(5)-7 Summary of Pit Excavation Survey, P-7

PROFILE DESCRIPTION Site No. : P-7 Survey Date : 31 JAN. '89

A. Information of the Site
 Soil Mapping Unit : Yc-mdl
 FAO Classification : Calcic Yermosols, moderate deep

USDA Classification : Typic Calciothids

Land Suitability Classification : S2kd

Location : About 20km west south west of the pilot farm site. Hailat

Al-Rakah

Landform : Wadi bank

Elevation : 270m Slope : <1%

Micro Relief : Even

Land use : Cultivation (Rhoase grass)

B. Information of the Soil

Parent Material : Recent alluvium over subrecent and old alluvium Drainage : Imperfect

Flood Hazard : None

Surface Feature : Loose sand

Evidence of Erosion : None

Wind blown Sand Hazard : Slight

C. Brief Description of the Profile

Moderate deep profile developed on alluvium. The soil texture is sand. There are gravel layer at 15-70cm in depth in the profile.

C Horizon occurs from 80cm in depth. There is gypsum content throughout the profile. This soil has moderate suitability for irrigated agriculture development.

D. Profile Description (P-7)

0 - 5

Horizon Depth (cm)

Au

Description

Dull yellow orange (10YR 7/4) dry, dull yellowish brown (10YR 5/4) moist; sand, 20% gravel (1-10mm in diameter); dry loose, moist loose; single grain; crack (3cm in width); few fine roots; many fine pores; strong reaction to HCl; clear smooth to:

1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 -		
11B1K	5 - 15	Dull orange (7.5YR 7/4) dry, orange (7.5YR 6/6)
		moist; fine sand; 10% gravel (1-2mm in diameter);
		dry soft, moist very friable; weak platy; crack;
	. ·	common fine roots; many fine pores; violent
		reaction to HCl; clear smooth to:
11B21K	15 - 50	Orange (7.5YR 7/6) dry, orange (7.5YR 6/6) moist;
1102.41	10 40	gravelly sandy loam, 40% gravel (2-5mm in
		diameter); dry very hard, moist friable;
		subangular blocky; crack; few fine roots; many
		fine pores; gypsum; violent reaction to HCl; many
		CaCO ₃ concretions; abrupt smooth to:
		Dull orange (7.5YR 7/4) dry, orange (7.5YR 6/6)
11B22K	50 - 70	
		moist; gravelly sand, 60% gravel (2-10mm in
		diameter); dry extremely hard, moist very farm;
		weak subangular blocky; crack; few fine roots;
		common fine pores; gypsum; violent reaction to
		HCl; clear smooth to:
11B23K	70 - 80	Light yellow orange (10YR 8/4) dry, dull yellow
		orange (10YR 6/4) moist; fine sand, 10% gravel
		(2mm in diameter); dry extremely hard, moist very
		farm; subangular blocky; no roots; few fine pores;
		gypsum; violent reaction to HCl; clear smooth to:
IIClK	80 - 90	Dull yellow orange (10YR 7/3) dry, dull yellow
		orange (10YR 7/4) moist; 90% gravel (2-5mm in
		diameter); dry extremely hard, moist very firm;
		massive; gypsum; violent reaction to HCl; clear
		smooth to:
IIC2K	90 - 93	Light yellow orange (10YR 8/3) dry, dull yellow
		orange (10YR 6/4) moist; fine sand, 5% gravel
		(2-3mm in diameter); dry extremely hard, moist
. `		very firm; massive; gypsum; violent reaction to
		HCl; clear smooth to:
IIIC3K	93 - 95	Dull yellow orange (10YR 7/3) dry, dull yellow
		orange (10YR 7/4) moist; 90% gravel (2-5mm in
		diameter); dry extremely hard, moist very firm;
		massive; gypsum; violent reaction to HCl; clear

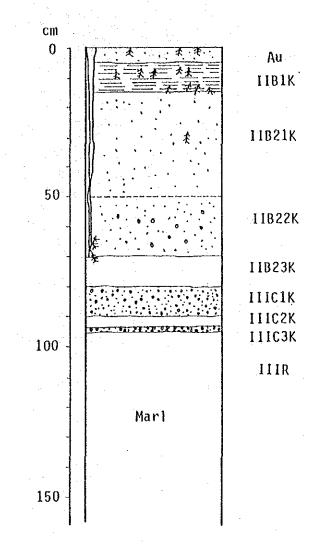
smooth to:

95 +

R .

Light gray (2.5Y 8/2) dry, light gray (5Y 8/2)

moist; marls



			-				-		-	ستسمحم		-
ß	- 1	10.88	6.85	1.685			otal	N (%)	0.040	0.030	0.010	
pH (1:2.5)		6.76	6.78	7.12								
1.50.1	(PPM)	0.5	0.6	0.5				Saluial				
1	linsd An	0.7	0.5	0.4			(B())	HC0 ₃	1.5	1.0	0.5	
		37	31	22			e anions	S0₄	1.11	6.0	1.7	
		21	23 -	25			Soluble	CI	96.2	61.5	14.6	
		q	p	קי			ar v	олл (ше/Ø)	23.8	17.3	12.9	
1 2 2 2 7	זבער	San	San	San			(0,	К	2.6	1.70	0.50	
	Clay	2.0	4.0	2.0			ons (me/	Na	82.3	50.0	14.0	
cle (%)	Silt	2.0	4.0	8.0			ible cati	Mg	8.1	5.80	0.75	· · ·
il parti	F.Sand	50.8	29.9	26.4			Solt	Са	15.8	11.0	1.60	
S		45.2	62.1	63.6			*100 1	53 SS	30.7	25.3	23.3	
		13.4	35.1	35.3			ردر. در	دیں e/100g)	15.0	17.4	14.6	
phases	AIr (%)	35.5	32.8	36.6			0g)		26		34	
ution of three	Water (%)	0.6	2.9	3.1			s (me/10	*	· 			
Distrib	1	63.9	64.3	60.3			e cation					
and the second second	and the second se						ngeable	Mg				
Duth doe	(g/cu (g/cu	1.9	1.7	1.6			Exchai	Ca	32.0	34.0	35.0	
80		10	40	75			Ŷ	8 8	3.48	2.19	0.54	
	Dilt donaity three phases crown Soil particle (%) Towards Control Concern Avail I ou	Bulk densityDistribution of three phasesSoil particle (%)Soil particle (%)TextureSat'nCaCO3CypsumAvail PPH(g/cm)(%) <td>$\begin{array}{ c c c c c c c c c c c c c c c c c c c$</td> <td>$\begin{array}{c c c c c c c c c c c c c c c c c c c$</td> <td>$\begin{array}{c c c c c c c c c c c c c c c c c c c$</td> <td>$\begin{array}{c c c c c c c c c c c c c c c c c c c$</td> <td>$\begin{array}{ c c c c c c c c c c c c c c c c c c c$</td> <td>Bulk density (g/cm) Distribution of three phases (g) Soil particle (g) (g) Soil particle (g) (g) Texture (g) Sain (g) CaCO₃ (g) Cypeum (g) Avail (g) PH (g) 1.96 63.9 0.6 35.5 13.4 45.2 50.8 2.0 2.0 2and 21 37 0.7 0.5 6.76 1.96 63.9 0.6 35.5 13.4 45.2 50.8 2.0 2.0 Sand 21 37 0.7 0.5 6.76 1.71 64.3 2.9 35.1 62.1 29.9 4.0 4.0 Sand 21 37 0.5 0.6 6.78 1.71 64.3 2.9 35.1 62.1 29.9 4.0 4.0 Sand 23 31 0.5 0.6 6.76 1.8 60.3 3.1 36.6 26.4 8.0 2.0 Sand 25 0.4 0.5 7.12 1.6 60.3 3.1 36.6 <t< td=""><td>$\begin{array}{ c c c c c c c c c c c c c c c c c c c$</td><td>$\begin{array}{ c c c c c c c c c c c c c c c c c c c$</td><td>$\begin{array}{ c c c c c c c c c c c c c c c c c c c$</td><td>$\begin{array}{ c c c c c c c c c c c c c c c c c c c$</td></t<></br></td>	$\begin{array}{ c c c c c c c c c c c c c c c c c c c$	$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$	Bulk density (g/cm) Distribution of three phases 	$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$	$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$	$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$	$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$

* Note : Data not used in the analysis of this study. Should be referred with reanalysis at the site.

Organic matter (%) 0.8 0.6 0.2 0.2

3-106

(5)-8 Summary of Pit Excavation Survey, P-8

PROFI	LE	DES	SCRIPTION	
site	No.	:	P-8	

Survey Date : 1 FEB, '89

A. Information of the Site Soil Mapping Unit : Yc-dl FAO Classification : Calcic Yermosols, deep USDA Classification : Typic Calciorthids Land Suitability Classification : S2k Location : About 40km west of the pilot farm site. Shasr. Landform : Flat plain Elevation : 290m Slope : <1% Micro Relief : Even

Land use : Cultivation (Date palm), since 1988

B. Information of the Soil

Parent Material : Recent alluvium over subrecent and old alluvium Drainage : Imperfect

Flood Hazard : None

Surface Feature : Loose sand

Wind blown Sand Hazard ; Slight

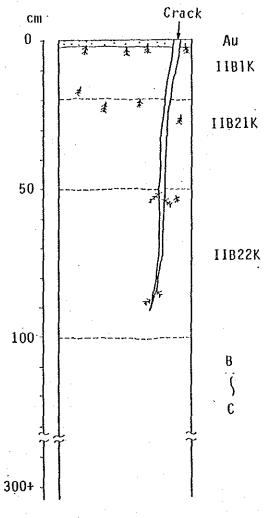
C. Brief Description of the Profile

Deep profile developed on alluvium. Surface soil is loose fine sand. Subsoil is sandy loam to loam and has subangular blocky to massive structure. Consistency of subsoil is hard in dry, very friable in moist. Cracks are developed on the profile. Roots are distributed up to 95cm in depth. This soil has moderate suitability for irrigated agriculture development.

D. Profile Description (P-8)

Horizon	Depth (cm)	Description
Au	0 - 2	Dull yellow orange (10YR 7/4) dry, dull yellowish
		brown (10YR 5/4) moist; gravelly fine sand, 30%
		gravel (2-5mm in diameter); dry loose, moist
		loose; single grain; crack (3cm in width); few
		fine roots; few fine pores; violent reaction to
•		HCl; clear smooth to:

11B1K	2 - 20	Dull orange (7.5YR 7/4) dry, bright brown (7.5YR
•	· ·	5/6) moist; sandy loam, 10% gravel (1-3mm in
		diameter); dry hard, moist very friable;
		subangular blocky; crack; few fine roots; many
		fine pores; gypsum crystal; violent reaction to
· ·		HCl; abrupt smooth to:
11B21K	20 - 50	Orange (7.5YR 7/6) dry, bright brown (7.5YR 5/6)
		moist; loam, 5% gravel (1-3mm in diameter); dry
		hard, moist very friable; subangular blocky;
		crack; few fine roots; many fine pores; gypsum
		crystal; violent reaction to HCl; abrupt smooth to:
11B22K	50 - 100	Dull orange (7.5YR 7/4) dry, bright brown (7.5YR
		5/8) moist; loam; dry hard, moist friable;
		subangular blocky; crack; few fine roots; many
		fine pores; gypsum crystal; violent reaction to
		HCl; abrupt smooth to:
B - C	100 - 300 +	Dull orange (7.5YR 7/4) dry, bright brown (7.5YR
		5/8) moist; loam; dry hard, moist friable;
		massive; violent reaction to HC1:



(Shasr)
Р-8

		: •								• • •	5
	1 ·	(1:5) ms/cm	5.39	0.375	11:04	-		Total	× (%)	0.025	0.025
		н (1:2.5)	6.91	7.21	6.76						
		(Mdd)	0.4	0.5	0.5) Base	Satulation (%)		
		ay hound (%)	0.4	0.2	0.5 -			(me/ <u>0</u>)	HC0 ₃	2.0	0.10
		(%)	18	16	12			Soluble anions (me/ q)	S0₄	4.6	1.2
	- - -	3al 1 (%)	19	21	24			Solubl	CI	47.3	2.4
		ובאוטוב	Sand	Sand	Sand			QYD	(me/g)	24.7	2.2
	- E	1 GX	S S S	Sa	Sa.		-	(0/	К	1.0	0.14
		Clay	2.0	2.0	2.0			Soluble cations (me/ g)	Na	46.0	2.0
	icle (%)	Silt	2.0	2.0	8.0		uble cat	Mg	2.50	0.55	
	Soil particle (%)	F.Sand	51.2	63.1	:74.5			*o	Са	4.40	1.50
	S	C. Sand	44.8	32.9	15.5				(%) (%)	14.6	15.7
		(%)	19.9	13.8	8.3			* 22 2	иси (me/100g)	20.5	24.8
	on of three phases	Air (%)	40.8	32.9	37.3			(30(0.30	0.28
	ution of three	Water (%)	1.1	1.9	1.3			s (me/10	Na *	3.0 0.	3.9 0.
	Distribution of three	Solid (%)	58.I	65.2	61.4			Exchangeable cations (me/100g)	E	භ 	
				~~~~				ngeable	* SM	85	75.0
くこのおこのノ		burk densily (g/cm)	L,54	1.72	1.63			Exchai	Са С	30.0	35.0
0   1	60	(cm)	10	30	80			Ç Ç	<u>8</u> S	1.75	0.12

* Note :

Organic matter (%)

0.5

0.5

0.2

Data not used in the analysis of this study. Should be referred with reanalysis at the site.

0.010

9-T

10.2

98.8

35.3

0.90

95:0

5.10

9.40

17.3

15.0

0.20

2.6

38.0

62.0

3.53

(5)-9 Summary of Pit Excavation Survey, P-9

PROFILE DESCRIPTION Site No. : P-9

## Survey Date : 2 FEB. '89

A. Information of the Site

Soil Mapping Unit : Yc-md2 FAO Classification : Calcic Yermosols, moderate deep USDA Classification : Typic Calciorthids Land Suitability Classification : S3dk Location : About 50km north of the pilot farm site. Dauka. Landform : Flat plain Elevation : 200m Slope : <1% Micro Relief : Even

Land use : Cultivation (Rhodes grass - Center pivot irrigation)

B. Information of the Soil Parent Material : Alluvium on limestone Drainage : Poor Flood Hazard : None Surface Feature : Covered by Rhodes grass

Wind blown Sand Hazard : None

C. Brief Description of the Profile

Shallow profile developed on the limestone. Hard and platy limestone occurs at 60cm in depth. This layer is impermeable one. Drainage is poor. Salinization same as P-10 may occur in the future. Roots are distributed up to 70cm in depth. This soil is not suitable for irrigated agriculture.

