.0	0.0	
Max.	1.5	0.0	66.5	109.3	142.4	182.1	100.6	140.0	247.2	214.7	3.0	6.3	901.0

Monthly Rainfall, Period 1998-2006

Governorate	TAIZ	StationName	MISAR	StationType	Raifall	Location:	UTM_N_Map	1483264	UTM_E_Map	396023
							Longitude	44.04	Latitude	13.42

Year	Jan	Feb	March	April	May	June	July	Aug	Sep	Oct	Nov	Dec	Total
1998						13.4	103.4	225.3	134.8	69.8	0.0	0.0	546.7
1999	1.5	0.0	20.0	0.8	158.1	113.3	95.3	143.1	124.7	122.1	0.0	1.3	780.1
2000	0.0	0.0	0.0	54.4	104.2	114.9	102.7	109.0	115.0	117.9	12.6	0.5	731.2
2001	0.0	0.0	99.7	0.0	141.0	44.1	117.0	98.0	110.0	92.2	8.0	0.0	710.0
2002	8.5	0.0	8.0	10.7	28.0	94.5	172.2	192.4	33.0	0.0	0.0	0.0	547.2
2003	0.0	0.0	35.9	34.6	3.6	65.3	11.1	118.8	96.8	8.0	0.0	0.0	374.1
2004	0.0	0.0	8.0	35.0	19.7	27.1	67.5	54.2	79.8	16.2	0.0	0.0	307.5
2005	9.1	0.0	28.0	21.8	32.6	13.0	13.8	56.1	92.0	12.3	1.0	1.3	280.8
2006	0.0	1.8	8.9										10.6
Av.	2.4	0.2	26.0	22.5	69.6	60.7	85.4	124.6	98.3	54.8	2.7	0.4	547.5
Min.	0.0	0.0	0.0	0.0	3.6	13.0	11.1	54.2	33.0	0.0	0.0	0.0	
Max.	9.1	1.8	99.7	54.4	158.1	114.9	172.2	225.3	134.8	122.1	12.6	1.3	780.1

Source: GARWSP

Monthly Rainfall, Period 1998-2005

Governorate	TAIZ	StationName	HERAN	StationType	Rainfall	Location:	UTM_N_Map	1472055	UTM_E_Map	382169
							Longitude	43.91	Latitude	13.31

Year	Jan	Feb	March	April	May	June	July	Aug	Sep	Oct	Nov	Dec	Total
1998	0.0	0.0	0.0	0.0	0.0	16.3	53.0	58.1	124.1	147.0	0.0	1.8	400.2
1999	2.5	0.0	46.7	9.4	84.3	49.3	20.8	39.3	90.7	136.9	0.3	1.5	481.6
2000	0.0	0.0	0.0	47.8	36.1	44.3	42.2	82.7	102.0	107.2	17.3	0.8	480.3
2001	0.0	0.0	74.9	31.5	81.5	77.3	34.3	57.8	93.7	79.4	0.0	7.0	537.4
2002	0.0	0.0	48.3	44.1	66.3	75.9	77.9	166.1	109.0	35.5	0.0	0.0	623.1
2003	0.0	34.0	34.5	40.0	22.0	65.8	8.0	68.0	61.0	14.8	0.0	0.0	348.0
2004	0.0	9.0	0.0	44.0	0.0	32.0	3.3	8.0	46.0	0.0	0.0	0.0	142.3
2005	2.3	1.3	2.3	34.8	7.3	41.0	0.5	62.9	96.3	0.0	0.0	0.0	248.5
Av.	0.6	5.5	25.8	31.4	37.2	50.2	30.0	67.9	90.4	65.1	2.2	1.4	407.7
Min.	0.0	0.0	0.0	0.0	0.0	16.3	0.5	8.0	46.0	0.0	0.0	0.0	142.3
Max.	2.5	34.0	74.9	47.8	84.3	77.3	77.9	166.1	124.1	147.0	17.3	7.0	623.1

Monthly Rainfall, Period 1998-2006

Governorate	TAIZ	StationName	JIMJAM	StationType	Rainfall	Location:	UTM_N_Map	1461900	UTM_E_Map	404556
							Longitude	44.12	Latitude	13.22

Year	Jan	Feb	March	April	May	June	July	Aug	Sep	Oct	Nov	Dec	Total
1998						16.0	70.0	120.0	138.0	86.5	0.3	1.3	432.0
1999	5.5	0.0	16.8	0.0	84.3	56.3	34.3	91.0	193.3	168.8	0.3	1.5	651.8
2000	0.0	0.0	0.0	77.0	26.0	47.3	105.5	54.5	178.5	207.1	2.5	7.3	705.7
2001	0.0	0.0	8.0	55.0	73.5	149.2	37.3	53.9	199.2	15.5	0.0	0.0	591.6
2002	0.0	0.0	15.0	93.8	85.0	34.8	97.7	104.6	82.5	0.0	0.0	0.0	513.3
2003	0.0	0.0	19.8	38.0	9.0	65.0	43.0	110.0	51.8	27.8	0.0	0.0	364.3
2004	0.0	12.0	5.8	35.5	12.3	72.0	44.0	77.0	24.0	0.0	0.0	0.0	282.5
2005	0.0	0.0	0.0										0.0
2006	0.0	4.2	13.0	15.7									32.8
Av.	0.7	2.0	9.8	45.0	48.3	62.9	61.7	87.3	123.9	72.2	0.4	1.4	515.7
Min.	0.0	0.0	0.0	0.0	9.0	16.0	34.3	53.9	24.0	0.0	0.0	0.0	
Max.	5.5	12.0	19.8	93.8	85.0	149.2	105.5	120.0	199.2	207.1	2.5	7.3	705.7

Source: GARWSP

Monthly Rainfall, Period 1998-2005

Governorate	TAIZ	StationName	IRAFAT	StationType	Rainfall	Location:	UTM_N_Map	1469225	UTM_E_Map	387500
							Longitude	43.96	Latitude	13.29

Year	Jan	Feb	March	April	May	June	July	Aug	Sep	Oct	Nov	Dec	Total
1998						28.1	45.1	100.2	149.7	130.0	0.0	0.3	453.4
1999	1.0	0.0	13.7	3.5	98.4	54.1	28.4	68.8	117.1	101.9	4.7	0.5	492.0
2000	0.0	0.0	0.0	68.8	47.1	75.9	53.5	77.7	74.6	157.4	9.3	0.0	564.4
2001	0.0	0.0	0.0	26.3	91.3	85.0	29.0	102.0	51.7	65.3	9.0	0.0	459.5
2002	0.0	0.0	11.5	67.1	72.7	37.9	47.9	125.4	108.0	6.5	0.0	0.0	477.0
2003	5.0	15.0	16.3	18.5	26.8	90.8	7.8	103.0	82.0	21.0	2.0	0.0	388.0
2004	0.0	0.0	1.5	26.5	1.0	29.6	24.9	9.5	29.0	0.0	0.0	0.0	122.0
2005	2.3	1.0	1.8	16.8	5.8	30.0	0.5	96.5	123.2	2.0	1.5	0.0	281.3
Av.	1.2	2.3	6.4	32.5	49.0	53.9	29.6	85.4	91.9	60.5	3.3	0.1	416.1
Min.	0.0	0.0	0.0	3.5	1.0	28.1	0.5	9.5	29.0	0.0	0.0	0.0	
Max.	5.0	15.0	16.3	68.8	98.4	90.8	53.5	125.4	149.7	157.4	9.3	0.5	564.4

Monthly Rainfall, Period 1998-2006

Governorate	TAIZ	StationName	BULAN	StationType	Rainfall	Location:	UTM_N_Map	1484000	UTM_E_Map	398099
							Longitude	44.06	Latitude	13.42

Year	Jan	Feb	March	April	May	June	July	Aug	Sep	Oct	Nov	Dec	Total
1998	0.0	0.0	0.0	0.0	0.0	0.0	115.8	245.5	115.5	70.3	1.3	0.8	549.0
1999	0.0	0.0	0.0	0.0	0.0	82.3	110.0	189.8	78.0	0.3	0.0	0.0	460.3
2000	0.0	0.0	0.0	59.4	74.6	81.7	98.9	108.0	166.0	136.5	11.0	0.0	736.0
2001	0.0	0.0	17.0	72.8	38.0	87.1	88.8	62.8	135.1	110.1	6.3	0.0	618.0
2002	4.3	0.0	0.0	33.8	69.9	20.3	145.2	155.8	36.9	2.5	0.0	2.8	471.4
2003	0.0	0.0	40.0	35.3	7.8	65.3	9.5	124.8	76.5	9.0	0.0	0.0	368.0
2004	0.0	0.0	37.0	159.0	75.5	30.9	30.1	1.8	7.6	57.2	0.0	0.0	399.0
2005	0.0	0.0	0.0										0.0
2006	0.0	9.5	0.0										9.5
Av.	0.5	1.1	10.4	51.5	38.0	52.5	85.5	126.9	87.9	55.1	2.6	0.5	512.4
Min.	0.0	0.0	0.0	0.0	0.0	0.0	9.5	1.8	7.6	0.3	0.0	0.0	
Max.	4.3	9.5	40.0	159.0	75.5	87.1	145.2	245.5	166.0	136.5	11.0	2.8	736.0

Source: GARWSP

Monthly Rainfall, Period 1997-2005

Governorate	TAIZ	StationName	TAIZNWRA	StationType	MET	Location:	UTM_N_Map	1502795	UTM_E_Map	394421
							Longitude	44.02	Latitude	13.59

Year	Jan	Feb	March	April	May	June	July	Aug	Sep	Oct	Nov	Dec	Total
1997							0.5						0.5
1998						40.0	71.0	129.5		7.0	1.0	0.0	248.5
1999	0.0	0.0	80.5	5.5	32.3	78.3	83.3	97.3	109.3	103.1	14.9	3.6	608.1
2000	0.0	0.0	0.0	60.4	62.9	13.7	17.2	3.1	188.4	231.3	19.3	0.0	596.2
2001	1.0	0.0	76.8	42.4	132.4	9.1	45.8	162.9	106.2	106.7	11.5	12.5	707.3
2002	11.0	0.0	42.0	96.1	66.3	24.4	77.7	216.0	63.4	20.8	0.0	1.8	619.4
2003	47.5	62.0	75.9	13.5	5.0	168.4	21.5	109.4	150.5	53.7	0.0	0.0	707.3
2004	0.0	10.0	17.0	59.0	77.5	86.8	0.0	121.4	130.9	6.4	0.0	0.0	509.0
2005	0.0	0.0	54.2	10.9	8.4	23.1	5.3	112.0	202.3	58.4	3.9	0.0	478.5
Av.	8.5	10.3	49.5	41.1	55.0	55.5	35.8	119.0	135.8	73.4	6.3	2.2	592.4
Min.	0.0	0.0	0.0	5.5	5.0	9.1	0.0	3.1	63.4	6.4	0.0	0.0	
Max.	47.5	62.0	80.5	96.1	132.4	168.4	83.3	216.0	202.3	231.3	19.3	12.5	707.3

Source: GARWSP

Monthly Rainfall, Period 1996-2005

Governorate	SANA'A	StationNo.	6.04	StationType		Location:	UTM_E_Map		UTM_N_Map	
		StationName	MAFHAQ-A				Longitude	43 54'	Latitude	15 06'

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1996	24.5	0.0	55.1	129.7	67.5	73.9	35.4	59.1	9.9	0.0	0.0	0.0	455.1
1997	0.0	0.0	6.0	59.8	51.1	63.1	38.7	8.3	17.8	141.7	28.3	0.0	414.8
1998	0.0	26.8	17.5	69.4	80.2	0.0	142.4	182.6	0.0	13.9	0.0	0.0	532.8
1999	0.0	0.0	13.1	13.4	0.0	7.0	92.8	53.6	35.0	5.8	0.0	0.0	220.7
2000	0.0	0.0	0.0	56.6	26.9	0.0	36.4	71.4	0.0	0.0	36.5	0.0	227.8
2001	0.0	0.0	137.8	70.3	57.5	0.0	155.7	127.9	10.0	27.8	0.0	0.0	587.0
2002	0.0	0.0	33.2	92.0	9.0	0.0	31.2	48.3	24.0	0.0	0.0	0.0	237.7
2003	0.0	0.0	41.8	33.3	0.0	0.0	64.7	131.4	32.3	0.0	0.0	0.0	303.5
2004	0.0	0.0	0.0	68.7	0.0	0.0	26.0	65.3	0.0	0.0	0.0	0.0	160.0
2005	0.0	0.0	91.3	34.0	92.3	0.0	56.0	79.7	3.8	0.0	0.0	0.0	357.1
Av.	2.5	2.7	39.6	62.7	38.5	14.4	67.9	82.8	13.3	18.9	6.5	0.0	349.7
Min.	0.0	0.0	0.0	13.4	0.0	0.0	26.0	8.3	0.0	0.0	0.0	0.0	160.0
Max.	24.5	26.8	137.8	129.7	92.3	73.9	155.7	182.6	35.0	141.7	36.5	0.0	587.0