D. Profile Description (P-9)

Horizon Depth (cm) Ap 0 - 10 Description

Dull yellow orange (10YR 6/4) moist; fine sand, 10% gravel (2-3mm in diameter); moist loose; single grain; many medium roots; common fine pores; strong reaction to HCl; clear smooth to:

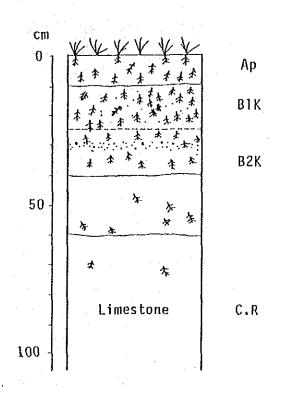
B1K	10 - 25	Bright yellowish brown (10YR 6/6) moist; gravelly
		sandy loam, 30% gravel (2-5mm in diameter); moist
		very friable; subangular blocky; many medium
		roots; common fine pores; violent reaction to HC1;
		abrupt smooth to:
<b>В2К</b>	25 - 40	Bright yellowish brown (10YR 6/6) moist; gravelly
		sandy loam, 30% gravel (2-3mm in diameter); moist
		very friable; subangular blocky; many fine roots;
		common fine pores; violent reaction to HCl; clear
		smooth to:

Light gray (7.5YR 8/1) moist, bright brown (2.5YR 5/6) mottled 30%; moist hard; common fine roots; violent reaction to HCl; clear smooth to: Limestone; gypsum mesh

R 60 +

40 - 60

C



ß	(1:5) ms/cm											
B	() (Car	and the state of the second	100	1.11	÷.		1	.*				
l	$\sim$ .	0.952	1.995	5.18			Total	24 <b>3</b> 6	0.025	0.020	0.020	
1.	5	7.25	7.00	7.21								1
A # 1	(Mdd)	0.7	0.6	0.8			Base	Salural (%)				
	(%)	0.4	0.5	2.1			(me/g)	HC0-3	1.1	L.3	1.3	
<u> </u>		22	17	91			e anions	S0₄	3.1	9.9	32.9	
, +ou	3at 11 (%)	17	21	22			Soluble	CI	5.3	87	17.6	
1 ···		q	q	p			av	( @())	2.5	1.9	2.4	
Tout	1Yal	San	Sar	Sar			( δ,	Х	0.51	0.85	0.15	
cle (%)	Clay	2.0	4.0	4.0			ons (me/	Na	4.0	5.0	11.0	
	SLIT	2.0	2.0	2.0			uble cat	Mg	1.80	4.90	13.90	
1 · · · · ·	F.Sand	57.7	58.2	73.9			Solu	Ca	3.20	9.20	26.75	
S	C.Sand	38.3	35.8	20.1			*iou	5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5				
Centrol	araver %	22.7	17.2	23.3		-	* دیر	UEU /100g)	20.5	20.5	22.9	
hases	AI r (%)	29.9	31.1	21.9				(me				
lon of three p	ater (%)	4.6		9.2			(me/100g	Х		· · · · · · · · · · · ·		
stributi							itions (	Na	2.6	4.0	2.5	
┝┈┉╼┥		65	25	39			sable ce	* 8 W	60	63.0	35.0	
food the	(g/cm)) (g/cm)	1.74	1.48	1.72			Exchange	Ca	10	31.0	30.0	
2.0		3	30	20 2			TCC	2 <del>2</del>	0.30	0.64	1.66	
	Distribution of Soil particle (%) Touting Soil Particle (%)	Bulk densityDistribution of three phasesSoil particle (%)Soil particle (%)Avail PBulk densitySolidWaterAir(%)CaCO3GypsumAvail P(g/cm)(%)(%)(%)(%)(%)(%)(%)(%)(%)	$\begin{array}{c c c c c c c c c c c c c c c c c c c $	$\begin{array}{c c c c c c c c c c c c c c c c c c c $	$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$	$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$	$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$	$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$

* Note :

Organic matter (%) 0.5 0.4 0.4

Data not used in the analysis of this study. Should be referred with reanalysis at the site.

(5)-10 Summary of Pit Excavation Survey, P-10

PROFILE DESCRIPTION Site No. : P-10

Survey Date : 2 FEB. '89

A. Information of the Site Soil Mapping Unit : Yc-md2 FAO Classification : Calcic Yermosols, moderate deep USDA Classification : Typic Calciorthids Land Suitability Classification : S3dk Location : About 50km north of the Pilot farm site. Dauka. Landform : Fan undulating Elevation : 200m Slope : <1% Micro Relief : Undulating

Land use : Cultivation, Growth condition is bad (Rhodes grass, Date plam)

B. Information of the Soil

Parent Material : Alluvium on limestone

Drainage : Poor

Flood hazard : None

Surface feature : Salinization

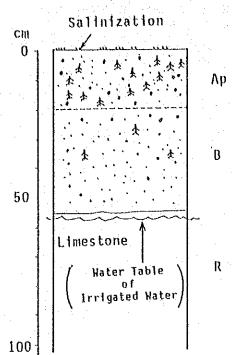
Wind blown sand hazard : None

C. Brief Description of the Profile

Shallow profile developed on the limestone. Hard and platy limestone occurs at 50cm depth. This layer is impermeable one. Drainage is poor. The profile is wet and the water table of irrigated water occurs at 50cm in depth. Strong salinization is observed on the surface. This soil is not suitable for irrigated agriculture.

D. Profile Description (P-10)

Horizon Depth (cm) Ap 0 - 20 Dull yellow orange (10YR 6/4) moist; gravelly sand; moist very friable; massive; common fine roots; common fine pores; violent reaction to HCl; abrupt smooth to: Light yellow orange (10YR 8/3) moist; gravelly sand; moist loose; single grain; few fine roots; violent reaction to HC1; clear smooth to: White; limestone; water table at 55cm depth



20 - 55

55 -

B

R

×				·	: 1 :				•		
	EC	) (1:5) ms/cm	2.99	1.334		Total	* %	0.040	0.045		
	1 1	ы (1:2.5	7.14	7.21				4 <b>43</b>			****
	1. 	(Mdd)	0.8	0.7		Base	Valutat (%)				
		morin (%)	0.5	0.7		(me/0)	HC0 ₃	0.8	0.7		
		رهر) (%)	29	22		Soluble anions (me/1) Base	S0.	9.0	1.3		
:	; ; ; ;	241 H	16	19		Soluble	CI	20.1	11.3		
	T	aini	nd	pu		đyo	(ne/g)	7.5	6.4		
	1 2 2	1 ex	Sand	Sand		( ð )	Х	0.30	0.34		
		Clay	I	2.0		Soluble cations (me/ $\mathfrak{g}$ )	Na	18.0	9.0		
	particle (%)	Silt	I	2.0		uble cat	Mg	4.20	1.50		
	Soil part	F. Sand	58.2	15.7		Soli	Ca	7.40	2.50		
	<i>й</i>	C.Sand	41.8	80.3		ESP*					
		vraver (%)	24.4	34.7		* Jaj	ссс (me/100g)	34.7	30.4		
farm)	on of three phases	Air (%)	13.4	19.2			<u>e</u>	0.26	12		
	Distribution of three	Water (%)	15.0	12.9		Exchangeable cations (me/100g)	Na * K		6 0.12		
100	)istribu	Solid (%)	71.6	67.9		cations		4.3	3.6		
uka	Low section of the se					ngeable	* 3W	16	3.0		
P-10 (Dauka local	D.11. 4	buik densi (g/cm [*] )	1.79	L.78		Exchai	Ca	14	3.0	 	
P-10	Samplig		5	40		COT.	23	0.96	0.43		

* Note :

Organic matter (%)

0.9

0.8

Data not used in the analysis of this study. Should be referred with reanalysis at the site.

# (5)-11 Summary of Plt Excavation Survey, P-11

PROFILE DESCRIPTION Site No. : P-11

Survey Date : 4 FEB. '89

A. Information of the Site Soil Mapping Unit : Yc-dl FAO Classification : Calcic Yermosols, deep USDA Classification : Typic Calciorthids Land Suitability Classification : S2k Location : About 2km west of the pilot farm site Landform : Wadi Elevation : 270m Slope : <1% Micro Relief : Even Land Use : None

B. Information of the Soil
Parent Material : Recent alluvium over subrecent and old alluvium
Drainage : Imperfect
Flood Hazard : None
Surface Feature : Loose sand
Wind blown Sand Hazard : Slight

C. Brief Description of the Profile

Deep profile developed on the alluvium. Surface soil is loose sand. Subsurface soil is sandy loam and has platy structure. Subsoil is sandy loam and subangular blocky structure. Silt content increase with depth. Consistency of subsoil is very hard in dry, friable in moist. Roots are distributed up to 180cm depth. Cracks were developed on the profile. This soil has moderate suitability for irrigated agriculture development.

D. Profile Description (P-11)

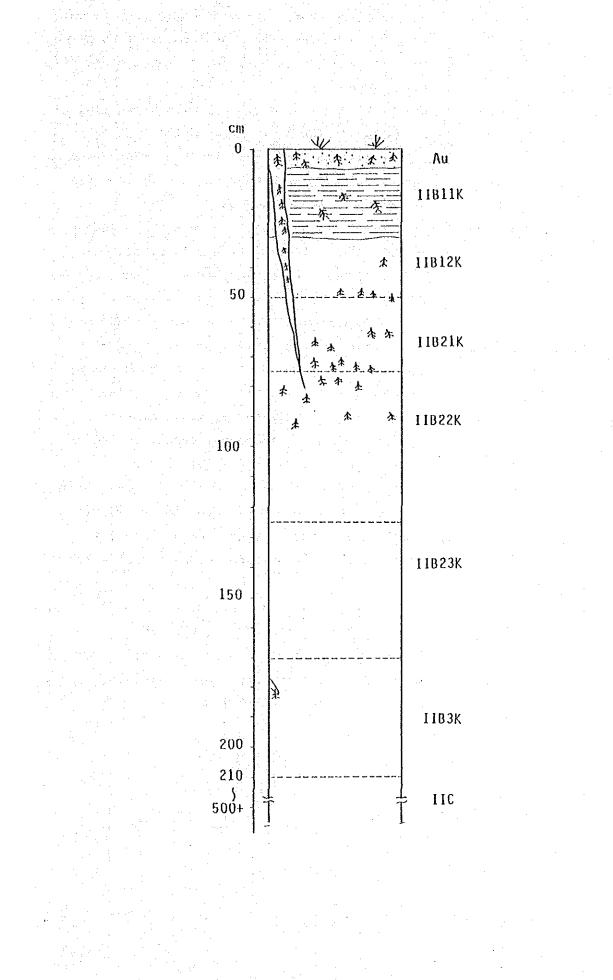
Horizon Depth (cm)

0 - 6

#### Description

Au

Dull yellow orange (10YR 7/4) dry, dull yellowish brown (10YR 5/4) moist; gravelly sand, 30% gravel (2-3mm in diameter); dry loose, moist loose; single grain; crack (10cm in width); few fine roots; strong reaction to HCl; clear smooth to:



.

11B11K	6 - 30	Orange (7.5YR 7/6) dry, yellowish brown (10YR 5/6)
	• • •	moist; sandy loam; dry soft, moist very friable;
		platy; crack; few fine roots; common fine pores;
		violent reaction to HCl; common CaCO3 concretions,
		clear smooth to:
11B12K	30 - 50	Orange (7.5YR 7/6) dry, yellowish brown (10YR 5/6)
		moist; sandy loam; dry hard, moist friable;
		subangular blocky; crack; few fine roots, common
	•	fine pores; violent reaction to HCl; many CaCO3
		concretions; abrupt smooth to:
11B21K	50 - 75	Dull orange (7.5YR 7/4) dry, bright yellowish
		brown (10YR 6/6) moist; sandy loam; dry hard,
		moist friable; subangular blocky; crack; common
		fine roots; common fine pores; violent reaction to
·		HCl; many CaCO3 concretions; abrupt smooth to:
11B22K	75 - 125	Dull yellow orange (10YR 7/4) dry, bright
		yellowish brown (10YR 6/6) moist; sandy loam; dry
		very hard, moist friable; subangular blocky; few
		fine roots; common fine pores; violent reaction to
		HCl; many CaCO3 concretions, abrupt smooth to:
11B23K	125 - 210	Light gray (5Y 7/2) dry, light yellow (5Y 7/3)
1		moist; bright yellowish brown (2.5Y 7/6) mottled
IIB3K		5%; silty loam; dry very hard, moist friable;
		massive; no roots; common fine pores; violent
·		reaction to HCl; few CaCO3 concretions; abrupt
		smooth to:
IIC	210 - 500 +	Dull brown (7.5YR 6/3) dry, dull brown (7.5YR 5/4)
		moist, orange (7.5YR 6/6) mottled 20%; silty loam;
		dry very hard, moist friable; massive; a root
		along the crack; few fine pores; violent reaction
		to HCl; few CaCO3 concretions

site)
farm
pilot
the
(Near
P-11

g. Id		Distri	Distribution of three	hases		Soil	oil part	l particle (%)		Ę		2		-		ы В
	(cm) BUIK density Solid Water (%) (%)	Solid (%)	Water (%)	Air (%)	uravel (%)	ravel (%) C.Sand	F.Sand Silt		Clay	Iexture	Sat n (%)	CaUC3 (%)	$\begin{array}{c c} \text{Sat } n & \text{catus} & \text{cypsum} \\ (\%) & (\%) & (\%) \\ \end{array}$	$ \begin{array}{c c} \text{AV21} & \text{Pit} \\ \text{(PPM)} & (1:2.5) \\ \text{(1:5)} \\ \text{ms/cm} \end{array} $	ри (1:2.5)	(1:5) ES/CE
10	1.52	57.2	1.4	41.4	8.8 44.6	44.6	55.3	I	1	Sand	18	\$ <del>7</del>	0.4	0.9	7.23	0.296
40	1.61	60.5	ļ	1.8 37.7	15.8 13.8	13.8	86.2	i.	1	Sand	20	26	0.4	0.8	0.8 7.32	0.460
60	1.67	62.8		35.0	2.2 35.0 11.3 21.5	21.5	78.4	.1		Sand	61	19	0.5	0.5	0.5 9.22	2.54
				_												
	Exchangeable cations (me/100g)	e catio	ns (me/100	0g)	*	*	Soli	ble cat	Soluble cations (me/Q)	(0)	Solub	e anions	Soluble anions (me/1) Base	Base	<u>الم</u>	Total