Monthly Rainfall, Period 1996-2005

Governorate	SANA'A	StationNo.	6.03	StationType		Location:	UTM_E_Map		UTM_N_Map	
		StationName	Al-Amir				Longitude	43 42'	Latitude	15 03'

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1996	83.0	0.0	119.7	149.0	132.1	26.0	65.9	24.0	30.0	0.0	0.0	0.0	629.7
1997	0.0	0.0	14.0	113.4	262.5	35.0	35.0	94.0	0.0	165.3	168.0	0.0	887.2
1998	0.0	0.0	10.0	58.0	80.0	58.0	185.7	242.6	65.0	0.0	0.0	4.0	703.3
1999	0.0	0.0	32.0	15.3	0.0	7.8	173.2	103.2	27.0	0.0	0.0	33.5	392.0
2000	0.0	0.0	0.0	77.0	37.5	0.0	28.0	84.0	99.0	8.0	0.0	48.0	381.5
2001	0.0	0.0	80.0	58.0	87.0	0.0	143.1	144.5	7.0	0.0	0.0	0.0	519.6
2002	0.0	0.0	16.5	63.0	3.0	12.0	54.5	90.0	13.5	0.0	0.0	38.0	290.5
2003	0.0	0.0	0.0	136.2	16.0	73.5	19.5	113.0	0.0	0.0	0.0	0.0	358.2
2004	0.0	0.0	0.0	85.4	40.0	21.5	61.5	81.3	0.0	0.0	0.0	0.0	289.7
2005	0.0	0.0	18.0	53.5	122.5	60.0	40.0	134.0	0.0	0.0	0.0	0.0	428.0
Av.	8.3	0.0	29.0	80.9	78.1	29.4	80.6	111.1	24.2	17.3	16.8	12.4	488.0
Min.	0.0	0.0	0.0	15.3	0.0	0.0	19.5	24.0	0.0	0.0	0.0	0.0	289.7
Max.	83.0	0.0	119.7	149.0	262.5	73.5	185.7	242.6	99.0	165.3	168.0	48.0	887.2

Source: Tihama Development Authority

Monthly Rainfall, Period 1996-2005

Governorate	SANA'A	StationNo.	6.10	StationType		Location:	UTM_E_Map		UTM_N_Map	
		StationName	Wallan				Longitude	44 16'	Latitude	15 04'

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1996	0.0	19.0	48.0	26.0	29.0	72.0	0.0	21.0	0.0	0.0	0.0	0.0	215.0
1997	0.0	0.0	58.0	105.0	29.0	60.2	0.0	31.2	0.0	70.0	88.0	0.0	441.4
1998	0.9	30.0	0.0	0.0	25.0	0.0	120.0	159.0	20.0	0.0	0.0	0.0	354.9
1999	0.0	0.0	0.0	0.0	0.0	0.0	81.0	71.0	0.0	0.0	0.0	10.0	162.0
2000	0.0	0.0	0.0	0.0	0.0	0.0	21.0	37.0	0.0	0.0	0.0	0.0	58.0
2001	0.0	0.0	103.0	0.0	0.0	0.0	99.0	139.0	0.0	0.0	0.0	0.0	341.0
2002	0.0	0.0	14.0	98.0	10.0	0.0	62.0	12.0	14.0	0.0	0.0	0.0	210.0
2003	0.0	15.0	0.0	45.0	0.0	0.0	0.0	72.0	0.0	0.0	0.0	0.0	132.0
2004	0.0	0.0	0.0	47.0	0.0	0.0	0.0	0.0	25.0	0.0	0.0	0.0	72.0
2005	0.0	0.0	65.0	72.0	0.0	0.0	30.0	40.4	0.0	0.0	13.6	0.0	221.0
Av.	0.1	6.4	28.8	39.3	9.3	13.2	41.3	58.3	5.9	7.0	10.2	1.0	220.7
Min.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	58.0
Max.	0.9	30.0	103.0	105.0	29.0	72.0	120.0	159.0	25.0	70.0	88.0	10.0	441.4

Monthly Rainfall, Period 1996-2005

Governorate	Taiz	StationNo.	11.11	StationType		Location:	UTM_E_Map		UTM_N_Map	
		StationName	Al-Dabab				Longitude	43 57'	Latitude	13 32'

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1996	0.0	0.0	45.7	128.0	160.3	0.0	10.0	80.8	0.0	120.0	0.0	0.0	544.8
1997	14.4	0.0	26.0	40.0	159.7	30.4	11.4	138.4	68.7	57.8	82.3	0.0	629.1
1998	23.0	0.0	10.0	88.8	107.1	3.7	20.0	88.6	86.2	0.0	0.0	0.0	427.4
1999	0.0	0.0	9.0	50.1	78.8	93.4	0.0	122.3	162.2	92.4	0.0	0.0	608.2
2000	0.0	0.0	0.0	164.2	40.0	20.0	32.0	101.0	124.0	72.4	0.0	0.0	553.6
2001	0.0	0.0	39.9	46.2	117.1	66.9	25.8	66.0	119.2	84.8	4.7	0.0	570.6
2002	0.0	0.0	11.2	130.3	179.4	40.4	103.5	103.7	94.2	17.5	0.0	0.0	680.2
2003	0.0	0.0	17.0	90.0	98.3	0.0	0.0	140.6	0.0	0.0	0.0	0.0	345.9
2004	0.0	0.0	20.0	155.9	22.0	55.1	100.8	14.5	206.8	130.7	0.0	0.0	705.8
2005	0.0	0.0	20.0	155.9	22.0	55.1	100.8	14.5	206.8	130.7	0.0	0.0	705.8
Av.	3.7	0.0	19.9	104.9	98.5	36.5	40.4	87.0	106.8	70.6	8.7	0.0	577.1
Min.	0.0	0.0	0.0	40.0	22.0	0.0	0.0	14.5	0.0	0.0	0.0	0.0	345.9
Max.	23.0	0.0	45.7	164.2	179.4	93.4	103.5	140.6	206.8	130.7	82.3	0.0	705.8

Source: Tihama Development Authority

Monthly Rainfall, Period 1996-2005

Governorate	Taiz	StationNo.	11.02	StationType		Location:	UTM_E_Map		UTM_N_Map	
		StationName	Jabal Habashi				Longitude	43 48'	Latitude	13 32'

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1996	0.0	0.0	0.0	52.0	272.2	254.4	28.4	215.4	90.2	71.2	75.0	0.0	1058.8
1997	0.0	0.0	0.0	99.2	201.4	62.6	8.4	122.0	60.6	36.4	109.4	0.0	700.0
1998	35.6	0.0	29.8	109.2	96.2	92.6	42.4	204.0	132.0	56.4	0.0	0.0	798.2
1999	0.0	0.0	0.0	3.0	89.6	109.8	64.6	88.6	163.8	70.4	0.0	0.0	589.8
2000	0.0	0.0	0.0	77.2	62.2	56.2	76.8	67.4	234.6	107.8	23.0	16.4	721.6
2001	0.0	0.0	65.6	22.2	217.0	0.0	28.6	75.2	172.0	96.0	0.0	0.0	676.6
2002	0.0	0.0	10.6	111.5	143.1	30.5	0.0	116.6	121.2	0.0	0.0	60.8	594.3
2003	0.0	0.0	9.2	125.2	32.8	56.0	11.2	111.8	223.8	3.4	0.0	0.0	573.4
2004	0.0	0.0	9.8	45.0	49.8	105.4	29.6	65.2	176.2	48.6	1.6	5.2	536.4
2005	30.0	0.0	44.6	61.6	135.5	67.8	0.0	38.6	0.0	22.6	7.0	0.0	407.7
Av.	6.6	0.0	17.0	70.6	130.0	83.5	29.0	110.5	137.4	51.3	21.6	8.2	665.7
Min.	0.0	0.0	0.0	3.0	32.8	0.0	0.0	38.6	0.0	0.0	0.0	0.0	407.7
Max.	35.6	0.0	65.6	125.2	272.2	254.4	76.8	215.4	234.6	107.8	109.4	60.8	1058.8

Monthly Rainfall, Period 1996-2005

Governorate	Taiz	StationNo.	11.08	StationType		Location:	UTM_E_Map		UTM_N_Map	
		StationName	Al-Robei				Longitude	43 54'	Latitude	13 35'

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1996	0.0	0.0	11.5	91.2	147.9	48.0	24.0	43.8	20.5	32.0	0.0	12.5	431.4
1997	0.0	0.0	25.0	73.0	130.0	80.8	14.5	138.0	165.5	110.5	17.5	0.0	754.8
1998	0.0	0.0	17.0	31.0	133.5	32.5	38.0	57.5	75.5	48.5	0.0	0.0	433.5
1999	0.0	0.0	10.5	35.5	16.0	84.0	59.0	26.5	112.0	141.4	7.0	0.0	491.9
2000	0.0	0.0	0.0	31.5	109.0	38.5	51.0	30.0	134.5	10.5	32.0	23.0	460.0
2001	0.0	0.0	12.5	141.0	136.0	29.0	58.0	46.0	128.5	49.5	0.0	0.0	600.5
2002	3.5	0.0	3.5	90.3	87.5	82.5	34.5	57.0	80.0	32.0	0.0	16.0	486.8
2003	0.0	2.0	39.5	107.0	39.5	114.0	11.0	174.0	95.0	58.0	11.0	0.0	651.0
2004	0.0	1.5	2.0	99.0	62.5	95.5	32.5	56.0	133.4	35.0	16.5	0.0	533.9
2005	No Data												
Av.	0.4	0.4	13.5	77.7	95.8	67.2	35.8	69.9	105.0	57.5	9.3	5.7	538.2
Min.	0.0	0.0	0.0	31.0	16.0	29.0	11.0	26.5	20.5	10.5	0.0	0.0	431.4
Max.	3.5	2.0	39.5	141.0	147.9	114.0	59.0	174.0	165.5	141.4	32.0	23.0	754.8

Source: Tihama Development Authority

Monthly Rainfall, Period 1996-2005

Governorate	Dhamar	StationNo.	12.1	StationType		Location:	UTM_E_Map		UTM_N_Map	
		StationName	Ghurafi				Longitude	43 27'	Latitude	13 32'

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1996	0.0	0.0	0.0	1.8	5.1	7.0	0.0	0.4	5.5	0.0	0.0	0.0	19.8
1997	0.0	0.3	4.0	0.0	0.0	0.0	0.0	0.0	7.0	6.7	6.7	7.0	31.7
1998	13.5	0.0	44.4	0.0	2.2	0.0	6.0	11.7		0.0	0.0	0.0	77.8
1999	0.0	0.0	20.0	0.0	0.0	0.0	4.0	17.0	0.0	4.0	0.0	0.0	45.0
2000	0.0	0.0	10.0	0.0	0.0	0.0	0.0	60.2	0.0	28.5	60.0	0.0	158.7
2001	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2002	25.0	0.0	0.0	80.0	0.0	0.0	0.0	0.0	28.7	0.0	0.0	15.5	149.2
2003	0.0	0.0	0.0	25.0	0.0	0.0	1.0	2.0	0.0	0.0	0.0	0.0	28.0
2004	9.0	3.2	0.0	26.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	38.8
2005	0.0	2.3	3.5	15.0	0.0	0.0	0.0	13.0	0.0	0.0	0.0	0.0	33.8
Av.	4.8	0.6	8.2	14.8	0.7	0.7	1.1	10.4	4.6	3.9	6.7	2.3	58.3
Min.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Max.	25.0	3.2	44.4	80.0	5.1	7.0	6.0	60.2	28.7	28.5	60.0	15.5	158.7

Monthly Rainfall, Period 1996-2005

Governorate	Dhamar	StationNo.	9.01	StationType		Location:	UTM_E_Map		UTM_N_Map	
		StationName	Wadi Al-Har				Longitude	44 16'	Latitude	14 24'