Ca       Mg *       Na *       K       (me/100g)       Ca       Mg       Na *       K       (me/10)       C1       SO.4       HCO3         3       3.0       4.0       3.7       0.18       36.7       -       0.85       0.60       1.0       0.51       1.2       1.6       1.2       0.10         7       3.0       3.0       3.9       0.34       45.5       -       1.10       0.65       2.0       0.82       2.2       3.2       1.2       0.15         7       3.0       3.9       0.34       45.5       -       1.10       0.65       2.0       0.82       2.2       3.2       1.2       0.15         8       3.0       3.9       0.28       33.6       -       3.45       1.85       19.0       1.19       20.1       4.7       0.60         1       3.0       3.9       0.28       33.6       -       3.45       1.85       19.0       1.19       20.1       4.7       0.60	, C	Exchang	Exchangeable cations (me/100g)	tions (m		* ت	*001	Soli	uble cat.	Soluble cations (me/ $\varrho$ )	(8)	Q¥0	Soluble	e anions	Soluble anions (me/1) Base	Base	Total
3.0       4.0       3.7       0.18       36.7       -       0.85       0.60       1.0       0.51       1.2       1.6       1.2         3.0       3.0       3.9       0.34       45.5       -       1.10       0.65       2.0       0.82       2.2       3.2       1.2         3.0       4.0       3.9       0.28       33.6       -       3.45       1.85       19.0       11.9       20.1       4.7         3.0       4.0       3.9       0.28       33.6       -       3.45       1.85       19.0       11.9       20.1       4.7	<u>8</u> <del>8</del>	Ca	¥ W2	Na *	. >	uev (me/100g)	23 <b>3</b> 3	Ca		Na	К	oun (me/⊈)	C1	S0₂	HC0 ₃	Saturation (%)	A (6)
3.0     3.0     3.9     0.34     45.5     -     1.10     0.65     2.0     0.82     2.2     3.2     1.2       3.0     4.0     3.9     0.28     33.6     -     3.45     1.85     19.0     1.10     11.9     20.1     4.7	0.09	3.0	4.0	3.7	0.18	36.7	1	0.85	0.60			1.2	1.6	1.2	0.10		0.025
3.0     4.0     3.9     0.28     33.6     -     3.45     1.85     19.0     1.10     11.9     20.1     4.7	0.17		3.0		0.34	45.5		1.10	0.65		0.82	2.2	3.2	L.2	0.15		0.020
	0.81	3.0	4.0	3.9	0.28	33.6	ł		1.85	19.0		11.9	20.1	4.7	0.60		0.020

* Note :

Organic matter (%)

0.5

0.4

0.4

. Data not used in the analysis of this study. Should be referred with reanalysis at the site. .-

3-119

. *

#### Summary of Pit Excavation Survey, A-12-18 (5) - 12

Proposed Pilot Farm, Site-3 (based on Harza-1985-)

Mapping Unit Tol Site Location A-12-8

Soil Classification : FAO - Calcic Yermosols, deep US -Typic Calciorthids, deep Land Classification :

FAO - S2 USBR - 2S Recent Alluvial Terraces, Outwash Fans and Deep Eolian Geomorphic Unit : Deposits alluvium Parent Material : level with slopes of less than 1% Topography : short grasses and small forbs. Vegetation : well drained Drainage : This soil is a deep sand to sandy loam that has moderate Remarks : potential for irrigated agriculture.

Horizon Depth (cm)

A11

## Profile Description

This is a layer of single grained sand on surface. 0 - 3Moist color is strong brown (10YR 5/8); coarse sand with 3 - 9 less than 2% fine gravels; massive to single grain structure; soft when dry, very friable when moist and nonsticky, nonplastic when wet. 9 - 33 Moist color is strong brown (10YR 5/6); loamy coarse A12 ca sand with no gravels; massive to single grain structure, slightly hard when dry, very friable when moist and nonsticky, nonplastic when wet. Brown color (10YR 5/4) when moist; very fine sandy loam 33 - 65 821 ca

texture; massive structures, hard when dry, very friable when moist and nonsticky, nonplastic when wet.

100 00	65		93
<u> В22 са</u>	0.2	•	20

11B2 t

Strong brown (10YR 5/6) moist color; sandy loam texture, medium angular blocky structure; hard when dry, friable when moist and nonsticky, nonplastic when wet. Strong brown (10YR 5/6) moist color; very fine sandy loam stratified with loam; medium angular blocky structure; slightly hard when dry, friable when moist and slightly sticky, nonplastic when wet. Hand augered from 135cm to 260cm.

155 - 200 Strong brown, very fine sand.

200 - 250 Brown to dark brown, very fine sandy loam.

250 - 260 Red (5R 4/8) moist loam to clay loam.

260 +

93 - 155

Too hard to auger.

	5.100 COCO	(%) (%) (%) (%) (%)	19.4 63.3 <0.1 -	18.7 63.2 <0.1 -	18.7 78.5 <0.1 -	24.5 54.0 <0.1 -	34.2 41.6 <0.26 -	Soluble anions (me/g )	$(me/l)$ CI $SO_4$ HCO ₃ Saturation $(\%)$										
	(1) (1) (1) (1) (1) (1) (1) (1) (1) (1)		1	1	]			Extractable cations (me/100g)	K	0.31	0.28	0.18	0.32	0.41		•			
	()	Clay		ł	1	-	<b>I</b> .	cations	Na	0.18	0.62	1.11	7.02	21.3		•			
(8)	ticle ()	Sit	1	1	1	1	1	ctable	Mg	0.49	0.36	0.33	1.07	1.01		· .	site.		
(A-12-8)	Soi! particle (%)	F.Sand		1	1	1	1	Extra	Ca	3.73	3.02	3.02	4.06	4.24		this study	at the s	 	
	Ų1	C.Sand	J	J	J	1	I	. <b>*</b>		9	28	73	>100	>100		s of th	alysis a		
SIte-3	1 21122	(%)	1	1	I	l	· [	* ,	ue/100g)	2.85	2.19	1.53	3.54	4.62		Data not used in the analysis of	Should be referred with reanalysis at the site.		
	on of three phases	Alr (%)	1	-	1	ŀ	J	(g0		1						d in th	ferred		
Farm.	ition of three	Water (%)	ì	1	ł	]	1	(me/10	*			<u>-</u>			-	not use	d be re	÷	•
Pilot	Distribution of three	Sol1d (%)	1	1	1	1	1	cations	* Na		-1	1		1	 ი)		Shoul		
		fre weiterer			<b> </b>			Exchangeable cations (me/100g)	* ¥	 	. 1	1	1	1	* Note			·	
OSGC		butk density (g/cm ³ )			1	1. 	1	Excha	Са	1	1	1	<b>I</b> .	l				,	
Proposed	<u>. 60</u>	(cm)	6~0	9~33	33~65	65~93	93~155		<u>8</u> 8		1	1	1	1	Organic	matter	(%)	ł	

Sased on Harza (1985)

1

1.1

(6) Summary of Pit Excavation Survey in the Pilot Farm Site

		in the Pilot Farm Sit
3.2.3-6 (2)	11	(PP-2)
		. 11
3.2.3-6 (3)	и.	(PP-3)
		. 11
3.2.3-6 (4)	<b>U</b>	(PP-4)
		ü
3.2.3-6 (5)	н	(PP-5)
		. ti
3.2.3-6 (6)	11	(PP-6)
		u

(6)-1 Summary of Pit Excavation Survey, PP-1

PROFILE DESCRIPTION	
Site No. : PP-1	Survey Date : 21 JAN. '89
A. Information of the Site	
Soil Mapping Unit : Yc-dl FAO Cl	assification : Calcic Yermosols, deep
USDA Classification : Typic Calciort	hids
Land Suitability Classification : S2	<b>k</b> in the second s
Location : North West side in the Pi	lot Farm Site
Landform : Wadi (branch of Wadi)	
Elevation : 282.5 m Slope	: <1%
Micro Relief : Even	
Land use : Slightly grazing of camel	and wildlife
Vegetation : Grasses <1% <u>Stipagrosti</u>	s plumosa
B. Information of the Soil	
Parent Material : Recent alluvium ov	er subrecent and old alluvium
Drainage : Imperfect	
Flood Hazard : Slight-may flood duri	ng major storm events
Surface Feature : Loose sand and gra	vel 70-90% (0.1-1.0cm in diameter,
0.2-0.3cm dominar	t)
Evidence of Erosion : None	
Wind blown Sand Hazard : Slight	
C. Brief Description of the Profile	
Deep profile developed on old and we	11 weathered alluvium.
Loose topsoil indicates a sedimental	layer of gravelly sand.
Subangular blocky structure develops	well in subsoil. And under layers
have massive structure.	
Compactness and silt content increas	e with depth.
Consistency of subsoil is hard to ve	ry hard in dry, but very friable to
friable in moist. Fine roots are ob	served up to 50cm in depth. There is
a high content of CaCO3 throughout t	
This soil has moderate suitability o	f irrigated agriculture development.

p. Profile Description (PP-1)

Horizon Depth (cm)	Description
Au 0 - 5	Dull yellow orange (10YR 7/4) dry, yellowish brown
	(10YR 5/6) moist; gravelly coarse sand, 40% gravel
	(2-5mm in diameter); dry loose, moist loose;
	single grain; a few roots; a few pores; strong reaction to HCl; clear smooth to:
11Blk 5 - 15	Dull orange (7.5YR 7/4) dry, bright brown (7.5YR
	5/6) moist, fine sand, 20% gravel (1-2mm in
	diameter); dry slightly hard, moist very friable;
	weak platy; a few roots; a few fine pores; violent
	reaction to HCl; clear smooth to:
11B21K 15 - 55	Light yellow orange (10YR 8/3) dry, bright
110210 13 - 33	
	yellowish brown (10YR 6/6) moist; loam, 10% gravel
	(1-2mm in diameter); dry very hard, moist friable;
	subangular blocky; a few roots; a few fine pores;
	common CaCO ₃ concretions, violent reaction to HC1;
77D002 55 00	no gypsum; gradual wavy to:
11B22K 55 - 80	Dull yellow orange (10YR 7/4) dry, bright
	yellowish brown (10YR 6/6) moist, slight paly,
	many bright reddish brown (5YR 5/6) mottled; loam,
	<10% gravel (1-2mm in diameter); dry extremely
	hard, moist friable; no roots; common CaCO3
	concentrations, violent reaction to HCl; no gypsum
	seen; gradual wavy to:
IIB3K 80 - 170	Bright reddish brown (5YR 5/8) dry, reddish brown
	(5YR 4/8); silty loam, <10% gravel (1-2mm in
• •	diameter); dry extremely hard, moist friable; no
	roots, common CaCO3 concentrations, violent
· · ·	reaction to HCl; no gypsum seen; Hand augered from

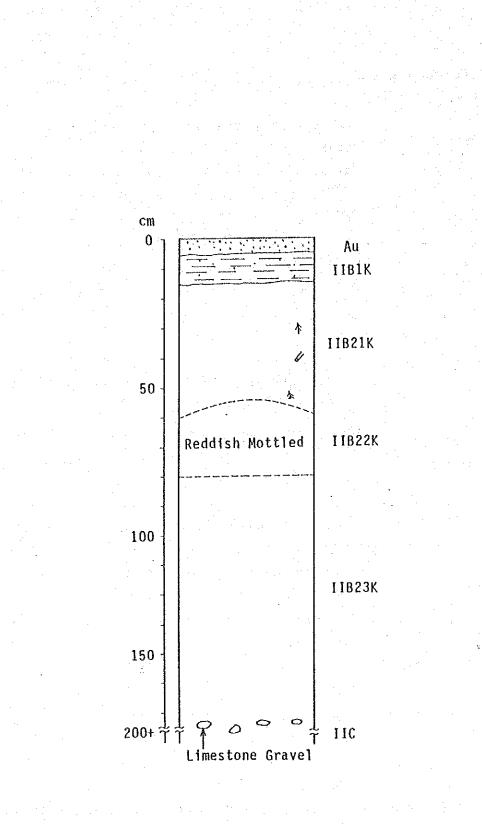
170 - 200

Reddish brown (5YR 4/8) moist; angular limestone gravel (2-5cm in diameter); violent reaction to HCl:

200 +

Too hard to auger

160cm to 200cm:



· · · ·

f or the second		
+ (	ר כי	
"Q`	4	
ţ.	4	ļ

	1	VELOU LAIM	× 11 × 2								•						
Samp1 g		<u> </u>	Distribution of three	on of three phases		S	Soil part	particle (%)		Ę		, , , ,	Ç. Ç.		1 1	11. 11.	B
(m)	buik delisity (g/cm)	y Solid (%)	¥a	Air (%)	uraver (%)	C.Sand	F. Sand	Silt	Clay	iex 1	exture		دمیں (%)	anst in	(Mdd)	ри (1:2.5)	(I:5) #S/Cm
5	1.52	54.8	0.9	44.5	11.2	50.8	43.2	6.0	I	Sand	pu	18	32	0.3	0.5	7.26	0.403
50	1.46	56.5	3.1	40.4	67	30.9	29.1	34.0	6.0	Loam	ER	35	18	0	0.5 0	6.94	3.40
06	1.59	60.2	3.5	36.3	1.5	27.1	32.9	34.0	6.0	Loam	am	38	14	0.6	4.0	5.87	4.54
130	1.57	62.1	4.8	33.1	6.0	23.6	34.4	30.0	12.0	Loam	ᇑᆿ	42	14	0.2	÷.0	6.98	3.89
																-	
ç	Exchangea	Exchangeable cations (me/100g)	ns (me/1	(300)	*	*,	105	uble cat	Soluble cations (me/ $\mathfrak{g}$ )	( ð/	Ę	Soluble	anions	Soluble anions (me/Q) Base	Base	-	Total
28	C3	* ³⁴	Na *	к Ч К К К К К К К К К К К К К К К К К К	ປມປ (me/100g)		Ca	Mg	Na	K	oun (me/g)	IJ	S0₄	HCO ₃		L (101); (1777-110-14)	N (S)
0.13	35.0	64.0	2.3	0.26	14.6	15.8	2.10	0.85	0.76	0.29	0.6	0.95	3.0	0.05	>100		0.040
1.09	48.0	57.0	4.0	0.30	14.6	27.4	6.80	3.35	23.0	1.03	10.2	28.5	5.4	0.10	>100		0-045
			-														

* Note :

Data not used in the analysis of this study. Should be referred with reanalysis at the site.

0.025

>100

0.10

11.9

33.4

7.5

1.08

24.0

7.80

12.5

30.8

10.7

0.26

3.3

63.0

57.0

1.45

0.015

>100

0.10

6.2

32.6

9.9

1.08

25.0

5.20

7.6

26.1

15.3

0.30

4.0

65.0

40.0

1.24

Organic matter (%) 0.8 0.9 0.5 0.3
------------------------------------------------------

(6)-2 Summary of Pit Excavation Survey, PP-2

PROFILE DESCRIPTION Site No. : PP-2

Survey Date : 24 JAN. '89

A. Information of the Site Soil Mapping Unit : Yc-vs FAO Classification : Calcic Yermosols, very shallow USDA Classification : Typic Calciorthids Land Suitability Classification : N2xd Landform : Eroded gravel hill Location : North edge of the centre of the Pilot Farm Site Elevation : 282.5 m Slope : 4% Micro Relief : undulating Land use : None Vegetation : grasses <1% Stipagrostis plumosa</p>

B. Information of the Soil Parent Material : Limestone Drainage : Poor

Flood Hazard : None

Surface Feature : Limestone gravel (10cm in diameter - 10%, 2-10cm in diameter - 60%) Evidence of Erosion : Eroded gravel Wind blown Sand Hazard : Strong

- C. Brief Description of the Profile Very shallow profile developed on limestone, weathered marl. Soil depth is only 12cm. This soil is not suitable for irrigated agriculture development.
- D. Profile Description (PP-2) Horizon Depth (cm)

Au	0 - 0.5	Dull yellow orange (10YR 7/4) dry, dull yellowish
		brown (10YR 5/4) moist, gravelly sandy loam, 60%
•		gravel (2-10cm in diameter); dry loose, moist
		loose; single grain; no roots; strong reaction to
		HCl; no gypsum; clear smooth to:

Description

Light yellow orange (10YR 8/4) dry, bright yellowish brown (10YR 6/6) moist, gravelly sandy loam, 30% gravel (2-3cm in diameter); dry soft, moist very friable; subangular blocky; no roots; violent reaction to HCl; no gypsum; clear wavy to: White; weathered alluvium with limestone gravel (5-10cm in diameter)

IIC 12 -

IIBK

50

cm Au 0 1 IIB 110 Limestone Gravels

0.5 - 12

(6)-3 Summary of PIt Excavation Survey, PP-3

PROFILE DESCRIPTION Site No. : PP-3

Survey Date : 22 JAN. '89

#### A. Information of the Site

Soil Mapping Unit : Yc-d1FAO Classification : Calcic Yermosol,USDA Classification : Typic Calciorthidsdeep

Location : South of the centre of the Pilot Farm Site

Landform : Wadi (branch of Wadi)

Land Suitability Classification : S2k

Elevation : 283.0 m Slope : <1%

Micro Relief : Even

Land use : Camel and Wildlife grazing, Water flooding due to pumping test of JICA No.3 pump.

Vegetation : cover 10%

harbs 5% <u>Fagonia bruguieri, Euphorbia SP</u>, <u>Erodium SP</u> grasses 5% Stipagrost<u>is plumosa</u>

B. Information of the Soil

Parent Material : Recent alluvium over subrecent and old alluvium (well weathered marl)

Drainage : Imperfect

Flood hazard : Slight-may flood during major storm events

Surface feature : Accumulation of salts is observed here and there.

Loose fine sand

Evidence of erosion : None

Wind blown sand hazard : None

C. Brief Description of the Profile

Deep profile developed on old alluvium. Cracks developed well in the profile. Loose topsoil passes into weak platy subsurface soil.

Subangular blocky structure develops well in subsoil and under layers have massive structure with gypsum mesh.

Profile is still moist due to pumping test, and roots are observed up to 160cm depth, especially along cracks.

Consistency is from very friable to friable in moist.

D. Profile Description (PP-3)

7 - 20

cm)

Horizon	Depth	.(
Au	0 -	7

IIB1K

#### Description

Dull yellow orange (10YR 7/4) dry, dull yellowish brown (10YR 5/4) moist; fine sand, 20% gravel (1-5mm diameter); dry loose, moist loose; single grain; many roots, common pores (1-2mm); violent reaction to HCl; clear smooth to: Light yellow orange (10YR 8/4) dry, bright yellowish brown (10YR 6/6) moist; sandy loam, <1% gravel (1mm diameter); dry slightly hard, moist very friable; platy; crack (4cm in width); many roots, common pores (1-2mm); violent reaction to HCl; clear smooth to:

Dull yellow orange (10YR 7/4) dry, dull yellow orange (10YR 6/4) moist, few orange (5YR 7/6) mottled; silty loam; dry hard, moist friable; subangular blocky; crack (3cm in width) with dead bodies of insect; common fine roots; common fine pores (lmm); violent reaction to HCl; few gypsum crystal; gradual wavy to:

Dull yellow orange (10YR 7/4) dry, dull yellow orange (10YR 6/4) moist, orange (5YR 6/6) mottled 20%; silty loam; dry hard, moist friable; subangular blocky; crack (1-2cm in width); abundant fine roots; common fine pores; violent reaction to HCl; few gypsum crystal; gradual wavy to:

Bright yellowish brown (10YR 6/6) dry, yellowish brown (10YR 5/6) moist, orange (5YR 6/6) mottled 20%; silty loam; dry hard, moist friable; massive; crack (up to 110cm); few fine roots; common fine pores; violent reaction to HCl; gypsum mesh; gradual wavy to:

Orange (5YR 6/6) moist; silty loam; moist friable; wind weathered limestone gravels (2-3cm in diameter) 5%; massive; few fine roots (up to 160cm); few fine pores; violent reaction to HCl; gypsum mesh; Hand augered from 160cm to 200cm

3-131

11821K 20 - 50

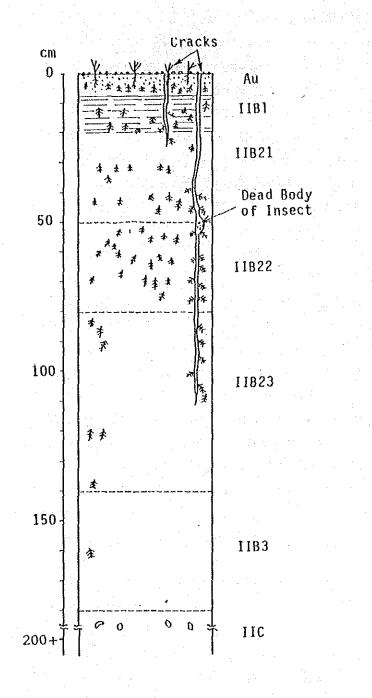
50 - 80 IIB22K

11B23K 80 - 140

140 - 180

IIB3K

IIC 180 - 200 Orange (5YR 6/6) moist; silty loam; angular limestone (5cm in diameter) 60% 200 + Too hard to auger