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1996	0.0	1.0	36.0	216.3	112.0	180.0	18.4	67.8	0.0	0.0	0.0	0.0	631.5
1997	14.0	0.0	1.0	99.3	101.0	139.1	42.0	55.7	7.0	232.1	41.0	0.0	732.2
1998	2.0	0.0	44.4	67.0	87.0	21.0	241.7	15.3	0.0	0.0	0.0	0.0	478.4
1999	5.0	24.2	1.8	9.3	0.0	0.0	275.0	138.5	0.0	0.0	0.0	0.0	453.8
2000	0.0	0.0	0.0	24.9	42.3	6.0	96.3	167.5	67.8	0.0	0.0	0.0	404.8
2001	0.0	0.0	90.5	25.9	97.4	0.0	76.4	121.5	53.5	0.0	0.0	0.0	465.2
2002	0.0	0.0	12.1	95.1	2.6	0.0	63.1	55.4	24.3	0.0	0.0	2.2	254.8
2003	0.0	19.0	37.5	83.8	8.4	0.0	67.3	54.7	0.0	0.0	0.0	0.0	270.7
2004	0.0	0.0	27.4	147.5	0.0	9.2	31.1	50.8	0.0	6.2	0.0	8.5	280.7
2005	0.0	0.0	54.7	42.7	51.5	23.9	55.4	84.4	11.0	0.0	0.0	0.0	323.6
Av.	2.1	4.4	30.5	81.2	50.2	37.9	96.7	81.2	16.4	23.8	4.1	1.1	429.6
Min.	0.0	0.0	0.0	9.3	0.0	0.0	18.4	15.3	0.0	0.0	0.0	0.0	254.8
Max.	14.0	24.2	90.5	216.3	112.0	180.0	275.0	167.5	67.8	232.1	41.0	8.5	732.2

Source: Tihama Development Authority

Monthly Rainfall, Period 1996-2005

Governorate	Dhamar	StationNo.	6.05	StationType		Location:	UTM_E_Map		UTM_N_Map	
		StationName	Al-Hamal				Longitude	43 57'	Latitude	14 45'

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1996	0.0	0.0	17.3	95.3	107.1	190.6	37.2	114.3	6.2	0.0	0.0	0.0	568.0
1997	0.0	0.0	0.0	148.4	79.6	100.4	57.8		58.4	197.9	26.8	0.0	669.3
1998	0.0	0.0	0.0	88.8	35.2	84.1	154.7	132.2	86.9	25.5	0.0	0.0	607.4
1999	0.0	0.0	37.7	35.1	45.4	45.1	115.9	82.9	32.4	0.0	0.0	0.0	394.5
2000	0.0	0.0	0.0	66.4	78.8	18.0	117.4	181.8	51.9	0.0	48.8	0.0	563.1
2001	0.0	0.0	0.0	115.1	83.2	0.0	165.6	128.4	35.0	15.7	0.0	0.0	543.0
2002	0.0	0.0	0.0	53.7	52.3	0.0	149.9	149.4	27.2	15.5	0.0	0.0	448.0
2003	0.0	0.0	0.0	87.4	0.0	22.7	78.4	88.5	18.3	29.5	0.0	0.0	324.8
2004	0.0	0.0	11.3	118.2	0.0	29.8	86.1	78.2	32.1	41.7	0.0	0.0	397.4
2005	0.0	0.0	44.1	100.1	111.1	0.0	27.7	155.6	59.6	0.0	0.0	0.0	498.2
Av.	0.0	0.0	11.0	90.9	59.3	49.1	99.1	123.5	40.8	32.6	7.6	0.0	501.4
Min.	0.0	0.0	0.0	35.1	0.0	0.0	27.7	78.2	6.2	0.0	0.0	0.0	324.8
Max.	0.0	0.0	44.1	148.4	111.1	190.6	165.6	181.8	86.9	197.9	48.8	0.0	669.3

Monthly Rainfall, Period 1996-2005

Governorate	Dhamar	StationNo.	8.10	StationType		Location:	UTM_E_Map		UTM_N_Map	
		StationName	Medinat Al-Shark				Longitude	43 57'	Latitude	14 38'

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1996	0.0	18.5	89.3	36.9	247.3	39.6	39.6	37.0	88.2	27.4	0.0	7.0	630.8
1997	0.0	0.0	0.0	0.0	0.0	222.6	144.1	121.6	5.3	231.7	78.2	0.0	803.5
1998	0.0	0.0	0.0	136.1	452.3	106.2	0.0	0.0	0.0	0.0	0.0	0.0	694.6
1999	0.0	0.0	94.0	0.0	0.0	40.7	353.5	312.8	184.9	25.0	41.0	0.0	1051.9
2000	3.4	0.0	0.0	0.0	64.3	0.0	69.8	67.1	55.8	42.4	8.3	0.0	311.1
2001	0.0	0.0	117.2	26.7	56.0	35.4	222.8	102.9	0.0	0.0	0.0	0.0	561.0
2002	21.2	0.0	40.7	114.3	46.4	49.7	32.5	207.1	56.4	0.0	0.0	0.0	568.3
2003	0.0	3.3	10.4	109.5	55.2	11.1	44.3	137.3	51.7	0.0	0.0	0.0	422.8
2004	0.0	0.0	8.6	185.1	28.5	52.3	167.3	92.3	5.2	18.5	0.0	0.0	557.8
2005	0.0	0.0	39.0	109.6	130.8	30.4	66.6	222.4	23.6	0.0	32.4	0.0	654.8
Av.	2.5	2.2	39.9	71.8	108.1	58.8	114.1	130.1	47.1	34.5	16.0	0.7	625.7
Min.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	311.1
Max.	21.2	18.5	117.2	185.1	452.3	222.6	353.5	312.8	184.9	231.7	78.2	7.0	1051.9

Source: Tihama Development Authority

Monthly Rainfall, Period 1996-2005

Governorate	Ibb	StationNo.	9.03	StationType		Location:	UTM_E_Map		UTM_N_Map	
		StationName	Ibb				Longitude	44 12'	Latitude	14 07'

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1996	89.0	11.0	289.0	579.0	46.3	806.0	541.0	409.0	441.0	102.2	0.0	15.4	3328.9
1997	14.5	25.8	100.5	458.7	339.1	417.8	229.8	76.7	179.4	161.4	89.5	0.0	2093.2
1998	2.1	18.2	101.0	109.8	134.4	590.9	463.6	687.8	86.9	80.2	0.0	0.0	2274.9
1999	0.0	65.6	23.1	29.8	298.9	271.5	80.9	331.7	198.9	137.8	13.6	61.1	1512.9
2000	0.0	0.0	0.0	257.9	131.3	174.2	277.3	348.5	153.4	83.8	43.3	0.0	1469.7
2001	0.0	0.0	237.0	94.2	313.2	158.7	141.6	152.1	77.3	32.0	0.0	0.0	1206.1
2002	7.2	3.2	46.6	124.8	96.1	218.1	135.5	125.5	142.2	0.0	0.0	29.7	928.9
2003	0.0	30.6	78.2	58.6	48.3	179.8	40.1	129.2	66.0	32.2	0.0	13.2	676.2
2004	0.0	0.0	0.0	192.6	93.2	108.1	135.3	136.7	80.2	16.7	15.2	0.0	778.0
2005	0.0	0.0	33.7	24.1	60.4	103.5	82.0	131.0	42.7	16.0	0.0	0.0	493.4
Av.	11.3	15.4	90.9	193.0	156.1	302.9	212.7	252.8	146.8	66.2	16.2	11.9	1476.2
Min.	0.0	0.0	0.0	24.1	46.3	103.5	40.1	76.7	42.7	0.0	0.0	0.0	493.4
Max.	89.0	65.6	289.0	579.0	339.1	806.0	541.0	687.8	441.0	161.4	89.5	61.1	3328.9

Monthly Rainfall, Period 1996-2005

Governorate	Ibb	StationNo.	9.08	StationType		Location:	UTM_E_Map		UTM_N_Map	
		StationName	Al-Udain				Longitude	44 04'	Latitude	13 57'

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1996	11.0	0.0	106.0	40.0	139.0	187.0	202.0	153.0	290.0	135.0	37.0	53.0	1353.0
1997	5.0	0.0	26.0	325.0	140.0	140.0	128.4	90.0	102.0	157.0	129.0	0.0	1242.4
1998	0.0	0.0	0.0	172.0	330.0	322.0	350.0	578.2	263.0	422.7	0.0	0.0	2437.9
1999	0.0	0.0	38.0	82.0	268.0	466.7	257.0	244.0	422.0	421.4	0.0	0.0	2199.1
2000	0.0	0.0	0.0	317.5	196.5	171.5	341.9	463.1	286.0	25.0	57.5	0.0	1859.0
2001	0.0	0.0	132.5	86.5	174.6	37.0	201.0	416.4	67.0	89.4	0.0	0.0	1204.4
2002	0.0	0.0	0.0	131.5	196.6	257.1	168.0	620.0	269.9	0.0	64.0	12.5	1719.6
2003	0.0	47.0	43.0	292.1	0.0	220.5	80.0	457.1	279.0	38.0	0.0	0.0	1456.7
2004	0.0	0.0	3.5	135.0	0.0	66.2	109.0	67.0	22.0	16.0	42.0	7.0	467.7
2005	0.0	0.0	219.2	30.5	219.6	56.5	56.5			0.0	0.0		582.3
Av.	1.6	4.7	56.8	161.2	166.4	192.5	189.4	343.2	222.3	130.5	33.0	8.1	1452.2
Min.	0.0	0.0	0.0	30.5	0.0	37.0	56.5	67.0	22.0	0.0	0.0	0.0	467.7
Max.	11.0	47.0	219.2	325.0	330.0	466.7	350.0	620.0	422.0	422.7	129.0	53.0	2437.9

Source: Tihama Development Authority

Monthly Rainfall, Period 1996-2005

Governorate	Ibb	StationNo.	9.07	StationType		Location:	UTM_E_Map		UTM_N_Map	
		StationName	Yarim				Longitude	44 22'	Latitude	14 18'

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1996	0.0	0.0	71.4	154.8	66.3	113.1	94.5	71.1	27.5	0.0	14.8	0.0	613.5
1997	0.0	15.8	30.1	87.8	130.8	77.1	100.9	99.6	43.9	44.9	67.1	0.0	698.0
1998	13.9	30.7	83.3	71.7	73.7	71.4	161.2	296.2	45.7	0.0	0.0	0.0	847.8
1999	20.2	0.0	87.0	25.4	0.0	85.4	216.3	213.2	69.4	0.0	0.0	0.0	716.9
2000	0.0	0.0	21.8	63.4	43.6	39.8	171.9	272.5	95.3	0.0	0.0	0.0	708.3
2001	0.0	0.0	158.8	114.9	176.9	75.4	200.1	293.8	63.7	0.0	0.0	15.4	1099.0
2002				131.9	95.3	58.2	189.2	107.1	182.5	0.0	0.0	0.0	764.2
2003	0.0	38.4	0.0	189.9	0.0	45.2	83.1	269.7	48.7	0.0	26.9	0.0	701.9
2004	0.0	0.0	43.5	213.5	73.4	41.5	97.2	88.9	0.0	62.7	0.0	0.0	620.7
2005	0.0	0.0	54.9	134.2	90.9	61.3	106.6	214.2	33.4	0.0	0.0		695.5
Av.	3.8	9.4	61.2	118.8	75.1	66.8	142.1	192.6	61.0	10.8	10.9	1.7	746.6
Min.	0.0	0.0	0.0	25.4	0.0	39.8	83.1	71.1	0.0	0.0	0.0	0.0	613.5
Max.	20.2	38.4	158.8	213.5	176.9	113.1	216.3	296.2	182.5	62.7	67.1	15.4	1099.0

Monthly Rainfall, Period 1996-2005

Governorate	Ibb	StationNo.	9.05	StationType		Location:	UTM_E_Map		UTM_N_Map	
		StationName	Al-Dalil Sumara				Longitude	44 12'	Latitude	14 07'