farm>
<pi lot<="" th=""></pi>
PP-3

ſ			<u> </u>					<u> </u>	NR-16-MARINE				<b> </b>	<u>ار</u>
	ដ្ឋ	) (1:5) ms/cm	0-666	16.1	3-39	2.38		Total	× 8	0.030	0.028	0.028	0.020	
	114	: <b>C</b>	7.26	7 06	6.84	6.89	•							
	front 1		0.7	0.6	0.5	0.5		Base	Saturation (%)	>100	>100	001 <	>100	
		lin (%)	0.3	0.4	0.6	0.5		; (me/ĝ)	HC0₃	0.10	0.10	0.15	0.10	
	ζ,	(%) (%)	27	18	12	11		Soluble anions (me/ $\varrho$ )	₹03	3.4	80	21.3	14.0	
	5a+ 2		20	33	38	39		Sol ub I	IJ	3.1	10.8	18.4	9.7	
	Tovtino	D TO 1	лd	Loamy Sand	Loam	Sandy Loam		dvo	(me/l)	1.4	4.1	3.3	3.5	
	Ē	1 GY	Sand	Loamy	Sandy Loam	Sandy		( 8/	K	0.34	0.80	0.85	1.60	
		Clay	2.0	3 0	14.0	14.0	:	ions (me	Na	2.0	<b>6</b> 0	12.0	9.0	
1010 (4)	1016 ///	Silt	2.0	12.0	18.0	18.0		Soluble cations (me/ $\varrho$	Mg	1.70	3.10	11.6	5.9	
Snil nartiela (4)	1.124 1.10	F.Sand	53.2	46.2	35.6	39.8		Sol	Ca	2.6	6.8	15.4	7.3	
Ö	2 · C	C. Sand	33.8	38.8	32.4	28.2		×uou	53 SS	18.3	11.8	11.6	7.3	
	0.10 U	(%)	12.9	10.4	7.4	2.8		* د	(me/100g)	18.6	19.5	19.8	24.5	
	three phases	Air (%)	38.9	32.7	34.4	27.5		0g)	(ne		38			
tion of	three	fater (%)	9.2	7.1	8.6	11.3		(me/10	× *	4 0.26	3 0 38	3 0.34	8 0 44	
Distribution of		Solid Water (%) (%)	51.9	60.2	57.0	61.2	a ¹	ations	Na *	3.4	2.3	2.3	1.8	
		~~~	5	ي 	2	9	, E	eable c	* 8	62.0	34.0	44.0	80.0	
	Dult doneity	(g/cm)	1.43	1.46	1.70	0.58		Exchangeable cations (me/100g)	Ca	34.0	73.0	58.0	55.0	
) [umos			15	40	10	120		- COL	<u>8</u> Se	0.21	0.63	1.27	0.76	

* Note :

Organic matter (%)

0.5

0.0

0.5

0.4

Data not used in the analysis of this study. Should be referred with reanalysis at the site.

(6)-4 Summary of Plt Excavation Survey, PP-4

PROFILE DESCRIPTION Site No. : PP-4 Survey Date : 23 JAN. '89

A. Information of the Site Soil Mapping Unit : Yc-dl FAO Classification : Calcic Yermosols, deep USDA Classification : Typic Calciorthids Land Suitability Classification : S2k Location : Center of the Pilot Farm Site Landform : Wadi Elevation : 283.0 m Slope : <1% Micro Relief : Even Land use : Slightly grazing of camel and wildlife Vegetation : grasses <1% <u>Stipagrostis plumosa</u>

B. Information of the Soil

Parent Material : Recent alluvium over subrecent and old alluvium (Well weathered)

Drainage : Moderately well Flood Hazard : Slight-may flood during major storm events Surface Feature : Loose sand and gravel 90% (2-3mm in diameter) Evidence of Erosion : None Wind blown Sand Hazard : Slight

C. Brief Description of the Profile

Deep profile developed on old alluvium (well weathered).

Surface soil is loose and gravely sand.

Subsoil have subangular blocky structure, and under layers have massive structure. Texture of subsoil is silty loam.

Compactness and silt content increase with depth.

Consistency of subsoil is hard to very hard in dry, but very friable in moist. Cracks develope well in the profile. Fine roots are observed up to 130cm depth. There is no gypsum and high content of CaCO3 throughout the profile.

This soil is moderately suitable for irrigated agriculture development.

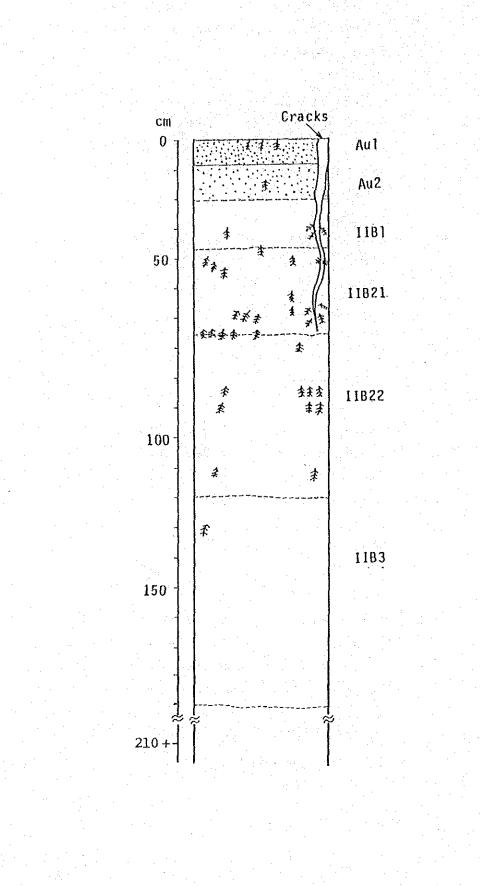
D. Profile Description (PP-4) Horizon Depth (cm) Description 0 - 7 Dull yellow orange (10YR 7/4) dry, dull yellowish Au brown (10YR 5/4) moist; gravelly sand, 60% gravel (1-3mm in diameter); dry loose, moist loose; single grain; crack (20cm in width); few fine roots; common pores; strong reaction to HCl; clear smooth to: IIB1K 7 - 20 Dull orange (7.5YR 7/4) dry, orange (7.5YR 6/6) moist; gravelly sand, 50% gravel (1-3mm in diameter); dry hard, moist very friable; subangular blocky; crack; few fine roots; common pores; common CaCO3 concretions; violent reaction to HCl; clear smooth to: Dull yellow orange (10YR 7/4) dry, bright brown IIB21K 20 - 37 (10YR 5/6) moist; sandy loam, 20% gravel (1-3mm in diameter); dry very hard, moist very friable; subangular blocky; crack; common fine roots; common fine pores; common CaCO3 concretions; violent reaction to HCl; gradual wavy to: 37 - 65 Dull orange (7.5YR 7/4) dry, bright brown (7.5YR IIB22K 5/6) moist; silty loam; dry very hard, moist friable; subangular blocky; crack; common fine roots, common fine pores; many CaCO3 concretions; violent reaction to HCl; gradual wavy to: Dull orange (7.5YR 7/4) dry, orange (7.5YR 6/6) 65 - 120 IIB23K moist; silty loam; dry very hard, moist friable; massive; crack; common fine roots; few fine pores; many CaCO3 concretions, violent reaction to HCl;

IIB31K 120 - 190

IIB32K

190 - 210 +

gradual wavy to: Dull orange (5YR 6/4) dry, bright reddish brown (5YR 5/6) moist; silty loam; dry very hard, moist friable; massive; few fine roots (up to 130cm); few fine pores; common CaCO3 concretions; violent reaction to HCl; Hand augered from 160cm to 210cm Bright reddish brown (5YR 5/6) moist; silty loam, 20% limestone gravels (1-2cm in diameter); violent reaction to HCl:



A	
· `	
Ē	
4	
- Èur	
đ	
- 10	
ιų.	
÷	
0	
· V	
E Anni	
t yest	
^	
5	
\sim	
41	
4	

PP-	PP-4 (Pilot farm)	0	farm.	\sim								• .						
Samp1 g			Distribution of three	on of three phases	_		SC	Soil particle (%)	icle (%)		č,				Concentration in			8
(cm)	(g/cm)) (g/cm)		Solid Wat (%) (Water / (%)	Air Wie		C.Sand	F.Sand	Silt	Clay	IG	amra	34 H (%)		since (%)	(MPM)	рп (1:2.5)	(1:5) as/ca
12	1.55	56		1.4 42	42.5	7.0	29.1	60.9	8.0	2.0	Sand	pu	22	41	0.2	1.0	7.25	0.275
55	1.53	91.1		2.3 36	36.6	11.1	31.8	58.2	8.0	2.0	Sand	nd	25	22	0.2	0.8	7.18	0.338
60	1.57	53	53.8	3.8 42	42.4	7 8	21.6	66.4	10.0	2.0	Sand	p	28	18	0.2	6. C	7.15	0_837
130	1.68	62	62.8	5.0 32	32.2 15	13.8	11.4	42.6	32.0	14.0	Loam	E	35	15	0.3	0.0	7.06	1.517
. CCF	Exchange	eable ca	Exchangeable cations (me/100g)	∎e/100g)	ν.μ. V	*	*:		uble cat	Soluble cations (me/ g)	(0/	đ	Soluble	Soluble anions (me/ g)		Base		otal
<u>8</u> 8	Ca	* 8¥	Na *	Х	ue/100g)	0g)	2 S	Ca	Mg	Na	K	(me/l)	C1	S0.	HCO ₃	Saturation (%)	-	* &
0.09	30.0	59.0	2.1	0.28	15.3		13.8	1.0	0.45	1.0	0.30	1.2	1.6	1.10	0-05	>100		0.025
0.11	50.0	67.0	2.3	0.24	19.0		12.1	0.60	0.40	2.0	0.37	2.8	2.4	0.85	0.10	>100		0.025

* Note :

Data not used in the analysis of this study. Should be referred with reanalysis at the site.

0.020

> 100

0.10

0.65

7.6

0.6

0.55

6.0

0.60

1.20

23.2

19.8

0.26

4.6

62.0

35.0

0.27

0.010

> 100

0.15

2.90

12.1

8.5

0.70

11.0

I.30

2.15

14.4

14.6

0.26

2.1.5

62.0

54.0

0.49

Organic matter (%) 0.5 0.5 0.4 0.2

3-137

.•

(6)-5 Summary of Plt Excavation Survey, PP-5

PROFILE DESCRIPTION Site No. : PP-5

Survey Date : 25 JAN. '89

A. Information of the Site Soil Mapping Unit : Yc-dl FAO Classification : Calcic Yermosols, deep USDA Classification : Typic Calciorthids Land Suitability Classification : S2k Location : North west side of the Pilot Farm Site Landform : Wadi Elevation : 283.5 m Slope : <1% Micro Relief : Even Land use : Slightly grazing of camel and wildlife Vegetation : Herbs and Grasses <1%, <u>Fagonia SP</u>

<u>Stipagrostis</u> plumosa

B. Information of the Soil

Parent Material : Recent alluvium over subrecent and old alluvium Drainage : Moderate well

Flood Hazard : Slight-may flood during major storm events Surface Feature : Loose sand and gravel 90% (2-3mm in diameter) Evidence of Erosion : None

Wind blown Sand Hazard : None

C. Brief Description of the Profile

Deep profile developed on old alluvium.

Topsoil is loose sand. Subsurface soil is sand and have weak platy structure. Subsoil have subangular blocky structure, and under layers have massive structure. Gracks develope well in the profile. Fine roots are observed up to 90cm in depth, especially along the cracks. Consistency is hard to very hard in dry, but friable to very friable in moist.

There is no gypsum. There is high content of CaCO₃ throughout the profile.

This soil is moderately suitable for irrigated agriculture development.

D. Profile Description (PP-5)

0 - 4

9

30

50

4

9 -

30 -

Horizon Depth (cm)

Aù

B

R

R

В

В

Description

Dull yellow orange (10YR 7/4) dry, dull yellowish brown (10YR 5/4) moist; sand, 20% gravel (1-5mm in diameter); dry loose, moist loose; single grain; crack (30cm in width); few fine roots; few fine pores; strong reaction to HCl; clear smooth to: Dull orange (7.5YR 7/4) dry, orange (7.5YR 6/6) moist; sand, 15% gravel (1-3mm in diameter); dry slightly hard, moist very friable; weak platy; crack (30cm in width); few fine roots; few fine pores; strong reaction to HCl; clear smooth to: Dull orange (7.5YR 7/4) dry, orange (7.5YR 6/6) moist; silty loam; 10% gravel (1-2mm in diameter); dry hard, moist friable; subangular blocky; crack (5-20cm in width); few fine roots; common fine pores; common CaCO3 concretions; violent reaction to HCl; gradual smooth to:

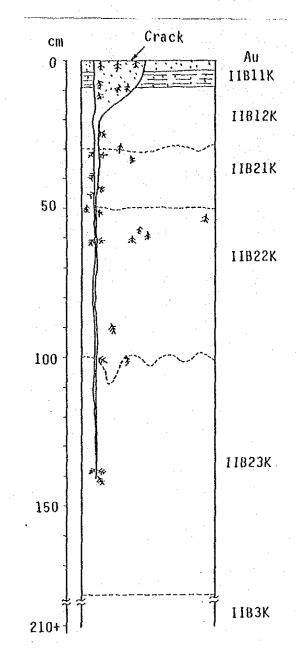
Dull yellow orange (10YR 7/3) dry, bright yellowish brown (10YR 6/6) moist; silty loam, 5% gravel (1-2mm in diameter); dry very hard, moist friable; subangular blocky; crack (5cm in width); few fine roots; common fine pores; many CaCO₃ concretions; violent reaction to HCl; gradual smooth to:

Dull yellow orange (10YR 7/3) dry, bright yellowish brown (10YR 6/6) moist; silty loam, 5% gravel (1-2mm in diameter); dry very hard, moist friable; massive; crack (2-3cm in width); few fine roots; common fine pores; many CaCO₃ concretions; violent reaction to HCl; gradual wavy to: Light gray (7.5YR 8/2) dry, dull orange (7.5YR 7/4) moist; silty loam, 5% gravel (1-2mm in diameter); dry extremely hard, moist friable; massive; crack (1cm in width); few fine roots; common fine pores; many CaCO₃ concretions; violent reaction to HCl; Hand augered from 150cm to 230cm

100 - 180

50 - 100

180 - 210 + Dull orange (7.5YR 7/4) moist; silty loam; subangular limestone gravel (2-3cm in diameter); violent reaction to HCl;



farm)	
(Pilot	
PP-5	

Ľ					c														
S C	Sampl'g	Duilt donaity		Uistribution of three	tion of three phases			So	Soil particle (%)	icle (%)				: ; ; ; ;	ç	2			띮
2		(g/cm)) (g/cm)	لا Solid (%)	d Water) (%)		Air waver (%) (%)		C.Sand 1	F.Sand	Silt	Clay	Ĕ	ainitai		(%)	رلا) (%) mnsdxn	(PPM)	рн (1:2.5)	(1:5) 電S/C階
<u></u> _	10	1.56	59.0	0 1.3	3 39.7		9.4 2	27.2	62.8	8.0	2.0	Sand	nd	25	29	0.2	0.7	7.02	L.635
	40	1.56	58.9	9 2.6	6 38.5	.5 11.4	.4 31	6.	44.1	18.0	6.0	Sandy Loam	Loam	32	22	0.2	0.5	7.08	2.46
	80	1.64	61.9	9 3.3	34.8	.8 21.6		24.7	47.3	20.0	8 0	Sandy Loam	Loam	36	24	0.5	0.4	7.01	3.50
	120	1.65	78.7	7 3.7	7 22.6	6 19.9		28.1	42.9	20.0	6.0	Sandy Loam	Loam	42	20	0.6	0.4	6.92	5.37
	, Dort	Exchange	Exchangeable cations (me/100g)	ions (me	s/100g)	ι U	*	*: 	Solı	uble cat	Soluble cations (me/ \mathfrak{g}	(0/	C to	Solubl	Soluble anions (me/ ℓ)	(me/Q)	ind more than the	100-240	ta!
	2 3	Ca	* SM	Na *	K	utu (#e/100g)		53	Ca	Mg	Na	К	(@/əw	ci	S0.	HCO ₃	Saturation (%)		≈ §§
L	0.52	32.0	54.0	4.6	0.28	19.5		23.6	1.20	0.55	13.1	1.5	21.3	14.3	1.9	0.15	>100		0.035
	67.9	55.0	62.0	4.6	0.26	18.6		24.7	1.80	1.20	20.0	1.6	16.4	22.4	2.0	0.20	>100		0.030
	1.12	61.0	46.0	2.5	0.26	11.3		22.1	1.90	1.30	30.0	1.8	23.8	30.6	4.2	0.20	>100	<u>د</u> ې	0.025
l																			

* Note :

Organic matter (%) 0.20.7 0.6 0.5

Data not used in the analysis of this study. Should be referred with reamalysis at the site.

~

0.010

>100

0.25

6.3

47.1

16.4

1.8

40.0

4.10

7.80

18.3

10.9

0.28

2.0

91.0

40.0

1.72

(6)-6 Summary of Plt Excavation Survey, PP-6

PROFILE DESCRIPTION Survey Date : 24 JAN, '89 Site No. : PP-6 A. Information of the Site FAO Classification : Calcic Yermosols, deep Soil Mapping Unit : Yc-dl USDA Classification : Typic Calciorthids Land Suitability Classification : S2k Location : South west side of the Pilot Farm Site Landform : Wadi Slope : <1% Elevation : 284.0 m Micro Relief : Even Land use : Camel and Wildlife grazing, water-flooding due to pumping test of JICA NO.4 pump Vegetation : Cover 10% Fagonia bruguieri, Euphorbia sp. Herbs 5% Monsonia heliotropioides, Stipagrostis plumosa Grasses 5%

B. Information of the Soil

Parent Material : Recent to old alluvium

Drainage : Moderate Well

Flood Hazard : Slight-may flood during major storm events Surface Feature : Loose sand and gravel 60% (0.1-2.0cm in diameter) Evidence of Erosion : None

Wind blown Sand Hazard : Slight

C. Brief Description of the Profile

Deep profile developed on old alluvium. The profile is still moist due to pumping test. Cracks filling up the sandy loam soil were developed well in the profile. Surface soil is loose and gravely sand. Powdery gypsum, whose size is about 5 by 10cm, occures on the subsurface soil. There are gypsum mesh throughout the subsoil. Also CaCO₃ is rich. Yellowish mottles are observed below 50cm depth. Roots are observed up to 130cm in depth.

D. Profile Description (PP-6)

0 - 2

Horizon Depth (cm)

Àu

IIB11Ky

Description

Dull yellow orange (10YR 7/4) dry, yellowish brown (10YR 5/6) moist; gravelly sand, 60% gravel (1-5mm in diameter); dry loose, moist loose; single grain; cracks (3-10cm in width); common roots; strong reaction to HCl; gypsum; clear smooth to: Light yellow orange (10YR 8/4) dry, dull yellow orange (10YR 6/4) moist; sandy loam, 30% gravel (1-5mm in diameter); dry soft, moist very friable; subangular blocky; cracks; common fine roots; many pores; violent reaction to HCl; gypsum rich; abrupt smooth to:

Dull yellow orange (10YR 7/4) moist; silty loam,

friable; weak subangular blocky; cracks; common
fine roots; many pores; violent reaction to HCl;

Orange (7.5YR 6/6) moist; silty loam, 10% gravel

subangular blocky; cracks; common fine roots; many fine pores; violent reaction to HCl; gypsum rich;

20% gravel (1-5mm in diameter); moist very

(1-5mm in diameter); moist friable; weak

powdery gypsum; abrupt smooth to:

abrupt smooth to:

11B12Ky 8 - 15

2

8

IIB21Ky 15 - 45

IIB22Ky 45 - 80

Dull yellow orange (10YR 7/4) moist; orange (7.5YR 6/8) mottled 20%; silty loam, 5% gravel (1-5mm in diameter); moist friable; weak subangular blocky; crack; common fine roots; common fine pores; violent reaction to HCl; gypsum mesh; abrupt smooth to:

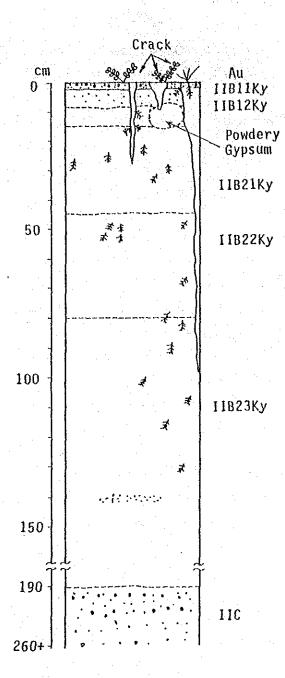
Dull yellow orange (10YR 6/4) moist; orange (7.5YR 6/8) mottled 20%; silty loam, 5% gravel (1-5mm in diameter); moist friable; massive; crack; few fine roots; few fine pores; vioilent reaction to HC1; gypsum mesh; Hand augered from 160cm to 260cm Orange (7.5YR 6/6) moist; gravelly silty loam, 50% gravel (1-10mm in diameter); moist very farm; violent reaction to HC1

IIB23Ky 80 - 190

IIC1 190 - 220

IIC2

220 - 260 + Light yellow orange (7.5YR 8/3) moist; gravelly silty loam 60% gravel (1-10mm in diameter); moist very farm; violent reaction to HCl



B	(1:5) ms/cm	1.062	2.56	1.053	5.57				25	25
	<u>.</u>			7.04			Tota	* 8	0.025	0.025
	La Contractor	20.7	6.81		6.88			Saturation (%)	>100	>100
	(MPR)	0.6	0-5	0.2	0.2	-) Base		~	T <
	mnsd for	0.3	0.7	0.3	0.5		£ (me/Ω	HCO ₃	0.10	0.20
	(%) %	35	28	17	16	•	Soluble anions (me/() Base	≥02	4.3	17.6
0.04 m		32	30	29	36 1		Solubl	cl	6.2	7.8
	ובאנתו	Loam	Loam	Loam	Sandy Loam		dyo	(me/g)	2.4	0.6
Ę	Yal	Sandy Loam	Sandy Loam	Sandy Loam	Sandy		(8)	K	0.85	0.54
	Clay		2.0	2 0	2.0	-	Soluble cations (me/ \mathfrak{g})	Na	4.0	2.0
icle (%)	Silt	16.0	18.0	14.0	30.0		uble cat	Mg	2.20	7.75
Soil particle (%)	F.Sand	52.4	61.8	52.3	44.6		Sol	Са	3.55	15.30
Й	C. Sand	31.3	18.2	31.7	23.4			~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	21.9	30.5
		11.3	30.4	10.7	12.7		* 202	(me/100g)	14.6	14.1
	Air (%)	40.6	14.1	26.1	30.2			(me/		
ion of three phases	Water (%)	3.8	12.2	11.9	9.3		(me/100	×	0.16	0.12
Distribution of three		55.8	73.7	62.0	60.5		tions	Na *	3.2	4.3
	လိ	55	73	62	60		able ca	¥8¥ *	61.0	64.0
11. 40005	(g/cm))	1.47	1.34	1.64	1.61		Exchangeable cations (me/100g)	Ca	50.0	72.0
THE OWNER WHEN THE OWNER	(cm)	ີ ອ	35	70	120		TOC	2 3 3	0.34	0.82

بر	
0 t	
-	
(Pi	
V	
\$	
Ĭ.	
^	

* Note :

Organic matter (%)

0.5

0.4

0.2

0.5

Data not used in the analysis of this study. Should be referred with reanalysis at the site.

0.020

> 100

0.10

5.0

5.4

L.0

0.85

2.0

2.70

4 95

25.3

17.4

0.24

4.4

60.0

46.0

0.34

0.010

>100

0.15

6.4

49.1

27.4

1.60

48.0

2 1

4.00

19.9

14.6

0.30

2.9

58.0

40.0

1.78

(7) Summary of Auger Boring Survey

Legend of Auger Boring

1. Area

D :	DAUKA	WM :	WADI MOKHAWRIM
ED :	EAST DAUKA	Q :	QUITBEET
SD-1 :	SOUTH DAUKA-1	н :	HANFEET
SD-2 :	SOUTH DAUKA-2	NH :	NORTH HANFEET
S :	SHASR	HA :	HAILAT AL-RAKAH
SS :	SOUTH SHASR		

2. Drainage Classification (FAO 1977)

21020000	•••••••••••••••••••••••••••••••••••••••
0 :	Very poorly drained
1:	Poorly drained
2 :	Imperfectly drained
3 :	Moderately well drained
4 :	Well drained
5 :	Somewhat excessively drained
6 :	Excessively drained

3. Soil

Soil Classification (TABLE 3.5.1)

4. Suit

Land Suitability Classification (TABLE 3.5.4)

- 5. Land Use
 - N : None

CG : Camel grazing

CV : Cultivation

6. Vegetation

tree : > 6 m in height Shrubs : 1 - 4 m

herbs : 0.3 - 1

grasses : > 0.3

7. Consistency

dl : dry and	loose	ml	:	moist	and	loose
ds: dry and	soft	mvf	:	moist	and	very triable
dsh : dry and	slightly hard	m£	:	moist	and	triable
dh : dry and	hard	mfi	:	moist	and	firm
dvh : dry and	very hard	mvfi	:	moist	and	very firm
deh : dry and	extremely hard	mefi	:	moist	and	extremely firm
and the second	and the second					

8. Reaction to Hcl

е	slight :	slight free carbonate
es:	strong	
ev :	violent :	high free carbonate

- 9. Others
 - : None
 - /: No data
 - > : greater than
 - < : less than

(7)-1 Results of Auger Boring in the Study Area

uger	Area	So11	Sult	Elevation	Landfora	Parent	Dralnago	Surfaco Stonlacss		Yerol	ALION	. Landuse	troston	bepth	Colur	lexture	Grav	vel	Consistence	Reaction to	Gypsun	ાય	КC	Resa
No.				(a)		Hatoriai		S120 (en)	Cover (%)	Compo	Covor (X)			(ca)			SIZO (C#)	Content (X)		IIC1		(1:2.5)	(1:5) #S/Ca	
1	SU,	Ye-s	N ₂	275	Flat plain of	Recent doposition	3	1~3	CO	horbs	<1	CC	vind	0~ 10	1048 5/6	l.S			d1	es		7,9	0,157	1
1		11 H.			old alluvium	on veathered.				grassos	<1			10~ 20	1018 0/6	SI.	1.1		dsh	EV .			1	
]. []		Flat	lisestono								[1] Z Z Z Z J	1. 19 A. 19 A.			a digan	dh	ev		8.1	0.113	
2	SU2	Vo-to-	Na	275	Flat state of	Recent deposition	3	0.5-9	10	herbs				20~ 30	10YR 6/0	<u>S1.</u>	Įi					8,1	1.130	
4	002	Yc-s	N 2	210	이 아이는 소설을 통하려면 하는 것이 같이 많이			0.5~2	10		<1	CC	vind	0~ 0	10YH 5/0	- 1.5		(-1)	d1	ev		8.0	0.124	
1.1					old alluviu≊	on vealhered				grasses	<1		1.0.0	G~ 12	IDYR 6/6	SI.			dsh	ey				
<u></u>	<u></u>				Undulating	llacstone	a sanat ya s					-		12- 30	TOLK C/C	SL		. /	dh				0.110	-
3	SD2	Ye+s	Nz	275	Flat plain of	Recent deposition	3	0 5~1	10	herbs	< 1	CC	vlaat	0~ 8	10YR 5/6	1.\$			dl	es	-	8.1	0.119	
		1			old alluvium	on veathered				grasses	<		1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1	8~ 20	10YR 0/0	1.\$	1.1	1	dsh	ev	7.5	8.0	0.125	
مشتحت					Flat	ilacstone				,								· · ·			·····	[
4	SD2	Yo-di	S2	200	Yadi	Recent alluvium	4	0.3~1	.00	herbs	<1.	CG	Vind	0~ 10	10YR 5/6	1.5	-	-	d di	es		8.4	0.110	
1.5					undulating					grasses	<1			10~ 20	10YR 0/6	SI.	-	<u></u>	dsh	ev	·— ·			I'-3
										and a second s				20~100	TOLK ULC	S1.		· . – · .	dh	CV		8.0	6 123	-
5	ED	Ye-s	Nz	260	Plat plain of	Recent deposition	3	0.5~5	70	herbs	20	CG .	Vlnd	0~ 6	10YR 574	1.\$. ~	e l	05	. –	8.2	.0.116	
					old alloylum	on veathered				grasses	<1			6~ 15	LOYK C/C	1.S		-	dsh	ev		8.1	0.148	
2					undulating	lisestone		and a star									-		l l			'		
6	ED	Yc-s	H2	260	flat plain of	Recent deposition	- 3	0.5~1	70	grasses	10	CC	vind	0~ 7	1018 5/6	1.5			d I	ev	-	7.9	0.130	
• •	1				old alluvium	on veathered								1~ 11	IOYR G/G	1.5			dsh	ev		8.0	0.235	1
				latti se	Flat	lialstone																<u> </u> − −, '		
7	SD	L-vs	N2	260	Flat plain of	Recent deposition	3	0.5~2	70	grasses	10	UG		0~ C	10YR 576	1.\$	·		d1	CV	-	7.8	0.205	1
•		5 13	1 . ¹⁰ 2.		old alluvius	on veathered					'										1.0			
. ¹		•	1 2			linestone				1 · · ·			1. 正书					ľ					1	1
					Flat	-								n- 10	10YR 5/6	The second se			dl	cs		7.9	0.115	-
. 8	SD,	Tc-s	K2	260	Flat plain of	Recent deposition	3	0.5	80	grasses		CC	Vind .	0~ 10	11 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1	ES			dh	ev	·	1.5	0.151	
1 A A					old alluvius	on veathered						1		10- 40	IONE CAR				1 . ""]			
		3.1		1 A.	Undulating	linestone					<u> </u>							· · · · ·				7.4	0.845	
9	SD1 -	Yy-s	N ₂	260	Flat plain of	llmcstone	3	0.5	80	erasses .	5	CC	vind	0~ 3	1058 5/6			-	el L-1		abundant		0.602	
•					old alluvium				1 - E - E -	·				3~ 20	5YR 5/8	st.	-	-	uch	CV .	ล่อนกรุสมไ	1.0	0.002	}
$(x_{i}) \in \mathbb{R}^{d}$		$(1,1) \in \mathbb{N}$			Undulating					<u> :</u>		-	1				-	1					0_154	
10	SD	L-vs	N ₂	250	Eroded gravel	lisestone	2	1~3	.90	grasses	<1	N	wind	0~ 4	10YR 6/6	LS · ·	-	- .	dl	cs	≁ .	8.4		1
					hlft				1.1	$(1,1)^{(1)}(1,1)$				4~	(5YK 6/8	Rock	-	· - ·	dch	ev .	– .			
	1 . 1				Undufating		i										, <u> </u>	· · ·	ļ			8.3	0.229	