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1996	12.4	0.0	44.2	69.6	76.2	103.4	141.4	85.0	19.0	0.0	5.0	13.0	569.2
1997	37.9	0.0	40.6	98.4	185.6	97.7	116.9	114.2	62.0	145.2	89.0	0.0	987.5
1998	6.2	3.0	32.5	74.5	115.8	140.7	119.4	279.7	88.7	24.3	0.0	7.0	891.8
1999	0.0	0.0	21.1	25.5	63.0	74.0	174.0	179.9	41.5	185.0	0.0	3.8	767.8
2000	0.0	0.0	5.5	173.0	197.7	7.8	104.2	128.3	39.7	32.5	41.5	14.1	744.3
2001	0.0	0.0	172.2	93.5	120.3	55.2	118.5	140.5	109.5	29.8	0.0	0.0	839.5
2002	0.0	0.0	77.0	105.8	81.0	41.8	199.2	102.5	42.6	61.7	20.8	17.9	750.3
2003	8.0	35.0	27.3	98.2	64.5	69.0	67.8	186.8	78.0	17.0	10.8	10.5	672.9
2004	0.0	0.0	3.5	135.0	0.0	66.2	109.0	67.0	22.0	16.0	42.0	7.0	467.7
2005	5.5	0.0	106.4	38.1	141.7	99.5				0.0	3.5		394.7
Av.	7.0	3.8	53.0	91.2	104.6	75.5	127.8	142.7	55.9	51.2	21.3	8.1	708.6
Min.	0.0	0.0	3.5	25.5	0.0	7.8	67.8	67.0	19.0	0.0	0.0	0.0	394.7
Max.	37.9	35.0	172.2	173.0	197.7	140.7	199.2	279.7	109.5	185.0	89.0	17.9	987.5

Source: Tihama Development Authority

Monthly Rainfall, Period 1996-2005

Governorate	Al-Mahweet	StationNo.	2.07	StationType		Location:	UTM_E_Map		UTM_N_Map	
		StationName	Al-Mahweet				Longitude	43 54'	Latitude	15 30'

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1996	0.0	0.0	54.7	158.1	61.5	86.8	46.6	84.8	53.9	0.0	0.0	0.0	546.4
1997	0.0	0.0	31.4	55.6	122.4	86.0	241.7	178.5	124.9	125.8	64.8	0.0	1031.1
1998	0.0	0.0	0.0	30.1	97.6	25.2	167.2	176.2	123.3	40.2	0.0	0.0	659.8
1999	0.0	0.0	24.5	123.8	34.8	98.5	134.0	86.2	5.8	80.7	33.0	13.2	634.5
2000	45.2	27.2	26.0	79.5	51.5	0.0	140.1	180.3	28.2	85.6	0.0	0.0	663.6
2001	0.0	0.0	144.7	182.4	240.2	20.4	103.6	271.4	28.2	85.6	0.0	0.0	1076.5
2002	0.0	0.0	0.0	23.5	35.2	25.3	72.8	35.1	52.3	0.0	0.0	61.5	305.7
2003	0.0	51.0	0.0	176.5	0.0	62.0	0.0	113.0	0.0	0.0	0.0	0.0	402.5
2004	0.0	50.4	20.3	196.4	0.0	50.6	155.7	248.3	115.8	10.2	0.0	0.0	847.7
2005	0.0	0.0	15.2	146.3	160.4	72.7	42.5	143.2	55.6	0.0	50.3	0.0	686.2
Av.	4.5	12.9	31.7	117.2	80.4	52.8	110.4	151.7	58.8	42.8	14.8	7.5	685.4
Min.	0.0	0.0	0.0	23.5	0.0	0.0	0.0	35.1	0.0	0.0	0.0	0.0	305.7
Max.	45.2	51.0	144.7	196.4	240.2	98.5	241.7	271.4	124.9	125.8	64.8	61.5	1076.5

Monthly Rainfall, Period 1996-2005

Governorate	Al-Mahweet	StationNo.	2.15	StationType		Location:	UTM_E_Map		UTM_N_Map	
		StationName	Shibam				Longitude	43 32'	Latitude	15 28

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1996	24.0	4.0	36.0	146.0	37.0	113.0	159.0	141.0	0.0	0.0	0.0	0.0	660.0
1997	0.0	16.0	55.0	43.0	30.4	37.0	58.0	40.0	0.0	57.0	42.0	0.0	378.4
1998	0.0	0.0	0.0	46.0	98.0	31.0	203.0	237.0	30.0	0.0	0.0	0.0	645.0
1999	0.0	0.0	0.0	26.0	0.0	0.0	126.0	75.0	37.0	0.0	0.0	0.0	264.0
2000	0.0	0.0	20.0	55.0	0.0	0.0	70.6	80.7	0.0	27.0	17.0	0.0	270.3
2001	0.0	0.0	30.0	48.5	70.0	0.0	149.5	96.0	0.0	0.0	0.0	0.0	394.0
2002	0.0	0.0	75.0	55.0	28.0	14.0	112.0	71.0	18.0	0.0	0.0	0.0	373.0
2003	0.0	0.0	0.0	44.0	0.0	0.0	67.0	109.0	0.0	0.0	0.0	0.0	220.0
2004	0.0	0.0	0.0	78.0	0.0	9.0	75.3	53.8	0.0	0.0	0.0	0.0	216.1
2005	0.0	0.0	0.0	93.5	34.0	7.0	89.0	102.0	3.5	0.0	0.0	0.0	329.0
Av.	2.4	2.0	21.6	63.5	29.7	21.1	110.9	100.6	8.9	8.4	5.9	0.0	375.0
Min.	0.0	0.0	0.0	26.0	0.0	0.0	58.0	40.0	0.0	0.0	0.0	0.0	216.1
Max.	24.0	16.0	75.0	146.0	98.0	113.0	203.0	237.0	37.0	57.0	42.0	0.0	660.0

Source: Tihama Development Authority

Monthly Temperature (1989,1990,1993,1996,1997)

Governorate	Sanaa	StationName	Al Amanah	StationType		Location:	UTM_N_Map	1701935	UTM_E_Map	414581
							Longitude	44.20	Latitude	15.39

Year		Jan	Feb	March	April	May	June	July	Aug	Sep	Oct	Nov	Dec
1989	Min.						14.9	15.9					
	Max.						28.5	28.6					
	Ave.						22.1	23.5					
1990	Min.	8.6	11.7	11.5	12.2				16.7	13.9	11.3		
	Max.	23.8	23.8	27.1	26.2				29.9	28.3	25.8		
	Ave.	15.5	16.8	18.6	18.9				23.2	21.4	19.4		
1992	Min.										6.6	6.6	6.0
1993	Min.	8.0	10.4		11.9	14.2	15.8	16.5	15.6				
	Max.	23.5	22.7		24.7	27.4	29.9	30.2	30.1				
	Ave.	15.3	15.6		17.2	20.5	23.1	22.8	22.5				
1996	Min.							16.2	15.7	14.3	9.6	6.9	
	Max.							29.0	30.1	28.3	25.8	23.6	
	Ave.							21.7	22.5	21.8	18.0	15.1	
1997	Min.	11.6	10.3	11.2	11.4	13.2	15.1	14.4	12.2	11.7	12.6	12.8	12.0
	Max.	28.1	26.5	26.8	27.3	27.9	29.7	28.7	28.0	28.2	27.1	27.3	27.8
	Ave.	15.7	11.2	13.6	15.4	12.1	15.4	22.4	15.7	12.5	12.3	18.5	16.9
	Ave.	16.7	16.6	18.1	18.3	19.2	21.6	22.5	21.8	20.1	16.8	15.8	15.7

Monthly Humidity and Radiation (1989,1990,1993,1996,1997)

Governorate	Sanaa	StationName	Al Amanah	StationType		Location:	UTM_N_Map	1701935	UTM_E_Map	414581
							Longitude	44.20	Latitude	15.39

Year		Jan	Feb	March	April	May	June	July	Aug	Sep	Oct	Nov	Dec
1989	Min.						26.2	23.6					
	Max.						27.9	24.8					
	Ave.						27.2	24.3					
1990	Min.	25.7	26.1	26.0	27.0				2.1	3.4	-0.3		
	Max.	27.4	27.4	27.8	27.7				51.3	47.0	12.2		
	Ave.	26.5	26.6	26.8	26.9				22.5	20.0	3.5		
1993	Min.	17.0	28.4		29.5	16.2	3.1	4.1	7.5				
	Max.	67.7	77.3		87.5	64.7	44.7	52.8	67.9				
	Ave.	41.4	53.5		59.6	38.5	19.6	26.2	33.1				
1996	Min.							7.8	5.7	1.1	4.1	7.7	
	Max.							51.8	58.4	27.8	5.1	12.4	
	Ave.							29.8	32.0	14.4	4.6	10.1	
1997	Min.		0.0	2.1		5.3	2.9	1.8			2.3	4.2	9.3
	Max.	28.2	26.4	36.0	38.4	38.7	32.8	21.6	47.2	43.6	42.7	36.0	34.9
	Ave.	19.6	17.9	18.8	18.9	20.4	22.1	21.0	19.5	19.9	19.5	19.7	19.9
	Ave.	31.7	31.5	22.9	39.4	30.6	22.9	24.1	31.6	22.1	10.4	15.0	21.4

Monthly Temperature (1998 - 2005)

Governorate	Ta'izz	StationName	Ta'izz	StationType	
		Altitude	1311		

Location:	UTM_N_Map	1502795	UTM_E_Map	394421
	Longitude	44.02	Latitude	13.59

Year		Jan	Feb	March	April	May	June	July	Aug	Sep	Oct	Nov	Dec
1998	Min.						23.4	23.2	21.9		18.8	17.0	15.8
	Max.						32.3	31.1	29.9		29.6	29.1	26.7
	Ave.						27.4	26.7	25.3		23.1	22.2	20.3
1999	Min.	15.8	17.7	18.5	21.4	22.1	21.6	21.5	21.6	20.2	18.2	16.8	15.0
	Max.	26.1	28.4	27.8	31.7	33.4	32.2	29.8	30.6	31.1	29.1	28.3	26.2
	Ave.	20.1	22.2	22.4	25.8	26.8	26.4	25.5	25.7	24.7	22.4	21.6	19.5
2000	Min.	15.2	17.0	18.8	20.8	21.9	22.4	22.8	22.7	20.1	18.7	17.0	16.3
	Max.	26.3	28.3	29.0	31.1	32.9	32.6	31.1	30.7	30.0	29.1	27.4	26.7
	Ave.	20.0	21.9	23.1	25.1	26.5	27.0	26.7	26.3	23.9	22.7	21.3	20.4
2001	Min.	14.2	16.1	19.7	20.9	20.8	23.5	23.2	21.8	20.2	19.3	16.7	16.6
	Max.	24.9	27.1	28.7	31.5	32.6	32.4	31.5	30.1	30.9	30.6	28.3	27.2
	Ave.	18.5	20.6	23.2	25.1	25.5	27.4	26.8	25.3	24.7	23.8	21.5	20.7
2002	Min.	15.3	16.9	18.8	20.8	20.8	23.5	24.4	22.3	20.3	18.2	17.6	17.6
	Max.	26.2	28.6	29.0	31.6	32.6	32.4	32.2	31.3	31.1	29.0	28.2	26.8
	Ave.	20.0	22.0	23.1	25.2	25.5	27.4	27.8	26.3	24.7	22.4	21.8	20.9
2003	Min.	14.3	16.1	19.8	21.9	22.1	22.4	22.9	21.4	20.8	19.2		
	Max.	24.9	27.1	29.0	33.0	33.5	31.7	31.0	30.7	30.8	30.6		
	Ave.	18.6	20.6	23.5	26.3	26.8	26.7	26.3	25.2	24.8	23.9		
2004	Min.	15.7	16.1	19.7	20.9	20.8	23.5	24.3	22.5	20.0	18.7	17.9	15.8
	Max.	24.8	27.1	28.7	31.5	32.6	32.4	32.2	31.3	30.5	29.1	28.0	26.7
	Ave.	18.8	20.6	23.2	25.1	25.5	27.4	27.7	26.4	24.2	22.7	22.1	19.6
2005	Min.			22.1	21.5	21.9	22.6	23.3	22.9	20.8	18.9	17.8	
	Max.			29.1	31.1	31.8	32.0	30.9	30.6	31.2	30.1	28.7	
	Ave.			25.0	25.6	26.0	26.8	26.8	26.4	24.9	23.4	22.1	
Average		20.0	21.9	23.9	26.1	26.8	27.4	27.1	26.2	25.2	23.8	22.4	21.1

Monthly Humidity (1998 - 2005)

Governorate	Ta'izz	StationName	Ta'izz	StationType		Location:	UTM_N_Map	1502795	UTM_E_Map	394421
		Altitude	1311				Longitude	44.02	Latitude	13.59