11	SU	¥5-5	N2	250	Flat plain of	Recent deposition	3	0.5	70	grasses		CC	Vind	0-5	1018 5/6	LS .			dl	es	-	A. A.	1.150	ļ
 			1.1		old alluvius	on veathered								5~ 30	TOXE C/C	LS	-	- '	dvh	ev	CO∎∎ON	7.6	1.130	
-					Plat	Hestone							· · · · · · · · · · · · · · · · · · ·										0.100	
12	SD1	Jc-s	Nz	250	Alluvial plain	Recent alluvium	5	1	80	herbs	15	CC .	vater	0~ 10	10YR 6/4	flue LS	0.2 -0.1	R 50	dl	ev		8.0	0.100	
n a l'inge					between hill					grasses				10~ 20	TOYR 0/4	fine LS	0.2 ~0.5	R CO	dsh.		-		0.140	
			[]		Undulating) <u> </u>		1	20~ 30	IOYR C/4	fine LS	0.2 ~0.	8 70	dh	ev		8.4		
13	NII	Yc-s	N ₂	295	Flat plain of	Recent deposition	3	0.5	70	shrubs	1	CC	vind	0~ 10	IDYR 5/6	1.5		-	dl	es		8.8	0.113	
10					old alluvium	on veathered				grasses	5		ter a	10~ 20	7 5YR 5/0	LS	-	-	dh		-			
5 I.			·		Flat	liscstone								20~ 30	7.5YX 5/0	1.5	-		dvh	<u>еү</u>		8.7	0.120	
	0	¥6-0	Nz	270	Flat plain of	-	3	0.5	80	grasses		N	vind	0~ 10	10YR 5/6	1.S	- 1	-	dl	CS CS	-	8.7	0.132	
14	SD,	Yc-s	n 2		old alluvium	on veathered								10~ 20	7 5YR 5/0	I.S	-	-	dh	CA .	-	8.8	0.122	
11 L.			[,]	24		lizestone				1						a a tratage					:		-	_
	<u> </u>				Flat	-[3	0.5	60	grasses		N	vind	0~ 10	10YR 5/6	I.S		-	dl	. es	→ 1.	8.0	0.131	1.
15	SD2	Ye-s	Nz	270	Flat pials of	Recent deposition	s i	u a		1				10~ 20	1 1 2 1 2 2		(. ·		dh	1	-	1		
					old alluvius	on veathered			1 - B - B	-		Sec. 2.	1.13	20~ 40	10YR 7/0		0.2~1	60	dli	ev	-	8.6	0.099	
					flat	Illnestone		<u> </u>	-	1		ĽG	vind	0~ 10	10YR 5/0			-	di	ev	-	δ.8	0.103	
16	SD2	Yc-s	N ₂	270	Fial plain of	Recent deposition	8	0.5~1	70	shrubs				10~ 20	1018 6/0		- :	-	dh	1.	-	1	1	1
					old alluvium	on veathered	lange of the			grasses	30			20~ 40	1018 6/0		0.5~1	. 40	1	ev	- ·	8.8	0.117	
					Flat	Haistone							-		-1				-)	ev	· · · · · ·	8.1	0.132	Soft
17	SD2 :	ïc-s	Nz	270	Flat plain of	Recent deposition	3	L .	80	grasses.		N	ting.	0~ 10	1018 5/0	M Para Carlo Ca			dh	ev		8.8	0.115	line
					old alluvium	on veathered								10~ 20	TOXE C/C	SJ,		1 .	1					
					Flat	limestone										-				ev	1 1	1	1	
18	SD,	L-vs	N ₂	275	Eroded	llacstone	2	3~5	90		-	N N	vind	0~ 5	IOYR G/C	1,5	1. 5	· · ·		\$	abundant	1	1	
					gravel hill									5~						· · · ·		- 19 - A.		
4 					llyily						e da a			1	4 <u>06 () / (</u>				-	CY .		1.1	0.270	
10 10	<u> </u>	Ye-s	. Nz	200	Flat plain of	Recent deposition	3	0.5	RD	herbs	10	CC	vind	0~ 10		1	. –	_	dh	1	1 <u>-</u> · · ·	1	1	
19	D	10-5	52		old alluvius					grasses			in the second	10~ 20	1	\$ · · · · · · · · · · · · · · · · · · ·				CY	_	7.3	0.880	
1					l'lat	lisestone								20~ 35	7.5YR 6/	1.5			dh	-	-{	7.0	0.167	
_ 3-							- 3	0.5	80	herbs	<1	CC	vind	0~ 12	10Y8 6/	SI.		1 . .	dt	es				1
20	SD1	Ye-s	N2	240	Flat plain of	이 이 것은 것이 같아요. 이 것이 안 하는 것이 같아요.	3	0.0		grasses	2					The second	· ·		 •				1.	
					old alluvium	on veathered												L	<u> </u>	<u> </u>				
	1 5 5	1 - E	31 - L - L	 attention (\$ 	Flat	limestone			1											3-14	0	1		

			موشنجیتین اسم		r					سیکیفیفلیج، بیم														
				Elevation		Parent		Surface	denual	Yerol	allen						Gra	el		These at Luxy 64		DI I	ιτ	
No.	Area	Soll	SULL	(a)	Landform	llaterial	Drainago	Stanlacss	Cover		Covor	Landuso	Eroston	Depth (cm)	Calor	Texture	Size	Content	Consistence	Reaction to NCI	Gypsua	(1:2.5)	(1:5)	Renarks
		i. Ar sa	1.44					Sl 70 (cm)	(\$)	Совро	(X)						(cn)	(1)					as/en	
21	- 11	¥r-8	N2	320	Gravel plain	Gypsic	2	0.5~1	8()	-		N	vini	0~3	1018 570	gravelly 1.	÷ *		di	CY		1.1	1.401	inter El constante de la constante de
				X 		Alluvivn								3~ 20	5YR 5/8		- s <u>-</u> ss 1 s	-	den .		ahundani	7.0	5.42	
22	SU2	Ye~ad2	<u> </u>	270	l'iat plain of	Recent deposition		1	80	grasses	1	N	vind	20~ 25	5YR 8/3 TUYR 5/6	Rravelly 1.			deh d1	CV CV	-	8.1	0.152	
¢ 6	302	10 = 42			old attuvius	on veathered				humach.			• 1 HIG	10~ 20	IUYR C/C		_	-	dsh	1	·	1	1	1917 - 19
÷ .		÷.,			l'Ial	limestone								20~ 50	7.5YK 5/0	2 (1			dyh	04		8.1	0.140	
23	SD2	Jc-s	H2	275	Vnd1	Recent alluvium	5	0.3~0.5	90	herbs	1	CG	valer	0~ 10	10YR.6/0	\$	0.2 ~0.5	GØ	dl	ev	~	7.7 8.1	0.124	
			- St	270	l'Iat Vadi	Recont altuvium		0.5	80	krassés horbs	3	CC	valor	10~ 20	7.5YR 6/A TOYR 5/G	<u> </u>	$0.2 \sim 0.5$ $0.1 \sim 2$	70 GO	dyh dl	еч су		7.9	0.134	กตลส
24	SD≱.	Jc~d∎	21	210	Fint	Necolit Informa		0,0	eur.	grasses	10		I AIGI	10~ 30	TUYN G/G	201 N. ⁸ 1914 S. 1917	u,2	70	ds	1		1	. /	I'-?
														30~ 50	10YR 578	s	0.2	60	dsh	еч	~	8.1	0.129	
······································				<u></u>										50~ 80	10YR 5/8	8	0.3	30	dli	<u>е</u> ү		8.3	0.151	
25	SD2	Ye-s	Nz	275	Flat plain of	Recent deposition	3	0.5~1	90	shrubs	≤ 1	N	Vind	0~ 10	1058 574	LS		. –	61 - 86	ey ey		7.4	0,146 0,129	
					old alluvium Plat	on venthered		n a a shii		herbs grasses	< I < 1		t de	10~ 30	10YR 576	1.8		·						
26	SD2	Je-s	Nz	275	Vad1	Recent alluvius	5	le le	90	grasses	5	CC	vater	0~ 20	10YR 576	8	./	1	ال	ev	-	/	1	
				in Anna Iomraichte	Fiat												·			· ·		. · ·		
		<u> </u>										,	-					·		02		7.8	0.146	
21	SD2	Ye-s	Nz	275	Flat plain of	Recent deposition on veathered	3	1	00	herlis grasses	<1	CC	vind	0~ 10 10~ 20	10YR 5/4 10YR 5/6	I.S SI.	-	-	d) dyh	ev		8.0	0.150	
					old alluvium Flat	Ilsestone				1149962				10 - 20	1.110 010	•••	1.1.1.1.1.1							
28	SD2	Yc-s	 N 2	275	Flat plain of	Recent deposition	• 3	l.	80	grasses	3	CC	v Find	0~ 10	10YR 5/6	si.	-	-	i dl	es	-	8. I	0.154	CaCO ₈
					gold alluvium	on venthered								10-20	10YR 6/6	SL.		-	dvh			8.0	0,160	eementation
					Flat	linestone		<u></u>				<u> </u>		20~ 40	10YR 5/0	Si. gravel by	0.2~0.5		dyh dl	<u>ev</u>	-	<u>6.u</u>	U .1100]
29	SD2	l,-vs:	Nz	275	fireded	Ilnestone	2	5	80			N	vind	0~ 5	TOLK 370	1.5	0.2~0.	οu				-		
· • •					Rravel hill													:						<u> </u>
30	SD2	Je-s	N ₂	275	vadt	Recent alluvium	5	0.5~1	80	herbs	5	ĽG	vind	0~ 5	TOLK C/4	LS L		-	dl	cv		7.6	0.189	
					Undulating					grasses	5			5~30	TOLE CAR	gravel ()	0.3	50	dt	ev	belov30cr aburdant	7.3	1.307	
		la se se se tra La seconda							<u> </u>			ļ		0~ 5	10YR 5/6	LS LS		i		es	-	7.3	0,155	
31:	SD3	Yc-ndi	S2	275	Fiat plain of old alluvium	Recent deposition on venthered	3	0.5	80	and the second		8	vind -	5~ 10	7.558 5/6	LS	-	-	ilyh		-	12	2	
	·				Flat	linestone								10~ 50	1.5YR 5/6	si.	· [· · · · ·	-	dvh	ev		8.1	0.145	
32	SD2	Yc-d1	S2	270	yadi	Recent alluvius	3	0.5~1	80	grasses	< 1 · · ·	- - N	vind	0~ 10	10YR 5/G	fine S	0.3	30	dl	ev ev		1.4	0.190	
					undulating		1 - A. BA							10~ 30 30~ 50	IOVE 6/6	LS LS			dh	ev	5%	15	2.16	
														50~120	1018 6/6	SI.	-		dvh	ev	_	1.7	2.30	· · · · · · · · · · · · · · · · · · ·
33	SD2	YC-di		270	vadl	Recent alluvius	4	0.5	80	grasses		N	vind	0~ 20	10YR 576	gravelly S	0.3	70	dl	05	-	8.1	0.180	
33	502	10-01	92	210	Flat				1. 1. 1. 1. 1. 1. 1. 1.					20~ CU	101R 7/6	\$			dh	CV	. - .	8.5	0.212	Suffline 30 Softline 30
										• [60~100	10YR 7/6	SL SL			db	<u>ev</u>		8.3	/ /	
34	SD2	Yy-5	H ₂	275	Eroded gravel	limestone	2	2~5	80	shrubs herbs	<1	N	¥1nd	0~ 10 10~ 25	10YR 5/6 1.5YR 6/6	5L 		_	dyh	ev	60%	1	/	
· · · · ·					hill undulating	Ranna		0.5~1	80	herbs		- N	valer		101R 6/4	SI.		-	d1	Cł.	-	1	1]
35	SD2	Jc-s	N ₂	275	Yadi on bed rock	Recent								10~ 30	1.518 G/G	gravel	0.3	. 70	dlı	CY	.	/	/	
36	SD2	ïc-s	Nz	275	Fiat plain of	Recent deposition	3	0.5	60	R FASSES	<1	N	vind	0~ 15	10YR 5/6	1.S		-	તા નેલ્પ્રે	ev er			1	
					old altuvium	on veathered					- -			.15~		linestone			BUR	1.1				
					Flat.	liscstone				herbs	3	CC	vind	0~ 5	IDYR 5/G	1.5				CY		1	1	
37	SD2	¥y-s	Hi2	275	Fiat plain of	11scstone	2	~2	90	fier us	3			5~ 15	1	L.			deh	ev	ลบบกปลกเ	. /	1 /	
. :					old alluvium Flat																	8.2	0.153	
38	SD2	Ye-di	S,	260	Yadi	Recent Alluvius	3	0.5~1	90	herbs	1	33	¥ind	0~ 10		fine S			dh dh	es		1	/	P-3
					Fiat				1	grasses				10~ 20 20~ 50	10Y8 4/0 10Y8 5/0	fine S SL	-	-	dh	ev	-	8.4	0.161	1
ł		ан. 1911 - 1914												50~100	10YR 5/0				dh	eγ		8 2	0.330	
	<u> </u>				Rine		2		80	herbs		CC	wind	0~ C	7.5YR 5/0	si.		-	di	CV 		1. J. 1. 1.		
39	SD2	L-VS	N ₂	275	Flat plain of old alluvium	linestone				grasses	tan ang sa							11	dvh -	ev			ĺ .	· · ·
н 2	[Flat								_		Lave etc	1.5		- <u></u>		ev	-		1	Near
40	SD2	Ye-s	N ₂	270	Plat plain of	lisestone	3	0.3~0.5	70	shrubs	<	CC	ં કોળતે	0~ 5 5~ 20	1 1 1 1 L		_	-	ցի	ev		1	1	P-1
•					old alluvius				1	RTASSES	<							L		<u> </u>		<u> </u>	<u> </u>	1
-		1 - S. S. S.	1. 3		undulating	1	4.0	T												3-14	പ്	•		. · ·

<u> </u>								Surfaco	1	Yerol	Allon						Gra	vel		T.					
No.	Агса	Soll	Sull	Elevation (m)	Landform	Parööt Hatoriai	Drainago	Stoulness Sizo (ca)	Cover (\$)	Совро	Covor (X)	Landuse	Eroston	Depth (cm)	Color	Texture	Size	Content	Consisience	Reaction to IIC1	Gy psu n	[1] (1:2.5)	EC (1:5) #S/U#	Reparks	
41	SD2	ïc-dı	Sz.	270	¥adi	Recent Alluviue	3	0.5~1	70	grasses	5	CC	VInd	0~ 10	10YR 5/6	S	(cm) 0.2 ~0.5	(X) 40	dl	OV		8.1	-	Near	
					Plat									10~ 25	IOYR G/G	Si.	-	-	dh	ĊŸ	, . ,		1	P-1	
														25~ 05 05~100	10YR 0/6	SI. SI.	_	<u> </u>	dvh deh	ev ev	-	8.1 ./ .	0.662		· .
42	SU2	Ye-ad	S,	270	Yadl	Recent Alluvium	3	0.2~1	70	shrubs	<1	ÇG	vind	0~ 10	1011 5/0	fine S	-		d1	es		8.2	0.190	· .	
					Flat					grasses	5			18- 20	10YR 6/6 10YR 6/6	I.S SL			dh dh	ev		. /	1		
														80~ 70	10YR 7/4	SI.	_		deh	CY	-	8.8		Softline	
43	SĐ,	Yo-dı	Sz	270	.Yadl	Recent Alluvium	3	0.5~2	70	grasses	2	CC	vind	0~ 10 10~ 20	10YR 5/6	1,5	-		d t dh	CS CV	-	8.6	0.175	Softline 20%	
					Flat									20~ 55	10YR 6/6 7.5YR 6/6	SL SL	-		deli	CV		8.7	1	Softline 30%	
<u> </u>														55-100	7.5TR 6/6	SI.			ોલો	CV		8.2	0.541	Sofiline 30%	
44	SD2	Yc-nd;	S3	200	¥ad) Ftat	Recent Alluviu		0.5-2	03	herbs grasses	5	CC	v Ind	U~ 10 10~ 20	1048 5/6 1048 6/6	S LS	0.5~ 1	40	d է մի	62 67	- ". -	8.6	0.179		·
														20~ 80	1078 610	LS	<u> </u>	20	deh	ev		8.6	0.150	linestone	
45	SD,	JC-s	Nz.	200	Yadi	Recent Alluvium	€.	0.3~5	80	herbs grasses	3 5	CC	Silghi	0~ 5 5~ 20	10YR 5/6 7.5YR 7/4	1.S 1.S	-		dt dh	es es	-	•.] 			
4 G	SD,	Je-d2	S2	270	Flat Vadl	Recent Alluvium	4	0.3~1	80	shrubs	् २	CG	valor Slight	0~ 10	10YR 5/6	gravelly S	0.3~0.5	5 CO	di	es	-	8.4	0.184	Near	
					Flat					grasses.	3		vater	10~ 20	/.5YR 5/6	S		-	đh	ev	-	/	/	P-5	
														20~ 50	10YR 6/6 10YR 6/6	SL. SI.	i, ≞i Sie	· · · · ·	dvh deh	ev cv	-	8.5 8.0	0.132		
41	SD2	Ye-ad	S1	270	Yadl	Recent Alluvius	3	0.5~1	80	grasses	5	CG	wfad	0~ 10	10YR 5/6	1.5			dl	CS		8.5	0.180		