Year		Jan	Feb	March	April	May	June	July	Aug	Sep	Oct	Nov	Dec
1998	Min.						24.9	33.4	42.5		20.5	18.2	29.2
	Max.						62.3	69.6	82.6		76.8	62.5	85.3
	Ave.						41.4	51.1	63.0		48.3	41.0	63.6
1999	Min.	30.6	25.8	35.8	18.1	17.7	26.4	35.1	35.8	30.4	30.6	22.7	31.8
	Max.	84.3	74.6	78.5	55.0	66.0	70.4	77.4	77.0	83.9	86.9	74.8	84.5
	Ave.	60.2	50.4	58.1	33.9	42.5	47.9	54.6	56.4	58.8	63.6	50.3	61.5
2000	Min.	29.7	23.4	24.3	23.3	21.9	22.4	31.9	34.8	34.8	30.3	28.1	32.5
	Max.	84.0	73.0	64.7	63.1	68.8	65.1	68.3	70.3	85.9	86.3	81.0	85.7
	Ave.	58.9	48.4	44.8	42.0	46.3	43.9	49.4	52.2	63.6	63.8	57.2	64.7
2001	Min.	35.9	27.9	30.3	22.2	24.7	22.9	31.2	41.7	31.1	23.4	23.2	29.7
	Max.	88.5	80.4	69.5	63.1	77.3	59.0	67.1	84.1	83.8	80.4	76.1	83.8
	Ave.	67.5	58.5	51.7	44.0	52.2	41.4	49.7	63.7	60.3	55.7	52.7	62.2
2002	Min.	29.6	22.1	24.3	16.8	24.7	22.9	25.2	31.9	30.4	30.6	20.6	21.8
	Max.	84.0	72.4	64.7	46.7	77.3	59.0	55.1	68.9	83.8	86.9	69.1	71.5
	Ave.	58.8	47.5	44.8	32.9	52.2	41.4	39.8	49.8	58.8	62.6	43.9	40.4
2003	Min.	36.5	27.9	32.8	17.1	17.9	29.2	35.4	39.9	33.5	23.3		
	Max.	88.4	80.4	75.2	62.4	66.5	70.2	67.8	76.1	81.1	82.3		
	Ave.	67.9	58.5	55.5	42.7	42.0	49.4	53.0	63.7	60.5	57.2		
2004	Min.	37.4	27.9	30.3	22.2	24.7	22.9	25.3	31.5	32.5	30.3	28.0	29.2
	Max.	78.3	80.4	69.5	63.1	77.3	59.0	55.7	67.7	84.1	86.3	78.6	85.3
	Ave.	63.5	58.5	51.7	44.0	52.2	41.4	39.9	49.0	60.6	63.8	53.2	66.1
2005	Min.			17.6	23.0	27.5	28.2	34.3	36.9	30.8	20.4	28.1	
	Max.			30.6	60.1	71.1	71.8	73.2	69.9	81.0	69.8	81.0	
	Ave.			24.0	40.3	51.6	51.6	52.7	53.4	58.7	47.5	59.1	
Average		60.2	52.1	46.6	39.8	47.7	44.8	49.0	55.9	58.5	55.3	50.0	57.1

16.3 Hydrological Data

Monthly Total Flow in Mm^3, Period 1996-2005

Governorate		StationNo.	32	StationType		Location:	UTM_E_Map	326000	UTM_N_Map	1655600
Wasi Name	Wadi Siham	StationName	Mahel Saleem				Longitude		Latitude	

(Mm^3)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1996	0.62	0.61	1.42	5.90	3.45	2.70	6.83	2.00	1.50				25.0
1997	0.34	0.34	1.76	0.83	1.73	2.00	3.75	2.60	1.42	9.46	7.23	1.33	32.8
1998		0.70	0.93	0.52	1.73		8.19	77.79	15.60	7.30	5.20	4.50	122.5
1999	3.60	2.69	2.80	1.80	1.73	1.75	3.20	4.50	3.40	1.82	1.10	1.21	29.6
2000	1.35	0.91	0.62	1.80	1.70	0.44	4.02	4.55	2.10	1.51	1.71	1.02	21.7
2001	0.72	0.44	5.10	4.41	4.50	0.67	28.20	35.30	4.93	2.37	0.73	0.81	88.2
2002	1.10	0.99	1.20	4.00	1.10	0.23	49.81	20.83	6.21	0.83	0.35	0.30	87.0
2003	0.22	0.56	0.38	1.51		1.84	47.28	16.21	6.38	0.51	0.53	0.27	75.7
2004	0.53	0.28	2.29	12.91	5.32	2.99	12.38	29.29	3.07	5.82	1.72	0.94	77.5
2005	0.52	0.64	11.10	26.20	11.37	1.74	9.07	13.55	1.63	1.71	0.34	0.12	78.0
Av.	1.0	0.8	2.8	6.0	3.6	1.6	17.3	20.7	4.6	3.5	2.1	1.2	65.1
Min.	0.2	0.3	0.4	0.5	1.1	0.2	3.2	2.0	1.4	0.5	0.3	0.1	
Max.	3.6	2.7	11.1	26.2	11.4	3.0	49.8	77.8	15.6	9.5	7.2	4.5	122.5

Monthly Total Flow in Mm3, Period 1996-2005

Governorate		StationNo.	42.01	StationType		Location:	UTM_E_Map	316600	UTM_N_Map	1727400
Wasi Name	Wadi Mawr	StationName	Shat Al-Arg				Longitude		Latitude	

(Mm^3)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1996	5.66	6.14	54.94	21.43	6.82	58.63	9.40	11.23	9.13	5.31	4.34	5.26	198.3
1997	2.48	2.28	22.69	17.48	25.87	57.60	64.09	41.84	12.22	47.25	25.44	10.27	329.5
1998	3.19	2.82	43.89	4.55	15.23	2.91	11.74	68.99	44.72	0.00	0.00	0.00	198.0
1999	0.77	0.79	17.11	0.83	0.85	0.87	35.19	35.33	14.49	4.57	0.81	0.74	112.4
2000													
2001	1.30	2.90	39.62	27.84	23.25	15.00	52.32	29.57	14.00	14.00	12.00	8.00	239.8
2002	7.67	2.10	4.48	26.79	3.10	3.60	23.18	44.84	28.47	5.20	4.20	4.80	158.4
2003	9.73	11.82	12.94	126.38	11.74	17.89	13.85	86.50	21.36	11.63	12.43	10.07	346.3
2004	17.12	10.44	13.21	95.33	9.43	18.00	67.40	38.10	12.15	10.63	9.72	9.42	311.0
2005	8.95	10.13	16.02	89.05	26.12	8.10	8.00	43.76	19.67	7.75	7.50	7.75	252.8
Av.	6.3	5.5	25.0	45.5	13.6	20.3	31.7	44.5	19.6	11.8	8.5	6.3	238.5
Min.	0.8	0.8	4.5	0.8	0.9	0.9	8.0	11.2	9.1	0.0	0.0	0.0	112.4
Max.	17.1	11.8	54.9	126.4	26.1	58.6	67.4	86.5	44.7	47.3	25.4	10.3	346.3

Monthly Total Flow in Mm3, Period 1996-2005

Governorate		StationNo.	49.01	StationType		Location:	UTM_E_Map	336000	UTM_N_Map	1566000
Wasi Name	Wadi Zabid	StationName	Al-Kolah				Longitude		Latitude	

(Mm^3)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1996	2.26	1.26	3.39	9.68	28.20	20.80	16.23	17.46	10.39	5.44	2.01	1.41	118.5
1997	1.76	1.50	0.19	0.89	0.78	20.80	18.49	28.22	38.35	37.20	17.50	0.00	165.7
1998				3.38	8.09	0.00	48.49	0.00	32.45	31.20			123.6
1999	0.00	1.83	1.73	1.06	3.73	4.44	9.33	23.30	18.51	19.20	3.24	1.47	87.8
2000	1.91	1.68	1.27										4.9
2001	2.31	1.33	1.02	5.08	6.50	9.50	1.73	25.65	27.63	5.71	2.57	2.06	91.1
2002	2.71	0.99	0.83	10.11	9.74	13.68	8.75	29.15	11.33	17.13	3.17	1.63	109.2
2003	0.83	0.31	0.39	7.45	0.74	2.15	3.41	21.37	8.73	2.52	0.04	1.39	49.3
2004	1.40	1.35	0.03	1.59	0.41	2.96	10.90	32.21	7.79	2.97	0.00	0.00	61.6
2005	0.00	0.00	4.98	7.52	12.42	7.82	2.70	38.80	10.63	3.39	0.83	0.12	89.2
Av.	1.5	1.1	1.5	5.2	7.8	9.1	13.3	24.0	18.4	13.9	3.7	1.0	100.6
Min.	0.0	0.0	0.0	0.9	0.4	0.0	1.7	0.0	7.8	2.5	0.0	0.0	
Max.	2.7	1.8	5.0	10.1	28.2	20.8	48.5	38.8	38.4	37.2	17.5	2.1	165.7

Monthly Total Flow in Mm3, Period 1996-2005

Governorate		StationNo.	59.01	StationType		Location:	UTM_E_Map	345800	UTM_N_Map	1483500
Wasi Name	Wadi Rasyan	StationName					Longitude		Latitude	

(Mm^3)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1996	0.00	0.00	0.03	0.25	2.26	2.71	2.24	0.60	2.92	1.46	0.56	0.37	13.4
1997	0.20	0.00	0.00	0.50	0.32	0.12	0.00	0.00	3.64	0.37	1.11	0.00	6.3
1998				0.39	0.72		0.00	4.58	2.69	5.02	1.07		14.5
1999	0.00	0.37	0.20	0.12	0.77	0.11	0.13	1.00	1.81	0.78	0.54	0.52	6.4
2000	0.41	0.21	0.08										0.7
2001									0.87	3.90	0.33	0.64	5.7
2002	0.25	0.02	0.25	0.08	2.83	1.86	0.20	0.12	0.53	0.33	0.43	0.43	7.3
2003	0.13	0.03	0.19	0.41	0.34	0.64	0.25	0.46	1.42	1.46	0.88	0.26	6.5
2004	0.00	0.00	0.00	1.08	0.00	0.00	0.00	0.00	0.00	3.52	0.00	0.00	4.6
2005	0.00	0.00	0.00	15.85	0.56	0.48	0.32	1.25	7.68	1.26	1.12	0.00	28.5
Av.	0.1	0.1	0.1	2.3	1.0	0.8	0.4	1.0	2.4	2.0	0.7	0.3	11.2
Min.	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	
Max.	0.4	0.4	0.3	15.9	2.8	2.7	2.2	4.6	7.7	5.0	1.1	0.6	28.5

Monthly Total Flow in Mm3, Period 1996-2005

Governorate		StationNo.	48.01	StationType		Location:	UTM_E_Map	345800	UTM_N_Map	1589600
Wasi Name	Wadi Rima	StationName	Mishrafah				Longitude		Latitude	

(Mm^3)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1996	0.24	0.00	0.48	1.48	7.61	0.00	0.00	5.62	10.17	4.62	1.23	0.92	32.4
1997	0.86	0.00	0.00			0.40	13.80	3.74		0.00	8.80		27.6
1998				1.98	5.21	0.00	4.84	1.68	0.00	1.10	9.10		23.9
1999	1.72	1.58	2.72	3.05	1.77	0.56	9.68	16.43	12.59	8.00	2.32	1.47	61.9
2000	1.05	0.88	1.24										3.2
2001							5.80	35.21	6.82		2.78	2.10	52.7
2002	0.86	0.44	4.02	2.88	0.59	6.20	4.25	5.02	7.51	6.27	3.09	1.98	43.1
2003	0.34	0.18	0.13	3.83	1.47	1.42	1.45	15.26	3.27	5.26	1.65	0.23	34.5
2004	0.00	0.00	0.00	24.21	3.65	3.57	7.01	24.54	0.00	0.22	0.00	0.00	63.2
2005	0.00	0.00	2.60	7.58	29.60	3.54	7.63	41.61	10.27	3.65	1.21	0.00	107.7
Av.	0.6	0.4	1.4	6.4	7.1	2.0	6.1	16.6	6.3	3.6	3.4	1.0	54.8
Min.	0.0	0.0	0.0	1.5	0.6	0.0	0.0	1.7	0.0	0.0	0.0	0.0	
Max.	1.7	1.6	4.0	24.2	29.6	6.2	13.8	41.6	12.6	8.0	9.1	2.1	107.7

17. PRESS RELEASE

17.1 Thawrah 14 February 2007

17.2 Thawrah 19 February 2007

17.3 News Yemen 13 February 2007

17.4 Thawrah 24 July 2007

17.5 Thawrah 2 October 2007

17.6 News Yemen 7 October 2007

17.7 Yemen Times 11 October 2007

15 الثورة Thawrah
الاربعاء ٢٦ محرم ١٤٢٨هـ الموافق ١٤ فبراير ٢٠٠٧م العدد(١٥٤٣٥)
Wed.14 Feb. 2007 .. 26/1/1428 - No(15435)

في ورشة عمل

مناقشة احتياجات خمس محافظات من مياه الشرب

■ ،، كتب/ أحمد الأسد

عقدت أمس بصنعاء ورشة عمل حول نتائج التقرير الذي شمل خمس محافظات لدراسة احتياجاتها لمشاريع مياه الشرب نظمتها الهيئة العامة لمشاريع مياه الريف بمشاركة رؤوساء المجالس المحلية ومدراء المديريات المستفيدة من مشاريع المنظمة.

وفي حفل الافتتاح أكد الاخ علي الصريمي- رئيس الهيئة أهمية هذه الورشة لوضع الدراسات التحليلية الاقتصادية والاجتماعية والجيولوجية وتستهدف الوقوف على المشكلة بمختلف جوانبها ووضع اللمسات الأخيرة لما يمكن أن يقدمه الجانب الياباني من دعم لمياه الريف خلال السنوات القادمة. كما ستضع معالم التعاون اليمني الياباني لتقديم المساعدات مستقبلاً.

وتوقع أن تخرج الورشة بإضافات جديدة للرؤية المستقبلية للهيئة والمنظمات الدولية الداعمة لمشاريعنا كالبنك الدولي والسفارة الهولندية والجهات المحلية كالصندوق الاجتماعي والمجالس المحلية في عملية تنفيذ مشاريع مياه الريف في المناطق المستهدفة.

كما أكد كل من السيد هانور السكرتير الاول بالسفارة اليابانية بصنعاء والسيد ناجاتا - رئيس فريق منظمة (جايكا) اليابانية على ضرورة تفعيل الشراكة اليمنية اليابانية في مجال استراتيجية مياه الريف باعتبار اليابان إحدى الدول المانحة لليمن حيث بدأنا النشاط التمويلي لليمن في هذا المجال منذ عقد السبعينات في القرن الماضي.

مؤكدين استعدادهم لمواصلة الدعم لليمن من خلال الهيئة العامة لمشاريع مياه الريف خلال الفترة المقبلة

تصوير /محمد حويس

Translation

Thawrah Newspaper Report
Wed. 14 Feb. 2007.

A DISCUSSION WAS CONDUCTED IN A SEMINAR ABOUT THE NEED OF DRINKING WATER IN FIVE GOVERNORATES.

- Reported by Ahmed Al-Assad.

A seminar was held yesterday in Sana'a about the results of a report that involved five governorates, concerning their needs for drinking water projects study and it was conducted and organized by GARWSP (General Authority for Rural Water Supply Project), incorporation with Heads of the local councils, and the General Directors of the benefiting Districts.

At the opening ceremonial talks, the Chairman of GARWSP Mr. Ali Al-Surami, emphasized on the important of this seminar, in relation to the state of the economical, social and geological studies and its objectives to analysis and examine its diversity issues from every aspect; as well as to put final touches on what the Japanese could render to support the rural water supply within the next coming years. Consequently, it will mark a significant milestone on the Japanese-Yemeni cooperation in future grant aids. It's expected that the seminar will come out with new future concepts for GARWSP, plus the International Organizations which support our projects such as the World Bank, the Netherlands Embassy, and the local entities like the social funds, and the local councils in the process of executing the Rural Water Projects in the targeted areas.

In addition, the first secretary in the Japanese Embassy in Sana'a, Mr. Hattori and Mr. Nagata, the Advisor of the Japan International Agency (JICA), elaborated further by assuring the necessity to effect on the Japanese-Yemeni cooperation strategy in the Rural Water Projects, as it is considered that Japan is one of the donating countries to Yemen, where in the pass decades, since the seventies, it had started the funding activities to Yemen, in this respect, confirming their willingness and readiness to proceed with the grant support to Yemen via GARWSP and during the next phase.

13 الثورة Thawrah
الاثنين ١ صفر ١٤٢٨هـ الموافق ١٩ فبراير ٢٠٠٧م العدد (١٥٤٤٠)
Mon.19Feb. 2007 .. 1/2/1428 - No(15440)

بتمويل ياباني

تنفيذ ٣ مشاريع لمياه الريف مطلع ابريل

■ ،كتب/احمد الأسد

تم التوقيع أمس الأول بمقر الهيئة العامة لمشاريع مياه الريف على المحضر الخاص بمناقشة التقرير المرحلي لمشروع مياه الريف ودراسات الموارد المائية بين الهيئة والوكالة اليابانية للتعاون الدولي (جايكا) وقعها عن الجانب اليمني الأخ علي محمد الصنريمي - رئيس الهيئة، فيما وقعها عن الوكالة السيد ناجاتا - رئيس بعثة (جايكا) والسيد فوجي - رئيس فريق الدراسة التابعة للوكالة اليابانية.

ويذكر أنه سيتم البدء بتنفيذ ثلاثة مشاريع للموارد المائية ضمن الاتفاقية باعتبارها من أهم المشاريع المتوقع تنفيذها في مطلع شهر ابريل المقبل في ثلاث محافظات هي صنعاء وذمار والمحويت، وذلك بالتنسيق مع رؤساء المجالس المحلية بالمحافظات ومدراء المديريات بهدف تسهيل إنجاز تلك المشاريع وضمان ديمومتها على العطاء وتوفير المياه للمواطنين من سكان تلك المناطق المستهدفة.

حضر التوقيع على محضر الاتفاقية المهندس فوزي الخرباش - مدير عام التخطيط والتعاون الدولي.

Translation of above newspaper article

Thawrah Newspaper
Monday, 19 February 2007

IMPLEMENTATION OF 3 RURAL WATER PROJECTS – FUNDED BY JAPAN

- Reported by Ahmed Al-Assad

The day before yesterday, at GARWSP (General Authority for Rural Water Supply Projects) main office in Sana'a, the minutes on discussions concerning the interim report on the rural water supply projects and studies on water resources was agreed between GARWSP and Japan International Cooperation Agency (JICA). The chairman of GARWSP, Mr. Ali Mohamed Al-Sureimi signed on behalf the Yemeni government while Mr. Nagata, head of the Japanese mission and Mr. Fujii, team leader of the Study Team signed on behalf of JICA. According to the agreement, 3 projects for water supply, as they are considered to be significant projects, shall be implemented at the beginning of April 2007 in 3 governorates of Sana'a, Dhamar and Mawheet. Coordination with heads of local councils in the governorates and directors of the Districts is important for facilitating success to those projects and assurance for providing water supply to the benefiting population of the targeted areas.

Present at the minutes signing was Eng. Fawzi Al-Kirbash, General Director for Planning and International Cooperation of GARWSP.

News Yemen

حكومة اليابان تدعم تحسين ادارة الموارد المائية في خمس محافظات يمنية

13/02/2007

أحمد الزيلعي، نيوزيمن:

نفذت الهيئة العامة لمياه الريف الوكالة اليابانية للتعاون الدولي (جايكا) ندوة خاصة عنيت بدارسة إدارة الموارد المائية وتحسينها في خمس محافظات في اليمن تهدف إلى صياغة تحسين إمداد مياه الريف للمواقع المغربلة والمساعدة في صياغة العمل لتنمية قدرات الهيئة العامة لمياه الريف.

وأشارت الدراسة إلى عدد المواقع المرشحة لخطة تحسين إمداد مياه الريف والتي يصل عددها إلى 36موقعا في محافظات صنعاء وذمار وتعز وإب والمحويت، جاءت في محافظة صنعاء في المرتبة الأولى في عدد المواقع المرشحة للتحسين وبواقع 14موقعا، موضحة الجدول الزمني لتنفيذها والمتمثل في مرحلتين وكل مرحلة تتورع في سنتين ماليتين.

ونفذت الدراسة في إطار مسحها للمواقع مقابلة شبه منظمة مع المجالس المحلية في المديريات المستهدفة وأخرى منظمة مع قادة المجمع المحلي، إضافة إلى مقابلة ثالثة منظمة مع عينة من العائلات في المواقع المرشحة وتقييم ومناقشة سريعة مع مجموعة من الذكور والإناث في المواقع المختارة، مشيرة في ذات الوقت إلى المعدل والمتوسط والأقصى والأدنى في عدد السكان للعام 2006م في المواقع المختارة التي جرى فيها المسح في المحافظات الخمس ومقارنته بالمتوقع في 2016م حيث يبلغ إجمالي عدد السكان في بحسب معدل النمو السكاني في 2006م 128.269 ويقابله الرقم المتوقع للسكان في 2016م والمقدر بـ164.728.

وقالت أن معدل الأشخاص المستهلكين والمقدرين بـ8.36 فيماقدرمتوسط المستهلكين بـ8أشخاص، مقرنة بكلفة المياه للإستعمال المحلي والتي يصل معدل سعر الإستهلاك الشهري للعائلة إلى 2.241ريال فيما يقدر المتوسط بـ1.300ريال، مضيفة أن معدل دخل العائلة الشهري في المحافظات الخمس التي جرى فيها المسح يصل إلى 42.062ريال، مقدرة متوسط الدخل الشهري بـ 30.000ريال، مقدرة نسبة المعدل في كلفة المياه إلى الدخل الشهري للعائلة بـ5.3% مقارنة بالمتوسط والذي قدرته الدراسة بـ4.3%، معددة مصادر المياه المستخدمة في المواقع المرشحة لتحسين لخطة تحسين إمداد مياه الريف والتي تصل إلى 6 مصادر والمتمثلة في البرك والآبار اليدوية والغيل، إضافة الآبار الخاصة وموزعي المياه عن طريق الوايتات ومشاريع المياه.

وعن مدى رغبة الأهالي المستفيدين في دفع الأجور للمشروع أشارت الدراسة إلى وجود رغبة في دفع أجور كمتوسط 200ريال للمتر المكعب يقابله معدل الرغبة والمقدربـ150 ريال للمتر المكعب، مضيفة أن المستفيدين يفضلون تقدير التكاليف بناء على الإستهلاك الحقيقي ودفع الأجور شهريا كطريقتين مفضلتين للدفع من قبل السكان المستفيدين، موضحة أن النساء يمقن بجلب المياه في الوقت الضائع حسب قولها، مشيرة إلى هذا العمل يعد أيظا السبب الأول في عدم التحاق الذكور من الفئة العمرية (6-14) سنة بالتعليم الأساسي.

وعن طرق التحليل التي تتبعها الهيئة في التحاليل للمواقع قالت الدراسة أن التحاليل التي تم تنفيذها على مصادر اختبار الضخ أظهرت ثمانية مواقع من إجمالي المواقع المرشحة للتحسين البالغ عددها 36موقعا غير صالحة للشرب نظرا لارتفاع بعض العناصر وارتفاع درجة الحرارة، موضحة أنه تم تصنيف المناطق طبقا لمعدل الضخ والتعويض.

وفي جانب أخر من الدراسة والمتعلق بغربلة المواقع أشارت الدراسة إلى إجمالي المواقع المغربلة والتي وصل عددها إلى 23موقعا جاءت محافظة صنعاء في المرتبة الأولى وبواقع 7مواقع، مشيرة إلى معايير الغربلة والمتمثلة في توافر مصدر مياه أمن وعدم وجود ازدواج في للمواقع من قبل المانحين الأخرين، إضافة إلى عدم وجود خلافات حول المياه والأرض المستخدمة للمشروع وعدم وجود صعوبة في الطريق المؤدية للمواقع.

وشرعت الدراسة في بيان أسباب استبعاد المواقع من الغربلة والتي يأتي في مقدمتها الإنتاجية القليلة للبئر وعدم صلاحية المياه للشرب والعودة البطيئة لمنسوب المياه، إضافة إلى تهدف البئر وارتفاع درجة الحرارة، موضحة أن أقصى حد لإمداد الوحدة بالمياه يصل إلى 40 لتر لشخص الواحد في اليوم.

وشددت الدراسة على ضرورة تشكيل لجنة محلية لإدارة المشروع مسجلة ومصادق عليها من قبل المجلس المحلي يتم تدريبها من قبل فروع الهيئة ويتم تسليمها المرافق المنفذة كطرق لتشغيل المشروع وصيانته.

ندوة تحسين إمداد مياه الريف و إدارة الموارد المائية في اليمن التي حضرها من الجانب الياباني السكرتير الأول في السفارة اليابانية في صنعاء هانوري والممثل المقيم للوكالة اليابانية للتعاون الدولي (كينيتشي ساساكي) شددت في توصياتها بضرورة تسليم المواقع التي تم غربلتها إلى المانحين كطلب لغرض سرعة التنفيذ، مشددة على ضرورة الإستجابة له.

وكانت حكومة اليابان قررت تقديم منحة بمبلغ 88،068 دولار لمؤسسة السلام الاجتماعية الخيرية التنموية لتنفيذ مشروع توسعة مدرسة الميثاق في قرية الحقل في مديرية السلام بمحافظة تعز.

وقال بلاغ صحفي صادر عن السفارة اليابانية بصنعاء أن هذه المنحة ستستخدم لبناء فصول دراسية إضافية في المدرسة بهدف تحسين البيئة التعليمية وتشجيع مزيدا من الطالبات والطلبة للدراسة في المدرسة.

الجدير بالذكر أن حكومة اليابان قامت بتمويل سبع عشرة مشروعا في الجمهورية اليمنية خلال السنة المالية اليابانية الحالية (ابريل 2006 - مارس 2007) بما فيها مشروع مديرية السلام، بمبلغ إجمالي 1،332،994دولارا أمريكيا.

ويأتي هذا الدعم في إطار البرنامج الياباني المسمى "المنح المقدمة لمشاريع الأمن البشري الأهلية"، ويهدف هذا البرنامج إلى دعم المشاريع الأهلية الصغيرة الحجم في مجال الاحتياجات البشرية الأساسية في الدول النامية، مثل التعليم الأساسي، والعناية الصحية الأولية، وتموينات مياه الريف

Translation

NEWS YEMEN

Japanese Government Supports Improvements in Water Resources Management in Five Governorates

Date: 13/2/2007

GARWSP and JICA held a seminar concerning the improvements of Water Resources Management in Five Governorates in the Republic of Yemen which has objectives to formulate the rural water supply improvement plan of screened sites and assist in formulating work to develop the capacity of GARWSP.

The seminar referred to the number of candidate sites to improve the rural water supply (36 sites) in five governorates of Sana'a, Dhamar, Taiz, Ibb and Al-Mahweet, in which Sana'a has the most number of candidate sites which is around 14 sites, and explained that the schedule of the study consists of two phases, each phase consisting of two fiscal years. This study was performed by making semi-organized interview swith local councils in the targeted districts and other interviews with the leaders of the social community in addition to interviews with households sampled from the targeted sites and discussions with groups of males and females in the selected sites. At the same time, the seminar referred to populations for 2006 in these targeted sites and compared it with the expected population for 2010. The total population in 2006 is around 128,269 and according to population growth rates, the population in 2010 is expected to be around 164,728. The average number of persons per household is around 8.36 with a median of around 8 persons. The household monthly expenditure is around 2,241 YR with a median of around 1,300 YR, and the household monthly income in these five governorates is around 42,062 YR, and the estimated monthly income per person is around 30,000 YR. The estimated ratio of water cost to household monthly income is around 5.3% compared to the median of around 4.3%. The seminar mentioned that water resources presently used in the candidate sites are cisterns, springs, dug wells, private wells, water vendors and project wells.

After that, the seminar explained the willingness of people to pay the fees for the projects was at an average of 200 YR /M^3 and 150 YR/M^3 as median, and also explained that the beneficiaries suggested that fees should be calculated according to the actual consumption amount, and paying the fees on a monthly basis are the best two ways to pay. The seminar mentioned that women and children are the ones fetching water and this work including waiting time is the main reason for not receiving basic education for children of ages 6-14 years. Based on the analyzing methods of GARWSP, the seminar mentioned that water quality analyses which were made for the water sources resulted in 8 sites from the total sites (36 sites) having quality not acceptable for use due to high concentrations of some items. Also, it was explained that a classification of the sites was made based on the rates of discharge and recharge of water sources.

In the seminar, it was explained that the total number of screened sites is 23 sites, and that Sana'a governorate had the most with 7 sites. The criteria for screening included the availability of reliable water sources, no duplication of sites with other donors, no conflicts with water rights and land use, and no problems with access to the site. After that, the seminar explained that sites were screened out which have low production in the well, poor water quality, due to well collapsing and high water temperature.

The seminar explained the importance of establishing a water committee to manage the project which should be registered and approved by the local council, and this committee should be trained by GARWSP branch offices after handing over the project to manage its operation and maintenance.

The seminar on rural water supply improvement and water resources management in the Republic of Yemen with attendance from the Japanese side by the first Secretary of the Japanese Embassy in Sana'a, Mr. Hattori, and representative of JICA, Mr. Kenichi Sasaki (Mr. Kenji Nagata), recommended the necessity of submitting the screened sites to donors as a request for early implementation.

The Japanese Government has decided to donate an amount of about 88,068 USD to Salam Institution to execute an expansion project for Al-Mithaq School in Al-Haql village, Salam District of Taiz Governorate. In a journalistic announcement from the Japanese Embassy in Sana'a, this donation will be used to build additional classrooms in the school to improve the educational environment and to encourage students to study in this school.

The Japanese Government financed 17 projects in the Republic of Yemen during the current Japanese Fiscal Year (April 2006 – March 2007) including the Salam District Project with a total amount of 1.332.997 USD. And this support is part of a Japanese program called "Donation provided to Human Security Projects", and this program will support all small individual projects for basic human needs in developing countries in the field of Basic Education, Primary Health Care and Rural Water.

ممولة من الحكومة اليابانية

افتتاح ثلاثة مشاريع مياه ريف في ثلاث محافظات

كتب/أحمد الأسد

□ .. تم أمس بمحافظة صنعاء افتتاح مشروع مياه الخرابة بني مطر والذي يعد ضمن ثلاثة مشاريع ريادية بتمويل من الحكومة اليابانية في ثلاث محافظات هي: صنعاء ، ذمار، المحويت .. بتكلفة تصل إلى ٧٣ مليونا و٨٥٠ الف ريال وبالمساهمة من الحكومة اليمنية في حفر الآبار.

وفي تصريح لـ(الثورة الاقتصادي) أوضح الاخ علي محمد الصريمي رئيس الهيئة العامة لمشاريع مياه الريف أن عدد المستفيدين من هذه المشاريع يصل إلى نحو ٤٤٩٤ نسمة وقد تم تشكيل لجان وجمعيات مستخدمي المياه للثلاثة المشاريع وذلك بغرض ديمومتها وإدارتها بالأساليب الحديثة وبمشاركة المجتمعات المحلية وبالتنسيق والتعاون مع قيادات المجالس المحلية بالمحافظات الموجودة فيها تلك المشاريع.

وأشار الصريمي في ختام تصريحه إلى أنه تم افتتاح هذه المشاريع بحضور السيد (ياما جوشي) نائب السفير الياباني بصنعاء الذي بدوره أكد على استمرارية الدعم لليمن في هذا المجال من قبل حكومته واستعدادها التام لتنفيذ المزيد من مشاريع مياه الريف في الجمهورية اليمنية من خلال منظمة (جايكا) اليابانية التي تعمل في اليمن منذ فترة طويلة.

Translation of above newspaper article

Thawrah Newspaper
Tuesday, 24 July 2007

INAUGURATION OF 3 PILOT PROJECTS FINANCED BY JAPANESE GOVERNMENT IN 3 GOVERNORATES

Yesterday, on 23 July, an inauguration was held for Al Kharaba in Bani Matar, which is one of the 3 pilot projects financed by the Japanese government in the governorates of Sana'a, Dahmar and Al Mawheet for a total cost of 73,850 thousand Yemeni Rials, with contribution by the government of Yemen through drilling of wells.

The Chairman of GARWSP clarified to Thawra Economic that the beneficiaries of the 3 projects reached 4,494 persons. The water user committees are already formed in order to manage the facilities for sustainability and continuation of this project with coordination of the Local Council leaders in the 3 governorates. Also, the Chairman announced that this inauguration was carried out by Mr. Yamaguchi, Counselor of the Embassy of Japan in Yemen. Mr. Yamaguchi emphasized that assistance for Yemen will continue in rural water supply and the Japanese government is ready to implement further projects for rural water supply in Yemen through JICA who is working in Yemen since a long time ago.

في ندوة عرض نتائج التقرير النهائي لمكونات إمداد مياه الريف

وزير المياه: فشل مشاريع المياه يعود لعدم وجود إدارة كفؤة وغياب مساهمة المستفيدين

■ ،،الثورة/ أحمد الأسد

أشاد الأخ عبد الرحمن فضل الارياني وزير المياه والبيئة بالدعم الذي تقدمه الحكومة اليابانية لبلادنا في مجال مشاريع مياه الريف ممثلة بمنظمة (جايكا) منذ عقدي الثمانينات والتسعينات من القرن الماضي، جاء ذلك خلال افتتاحه أمس بصنعاء ندوة عرض نتائج مسودة التقرير النهائي لمكونات إمداد مياه الريف وإدارة الموارد المالية وتحسين هذا الامداد في الجمهورية اليمنية.

منوها إلى أنه يجب أن نتعلم من تجاربنا واخطائنا ومناقشة أسباب فشل بعض تلك المشاريع حتى لا نكررها من جديد، حيث اتضح لنا بأن السبب الرئيسي في فشلها يعود إلى عدم وجود إدارة كفؤة وغياب مساهمة المستفيدين من الاهالي ولهذا فأنا سعيد جدا اليوم بوجود مكونات أخرى وهي المساهمة المجتمعية والهيئة العامة لمشاريع مياه الريف والمجالس المحلية وكم كنت اتمنى أن يكون هناك ممثلون عن المستفيدين كونهم المعنيين بإدارة المشاريع ومعالجة الاخطاء أثناء تنفيذ المشاريع المستقبلية.

وأقترح الارياني على هيئة مشاريع مياه الريف إجراء مسح ودراسة ميدانية للمصادر التقليدية للتقليل من مخاطر التلوث البيئي الناتج عن تنفيذ المشاريع الكبيرة خصوصا وأن سكان الريف يمثلون نسبة كبيرة، فيما يصل عدد السكان الذين يفتقرون إلى خدمات مياه الشرب النقية يصل إلى حوالي (٦٠٪) ولهذا لا يمكن التقليل من أهمية المصادر التقليدية كونها تسهم في الحد من التلوث في الآبار وهي غير مكلفة وتتمثل في بناء حواجز لمنع دخول مياة الأمطار أو تسرب بعض المواد الضارة إلى تلك الآبار.

من جانبة أكد الأخ علي محمد الصريمي رئيس الهيئة العامة لمشاريع مياه الريف أن هذه الندوة جاءت لاستعراض مسودة التقرير النهائي لفريق المسح والدراسة الميدانية من قبل الفريق الياباني بالتعاون مع الهيئة التي شملت تنفيذ ٣مشاريع مياه ريفية من ضمن المشاريع المختارة والبالغ عددها (٢٣) مشروعا في خمس محافظات هي، صنعاء، ذمار، تعز، إب، والحويت وسيتم البدء باستكمال الاجراءات الفنية كمرحلة ثانية وموافقة الجانب الياباني على التمويل لتلك المشاريع والتي من شأنها أن تسهم في رفع القدرات المؤسسية للفروع الخمسة خصوصا وأن عدد المستفيدين من تلك المشاريع بعد التنفيذ يصل إلى أكثر من (٢٠٠) ألف نسمة معظمهم من المناطق الريفية.


■ وزير المياه والبيئة

وعن الجانب الياباني أكد كل من السيد نوشيكا جيه سفير اليابان بصنعاء والسيد ناجاتا رئيس فريق اللجنة الاستشارية لمنظمة (جايكا) اليابانية على أهمية انعقاد هذه الندوة والتي ستقدم بعض الحلول لإيجاد مياه نقية في المناطق الريفية التي شملها مشروع إمداد المناطق الريفية بالمياه النقية كون هذا المشروع لا يوفر فقط المخصصات المالية بل يتعدى ذلك إلى بناء القدرات لهيئة مشاريع مياة الريف وفروعها والمجتمعات المحلية.

كما أن الهدف من دراسة إدارة الموارد المائية هو وضع خطة عمل لتحسين وإمداد مياه الريف بالإضافة إلى تنمية المناطق الريفية في اليمن وتوفير المياه النقية فيها.

Translation

Thawrah Newspaper
Tue. 2 Oct. 2007

In the Seminar on Presentation of Draft Final Report for Rural Water Supply Component, Minister of Water Explains that Water Projects Fail because Management is not Efficient and Beneficiaries do not Contribute

Al-Thawrah / Ahmed Al-Asad

The Minister of Water and Environment, Eng. Abdul Rahman Al-Eryani, has mentioned the support of the Japanese government to Yemen in rural water projects represented by JICA since two decades from the 80's and 90's. This comment was made during the opening of the presentation of draft final results for the rural water supply component of the study for water resources management and rural water supply improvement in the republic of Yemen. He also mentioned that we should learn from our mistakes and experiences, and discuss the reasons so that the same mistakes are not made. The mistakes are that management is not efficient and contributions are not made from beneficiary residents. Now, I am so happy today because concepts such as community contribution are proposed and local councils, GARWSP and I hope that representatives from the communities can remedy the mistakes for future projects because they are the real beneficiaries of the projects.

Mr. Al-Eryani also suggested that GARWSP should make studies on preventing pollution of major resources (such as water) caused by large projects, especially since the rural population represents the biggest percentage and they are the ones suffering. Since the percentage of the people who cannot access clean drinking water is about 60%, we cannot neglect the importance of preventing contamination of wells through such measures as building walls around wells to prevent intrusion of rainwater and other detrimental materials, and these methods are not costly.

Mr. Ali Mohammed Al-Suraimi, the Chairman of GARWSP, has expressed that this seminar presents the draft final results of the study team of JICA along with GARWSP, and three pilot projects were implemented in three governorates which were selected from 23 sites in five governorates of Sana'a, Dhamar, Taiz, Ibb and Al Mahweet. The next procedures will be discussed for agreement by the Japanese side for project financing, which can improve the institutional capacity of the five governorates especially if the number of beneficiaries from these projects after improvement becomes over 2 hundred thousand persons who are mostly in rural areas.

And from the Japanese side, both (Mr. Toshikage, ambassador of Japan) Mr. Yamguchi, councellor of Japan, and Mr. Nagata, the Leader of JICA Advisory Committee expressed the importance of holding this seminar to resolve problems of supplying clean water in rural areas where rural water supply projects are being implemented, and projects will not only provide financial assistance, but also build the capacities of GARWSP headquarters and branches as well as local communities. The aim of this study is to formulate a plan for rural water supply improvement to develop rural areas in Yemen and give support through clean water.

2007/10/07

دراستهم حذرت من تصاعد شحة حوض صنعاء جراء عدم توازن التغذية مع الاستهلاك .. جايكا اليابانية تدرس ادارة الموارد المائية وتحسينها في الريف

صنعاء, نيوزيمن:

حذرت دراسة دولية حديثة من شحة مياه حوض صنعاء التي تصاعدت بسبب عدم التوازن المستمر بين التغذية السنوية للمياه الجوفية والطلب المتنامي للمياه, ملفتة إلى ما لإستمرار الطلب على المياه حالياً من خطورة على المستقبل, حيث انه "ربما تنضب موارد المياه الجوفية في المستقبل القريب"

كان ذلك في بلاغ للوكالة اليابانية للتعاون الدولي (جايكا) الذي أشارت فيه الى انه في إطار التعاون الفني المقدم منها فقد قامت بتوقيع مذكرة مع وزارة المياه والبيئة خاصة بم سودة التقرير النهائي للدراسة التنموية "دراسة أدارة الموارد المائية وتحسين تزويد مياه الريف" والتي تتكون من جزأين وتنفذها بالتعاون مع هيئتا مشاريع مياه الريف والموارد المائية.

ووفقاً لبلاغ صحفي صادر عنها – تلقى نيوزيمن نسخة الكترونية منه – فقد بدأت الجايكا بتنفيذ الدراسة الخاصة بعنصر تحسين تزويد مياه الريف في نوفمبر 2005م في 5 محافظات (صنعاء، ذمار، اب، تعز، المحويت) والتي تم من خلالها صياغة خطة لتجهيز 23 موقع في الخمس المحافظات بالتجهيزات اللازمة لتزويد المياه وتم من خلالها تنفيذ 3 مشاريع تجريبية في صنعاء وذمار والمحويت بالشراكة الج يدة مع المجتمع المحلي, ملفتاً الى ان الدارسة تهدف أيضا لتحسين بناء القدرات لمقر الهيئة العامة وفروعها في المحافظات المستهدفة من خلال برامج التدريب.

وذكر البلاغ انه بشأن "أنشطة الجزء الثاني الخاص بإدارة الموارد المائية فقد تم صياغة واقتراح خطة عمل من 8 إجراءات لإدارة حوض صنعاء بناء على الدراسة والتحليل للمعلومات المتو فرة والمراقبة الميدانية, تعالج خطة العمل المسألة الحرجة لشحة المياه فيه, منوهة الى انها ازدادت بسبب عدم الـ توازن المستمر بين التغذية السنوية للمياه الجوفية والطلب المتنامي للمياه.

وحذرت الدراسة من خطورة الإستمرار في الطلب على المياه حالياً على المستقبل, وأضافت "فربما تنضب موارد المياه الجوفية في المستقبل القريب".

تتكون خطة العمل من 8 اجراءت يجب اتخاذها حالا لتخفيف الاستهلاك الزائد للموارد المائية، ولتأمين المياه للاستخدام المنزلي وللتطوير المؤسسي لإدارة حوض صنعاء.

وتهدف الدراسة أيضا لنقل المعرفة والتقنية اليابانية الخاصة بإدارة موارد المياه إلى النظراء اليمنيين من خلال مشاركتهم المباشرة في الدارسة.

وأشار البلاغ الى انه تم توقيع الاتفاقية بحضور وزير المياه والبيئة المهندس عبد الرحمن فضل الأرياني والسيد كنجي ناجاتا رئيس بعثة الجايكا والسيد هاتوري السكرتير الأول في السفارة اليابانية في صنعاء، والسيد كينيتشي ساساكي الممثل المقيم لمكتب جايكا اليمن.

يشار الى ان الوكالة اليابانية (جايكا) هي الجهة المسئولة عن تقديم المساعدات الفنية التي تأتي ضمن المساعدات الرسمية اليابانية للتنمية وتستمر في تقديم المساعدات الفنية لليمن م نذ عام 1978 وتركز مساعدتها الآن على التعليم الأساسي والصحة العامة وإمداد مياه الريف والتدريب المهني والذي أصبح من أولويات المساعدة للجايكا بعد زيارة الرئيس علي عبدالله صالح الى اليابان في 2005م.

معلومات أساسية
مواقع ذات علاقة

Translation

News Yemen Website
October 7, 2008

Their Study Warned Against Growing Shortage of Water in Sana'a Basin Because of Imbalance between Recharge and Consumption.... JICA Studies Water Resources Management and Rural Water Supply Improvement.

A recent international study warned against shortage of water in Sana'a Basin that has been accelerated by continued imbalance between annual recharge and the growing water demand.The study indicated that if the projected future water demand continued to be satisfied, water may be at stake in the future as "the groundwater resources may be depleted very near future".

This was stated in a press release issued by Japan International Cooperation Agency (JICA) which indicated that within the technical cooperation scheme of JICA, it has signed a Minutes of Meeting with the Ministry of Water and Environment on the draft final report of the development study named, "The Study for Water Resources Management and Rural Water Supply Improvement" which has two components conducted jointly with the General Authority for Rural Water Supply (GARWSP) and the National Water Resources Authority (NWRA).

According to the press release issued by JICA, of which News Yemen received an electronic copy, JICA started the study in November 2005 with the component of Rural water supply Improvement targeting 5 governorates (Sana'a, Dhammar, Ibb, Taiz and Almahweet) in which a plan was formulated for equipping water supply facilities for 23 sites in the 5 governorates and three pilot projects were conducted in Sana'a, Dhamar and Almahweet with good participation of local community.This study was aimed also to improve the capacity for GARWSP HQ and its branches in the targeted governorates by conducting training programs.

The press release mentioned that within the activities of the second component of water resources management, an eight-action plan for Sana'a Basin was formulated and proposed based on analysis of existing data and information and field observation. The action plan addressed the critical issue of the water shortage in Sana'a Basin and it confirmed that water shortage has been accelerated by continued imbalance between annual recharge and the growing water demand.The study warned against the risk of the current growing demand on water in the future and it added "the groundwater resources may be depleted very near future".

The action plan consists of eight actions to be taken immediately to reduce over-use of water resources, secure domestic water and develop institutional organization. The study also aimed at transferring Japanese technology and knowledge on water resources management to the Yemeni counterpart personnel through their direct participation into the study.

The press release indicated that the signing of the agreement was attended by H.E.Mr.Abdulrahman Fadl El-Eryani, Minister of Water & Environment, Mr.Kenji NAGAT, JICA Mission Leader, Mr. HATTORI, first-secretary of Embassy of Japan in Sana'a and Mr.Kenichi SASAKI, Resident Representative of JICA Yemen Office.

It is worth mentioning that Japan International Cooperation Agency (JICA) is the implementing agency for the technical assistance of the Official Development Aid of Japan (ODA). It has been extending its technical assistance to Yemen since 1978 to contribute to the socio-economic development of Yemen. This assistance is now focused on Basic Education, Public Health, Rural Water Supply and Vocational Training, which became a priority area of JICA's assistance after H.E.President Saleh's visit to Japan in 2005.

YEMEN TIMES
Yemen's most widely read English-language newspaper

11 October 2007

Strategy to avert water crises in Yemen

Nadia Al-Sakkaf

SANA'A, Oct 10 — Halving agriculture consumption of water, reducing urban water waste by 50 percent, and treating wastewater are the main measures proposed to avert a water crisis in Yemen.


JICA funded team at Al Kharaba Area of Sana'a Governorate.

An action plan has been drawn up after a two-year study by Japan International Cooperation Agency (JICA). Working with the Gneral Authority for Rural Water Supply (GARWSP) and the National Water Authority (NWRA), they have warned that unless demand for water is reduced significantly, the water resources in the Sana'a Basin may disappear "in the very near future".

In order to mitigate the future threat of drought in five Yemeni governorates, a Japanese technical team conducted a development study funded by The team proposed a water resource management action plan for Sana'a Basin of seven actions, which were agreed by the Yemeni authorities. They include reducing water consumption in irrigation, reducing physical loss of urban water supply, reuse of treated wastewater, constant consumption of industrial and touristic use, institutional and organizational development.

As a consequence, Yemeni farmers will be educated on new methods for irrigation, and their use of water will be regulated. The purpose of this regulation is to save 90 million of cubic meters annually by 2020. This means irrigation efficiency will be improved from 40 to 70 percent.

Similarly, the second action aims at saving 9.9 million cubic meters of water consumption by reducing physical loss from 30 to 15 percent. Awareness activities on wasting water and controlling leakage in the domestic water network are means to achieving this aim.

According to the action plan, treatment of wastewater will yield around 50 million cubic meters every year. This water will be dedicated to irrigation purposes. For this to take place, the only water waste plant in Sana'a must be increased 20 fold, according to engineer Moain Al-Muhajery at the Technical Department of Sana'a Municipality.

The action plan addresses the critical issue of the water shortage in Sana'a Basin where water shortage has become worse and has been accelerated by continued imbalance between annual recharge and the growing water demand. It warned that if the projected future water demand continued to be satisfied, the groundwater resources may be depleted very near future. The action plan consists of eight actions to be taken immediately to reduce over-use of water resources, secure domestic water and develop institutional organization. The study also aimed at transferring Japanese technology and knowledge on water resources management to the Yemeni counterpart personnel through their direct participation into the study.

Capacity building and advocacy

The strategy also includes capacity building of GARWSP branches in the targeted governorates: Sana'a, Dhammar, Ibb,Taiz and Almahweet. Staffs were trained on job and through pilot projects, some had been sent to Japan to get training.

A public awareness campaign with a specialized awareness package is deployed during the strategy. A reliable source of information and analysis will also be available for political leaders in order to assist them to making the right decisions. The people working on the strategy ending in 2009 will work closely with the local councils in the fiver governorates in order to ensure local ownership and decentralization.

Ali Al-Surumi director of GARWSP confirmed that the idea of such decentralization is to improve local capacity around the republic. "I feel our job in GARWSP is to facilitate local bodies in handling their own problems. Our job is to provide technical assistance and guidance. This is why we work closely with the local councils."

JICA has been extending its technical assistance to Yemen since 1978 to contribute to the socio-economic development of Yemen. This assistance is now focused on Basic Education, Public Health, Rural Water Supply and Vocational Training, which became a priority area of JICA's assistance after President Saleh's visit to Japan in 2005.

Development of legislative framework for Sana'a Basin water management includes:

- A ban on well new drilling for agriculture and irrigation use

- Licensing of all wells irrespective of depth

- Mandatory water abstraction metering

- Groundwater pricing for agriculture and irrigation use.