					Fiai									10~ 20	10Y8 6/6	S1.			dh deh	ev ev	-	8.4	0.209		
48	SD,	1vs		275	Eroded grvel	llsestone	2	j~5 _	80	-		N	vind	20~ 70	10YR 6/6 10YR 5/6	St.	-	8	dl	es	-	· · ·			
40	1 201	14.9			lerrace									8~					deh	es	abundant	1			
					Undulating				80	harbe	2	CG	hniv	0~ 10	10YR 5/6					es	-				
49	ED	Yy-s	N2	260	Flat plain of old alluvium	lizestone	2	0.3~1	60	herbs grasses	10			10~ 30	IOTR 6/6	SL.	-	-	ds	es	abundant	1.1	2.96		
			1000		Undulating			[dl			8.3	0.178		
50	SD ₁	Yc-s	° M ₂ .	250	Flat plain of old alluvium	Recent deposition	3	0.5-1	60	grasses	30	CC	balv	1 10.111 (10.11)	10YR 5/6 7.5YR 5/G	LS SL	-	-	dli	es ev		/	/		
•					Undulating	liscslone								25~ 40	1.518 G/G	si.			dh	<u>сү</u>	-	8.0	0.133		
51 .	SDI	Ye-s	Nz	250	Fiat plain of	Recent deposition	3	0.3~1	70	grasses	30	ĽG	VInd	0~ 10 10~ 30	10YR 5/6 10YR 6/6		0.1 ~0. -	2 30	dh dh	es ev	-		1		:
· · · ·					old alluvius Undulating	on veathered linestone											· · · · · · ·							·	
52	SD1	Yy-s	S,	250	Flat plain of	linestone	3	0.3~1	70	grasses	20	CC	vind	0~ 20	10YR 5/6 2.5YR 4/6	LS SL			d) deh	es cv	- aburdant	7.6	5.29		
					old alluvium Undulating									20~ 50	2,018 470										
53	SD,	ivs	N ₂	240	Eroded gravel	llacstone	3	0.5~10	95	grasses	5	CC	vind	0~ 5	10YR 6/6		-	~	d l dh	ev ev	-			limestone	
•					lerrace									5~	7 5YR 8/1				U11						
54	D	Yc-nd;	S1	200	Undulating Fan	Alluvius on	3	<u></u>	-			CY		0~ 20		gravelly 1.5	0.2	50	61	ev		1.1	0.225	fars GlV.35cm	
					Undulating	veathered								20~ 50	10YR 8/3	gravelly SL	0.2	50	ds	CY		1-1	0,310	······································	
46	SD.	L-vs	Na	240	Flat plain on	linestone lisestone	3	0.3~1	60	grasses	1	Ň	vind	0~ 5	10YR 5/6	st.		-	<u>d1</u>	ev	-	1	1	lingthe	
55	ועט	1, 15	HZ I	464	veathered									5~	5YR 7/4			-	ժի	ev	COREON			limestone	
					liscstone Undulating																			 	
56	SD2	Ye-#d	53	270	Flat plain of	Recent deposition	3	0.3~1	30	grasses	5~10	ĽG	vind	0~ 10	10YR 5/6		-		dil 	CY	-		1		
					old alluvium	on vealhered								10~ 25 25~ 30	10YK C/C			-	તો! ગુલ્ફો	ev ev	-		1	softline	
					Flat	lincslone								23~ 30 30~ 50	10YR 7/4	E 11 1	-		deh	<u>сү</u>		/	0.195	softline	
57	SD2	Yc-s	H2	275	Fint plain of	Recont deposition	3	0.3~1	70	herbs	5	ÇG	wind	0~ 10	10YR 5/6		. j⊷ (- ²	d I d h	CS CV	-	8.5	0.185		
					old altuvium	on veathered				grasses	5			10~ 20 20~ 10	10YR 5/6 10YR 6/6			-	dek	ev	_	8.5	0.137		· · ·
					Flat	llaestone												<u> </u>	d1						
58	SD2	ic-s	K2	260	Flat plain of	Recent depositioin	3	0.3~1	70	herbs	6	CC	vind	1	TOYR 5/6 Toyr 6/6			-	dh dh	CS ev		1	1		-
	1				old alluvium	on veathered	l e e			grasses	5	t di seco		10-20	1018 0/0			1		The second	A the second	1 ·	1 - <u>-</u>		

lunon				Playattas				Surfaco	la envel	Ycrot	alion			4			Grn	vul					1.0		
No.	Area	Soll	Sult	Elovation (m)	Landform	Parent Haloriai	praluago	Stonlnoss/ Stzo (ca)	Cover (X)	Compo	Cover (X)	Landuse	Eroston	Dopth (cm)	Culor	Texture		Content (%)	Consistence	Reaction to	Gypsun	191 (1:2.5)	EC (1:5) #\$/em	Remarks	
59	S₽₂	Ye-dı	S?	200	Yadi	Recont alluvium	4	0.5~1	00	herbs	5	ÇG	vind	0~ 10	10YR 576	flue 8	(ca)	- (A) -	and a second	QY	-	8.3	0.169	····	
					Plat					RTASSOS	20			10~ 90	1018 6/6	1,5			delı	eγ		8.5	0.146	ter george en se	
<u>CO</u>	SD1	Ye-s	Nz	251	Flat plain of	Recent depositoin	3	0.3~2	70	grasses	10	CG	v knd (90~ 0~ 5	10YR 6/6 10YR 5/6	1.S 		1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 -	deh dl	0V 05				<u> </u>	
					old alluvium	on veathered								5~ 15	1.5YK 5/8	SL.	$ = \frac{1}{2}$	-	dh	ev	-	2 Z - 2	1		
GI	SD1	Ye-s	Nz	250	Fial plain of	Recent deposition	3	13	70	RTASSOS			wind	0~ 10	10YR 5/6	L.S			dl	 C5				······	
					old alluvium	on veathered									7.5YR 5/8	L.S	· · · · · · · ·	-	dih	ev	-		1	•	
62	SUL	ïc-s	N2	250	Undulating Fiat plain of	limestone Recent deposition	3	0,5~5	60	Rrasses	10	CC	vlud	0~ 5	10YR 4/G	LS				es		· · / ·	<u> </u>		
					old alluvium	on veathered								5~ 20		51.	-		dh	ev	-	1.	11		
63	SD2	Je-id	e.	270	l'Ial Vadi	Heestone Recent alluvium	4	0.2~0.8	80	REASSOS	20	CC	v End	0~ 5	10YR 5/4	gravelly LS	0.2	50	dl	es		8.0	0.150	Kear	
03	302	30-10		£10	Flat	Recent arrovius		0.1 - 0.4		1,183253	τ ν	cu		5~ 20	IOYR 5/0	Sl.	- U.2	-	dh	ev		1	1	P-1	
											 		 	20~ 50	7.5YR 5/6	SL.					ລ່ວນເປັນ	8.7 8.4	0.154	· · · · · · · · · · · · · · · · · · ·	
64	SD1	Je-∎d;	51	240	Vadi Flat	Recent alluvium	4	0.5	80	herbs grasses	10	CC	Stight vater	0~ 5 5~ 30	10YR 5/G Lovr g/g	gravelly S gravelly LS	0.2 D.2	60 60	dl dh	es cv		12	/	a de la composition de la comp	
														30~ 50	7.5YR 6/6	gravel by LS	0.2	50	deh	ev		8.1	0.289		
65	SD1	lc-s	Rz	240	Fiat plain of old alluvium	Recent deposition on veathered	3	0.5~3	70	REASSON	5	CC	Wind	0~ 5 5~ 25	10YR 5/6 10YR 6/6	LS gravelly LS	- 0.2	60	d) dli	es ev	-		1		
					Flat	liscstone																		4	- - -
66	Ð	Je-ad	S1	200	Plat pialo	Recent alluvius	5 ,	0.2~1	90	herbs	5	CC	-	0~ 5 5~ 50	10YR 5/6	S gravelly LS	0.2~0.3	- 70	di dh	CS CS	-	8.3 1.9	0.268		
	e Na tra			in Serge Les	l'Ial					grasses														·	
67	D	Jc-ed;	S3	200	Flat plain	Recent alluvium	5	2~3	70	herbs	10	CC	vind	0~ 5 5~ 25	10YR 5/6	gravelly S gravelly LS	0.3 0.5	60 60	d1 dh	es		1	1		
					Flat									25~	TOTE 6/6	gravelly LS	2	90	તી	еч	- 2	/	1		
G8	S	Rc-d	S,	287	Alluvial Fan	Recent deposition	5			-	-	CY	-	0 ~ 140	10YR 5/G	fine S	-		T d1	es		7.0 8.2	5cm 1.224		
		e De la g			Undulating										- 10 - 10										
69	S	Yy-s	Hz	289		Recent deposition	3	0.2~0.5	70	Shrubs	1	CC	vlnd	4. South to 12	10YR 5/6	1 A start of the start of the	0.2	30	d I dh	OS DV	- lietov 12cr	1			
А					old allovium Undulating	on veathered lisestone	an an tr							3~ 12	1410.074	- 34,					abundant				-
70	S	Jc-s	N ₂	290	Yadi	Recent alluvium	5	0.5~2	80	herbs	20	CC	valer	0~ 5	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	gravelly S	0.5	80 90	d I d I	es es	· ·	1			
					Flat									5~ 45	TUIK 0/0	gravelly S	0.0								
<u>.</u> 11	IIA	Yc-sd	S2	270	¥adl	Recent	1	-		, ¹ –		CY			A state of the	gravelly S	0.2 ~0.1		d i dh	es ey		8.0 7.8	0.419	Roase Grass	
					Undulating	alluvium								25~ 50	109K 57G	gravelty LS	0.2			-					-
72	ED	Yy-s	Nż	235	Fiat plain of	listone	4	0.1~1	70	herbs	1	ĸ	vind			gravelly S	0.5~1	30	d l dh	es ov	COBRON				
					old alluvius					REASSES					10YR 6/6 10YR 7/6				dvh	ev	CORRON	1	./		_
73	а а. ¥И	Yy-s	N ₂	240	Fiat Fiat plain of	linestone	3	0.3~1	70	herbs	1	ĸ	vlnd	0~ 5	IOYR 5/G	SL	-	-	dl	ev ey	– abundant	7.6 7:6	6.53 8.88		
n de la constante Se se					old alluvium									5~ 10	2.5YR 4/G	SH.			dh.		AUGINARY				
74	YD	Jc-s	N2	240	Undutating Vadi	Recent alluvium	5	0.5~1	70	herbs	10	CC	valer	1 1 2 2 2	1078 5/6	1	1 - 141 <u>-</u> - Ali		di di	es ev					
					Plat					grasses	5.			5~ 40	10YR 5/6	gravel by LS	0.3~0.	5 70	dsh	CT.			_		
75	0	Yc-s	H ₂	300	l'lat plain of	Haestone		0.2~3	70	grasses	<1	CC	vind	0~ 5	10YR 5/6	SI.			dl	es	coomon	1		veathered	
					old alluvium									5~ 75	107K 8/C	Ci.		-	dh	CV	000=011		_	linestone	_
	1	·····		200	Fiat Alfuviat	Recent		0.2	80	shrubs	20	CG	Silght	0~ 5	10YR 5/6	I.S	0.2	5	di	68 011		8.3	0.164		
76	1	Jc-d1	Sı	320	Locslope	ailuvium				grasses	1		vind	5~ 30	可した だいい		0.2	10	ds dh	CY CY	-	8.G	0.131		_
				A	Univiating			1~3	70	herbs	2	CC	vator vlnd	30~100 0~ 5				-	dI	es	-				
11	SD2	Ye-s	Hz	215	Eroded gravel Lerrace Fist	limestone	3	1~3		Rrasses	<1				7.5YR C/G				dh	ov					_
	1 VE							<u></u>		herbs	<u> </u>	CC	Stigth	0~ 5	10YR 5/4	1.5	-	-	dl	CY		1			
78	SD2	Jc-s	H2	275	Vadi Plat	Recent alluvium	4	0.5~1	70	RTAASCS			valer				-		dh	CV	- 17 - 18				

		1	· · · · · · · · · · · · · · · · · · ·		y to y t			Surfaco					<u></u>		ж I	f			1					
uger No.	Area	Soll	Sult	Elovation (m)	t.andform	Parent Hatorlal	Dralnago	Stoniness. Sizo	/gravel Cover	Verot	Cover	Landuse	Eroston	Depth (ca)	Color	Texture	Grav Slzo	ol Content	Consistence	Reaction to IICI	Gypsum	141 (1:2.5)	FC (1:5)	Remarks
				."/				(ca)	(X)	Conpo	(X)						(en)	(%)					ss/es	
79	D	Je-dı	St	200	Vadl sido	Recont alluvium	5	0.5~2	80	herbs	10	CC	stight	0~ 5	10YR 5/6	S	0.3	70	dÌ	¢5	- -	8.2	V.185	
					Flat			e qui tra ideas 1 Anni 1		grasses			vator	5~ 20 20~100	10YK 6/6 10Yk 6/6	6 - 5 - 5 - 5 - 5 - 5 - 5 - 5 - 5 - 5 -	0.3	00 00	ıls Us	ęs ev		8.5	0,315	
80	D	Yc-s	N ₂	200	fiat plala Fiat	Recent deposition on veathered limestone		0.5	80	horbs grasses	20 1	CG	viui	0~ 5 5~ 20	10YR 576 10YR 676	LS IS	0.3	30	d1 111	6A 62				
81	ווא	FC-S	N2	295	Fial plain of old alluylum Fial	1 Jacstone	3	0.2~1	80	shrubs grassos	<1 <1	N	C. VInd	0~ 2 2~ 4 4~10	10YR 5/4 10YR 5/6 7.5YR 5/6	Fravelly S 1.8 1.8	0.1 ~0.2	30	di dh dh	0V 0V 0V	-			
82	SD2	Ye-di	S2	270	¥adi	Recent alluvium	3	0.3~0.5	70	grassos	5	CC	Silght	0~ 3	10YR 574	S	0.2 ~0.3	30	dı	οv			1	
					Flat								valor	3~ 8	IOYR G/G Ioyr g/g	st. si.		- · · ·	ds dh	CY CY	-		1	
83	Q	Jc-s		300	Yadl	Recent alluvium	5		-		-	CY	Silght	8~100 0~ 10	10YR 6/4	31. S			dl al	cv		8.1	0.170	Fars
					Fiat								Vator	10~ 30	1.5YR 7/6	gravelly S	2~10	30 70	dî ∎i	ev		8.3	0.252	
84	SD2	Ye-s	Sz.	269	¥ad I	Altuvium		0.2~0.5	90	grasses	5	CC	Slight	30~ 0~ 2	7.5YR 6/8 10YR 5/4	gravelly S	$\frac{3-5}{0.2-0.5}$	70 40	dl ml	CY CS		<u> </u>	1	Near the
					Flat								Valor	2~ 20	TOYR 574	rravelly S	0.2 ~0.5	ÇO	dh svi	ey	-	8.0	0.133	pllot far∎
6 														20~ 90 90~	1 SYR 5/6 7 SYR 5/6	SII. S11,		يني. 1 راي - راي	dh∎f dh∎f	CY CY		.8.4	0.509	
85	SD2	¥c~s	N2	270	Yeak gravel	Yeathered warts	2	10 ~ 20	30	grasses	3	CG	Vind	0~ 2	1.5YR 5/6	gravelly S	0.2 ~0.5	80	dyk	ev		1	1 * *	Near the
· · ·					hill. Undulaling									2~ 40 40~(150)	7 5YR 5/6 7 5YR 7/4	SU. SU.			dvh dvh	CY CY		δ.4 8.0	0.242	pilot fars
86	SD2	Yc-dı	S2	269	Alluvial	Alluviom	4	0.3~0.5	70.	grasses	<1	- N	Yind	0~ 15	10YR 5/4	<u> </u>			d] #1	GÅ	10 <u>1</u> 1	8.7	0.120	Near the pilot far∎
	\$2 \$2				toeslope									15~ CO CO~(1CO	10YR 5/0 10YR 6/4	SI. SI.		_	dh evi dh ef	ev ev	-	9.1	0,276	pitot fai
87	SD2	Yc-dı	S ₂	267	Undulating Yadi	Allovium	3	0.2~1.0	90	grasses	<1	00	Vind	0~ 2	1018-5/4	gravelly S	=		dl al	es	-	- /		Near the
• •					Flat									2~ 10 10~ 60	1.5YR C/G	SI. gravel by SH.	- 0 2 ~1 8	40	dli af	CY CV	fev	8.2	0.953	pilot farm
* • •							-							60~	1018 7/4	gravélly SII.	0.2~1.0	50	dh ∎f	CV .	совкал	8.2	1.882	
88	IIA	Yy-s	Nz	270	Yadi bank	Veathered marts	4			Shruhs	<1	2 2 -	wind	0~ 10 10~ 50	10YR 5/6 10YR 6/6	SL. S1.			ds ∎vf dh ∎f	CY CY	abundant abundant	8.1 8.1	3.93D 3.760	lland dug vell
					Undulating			a ang Sila. Ng Sila ang Sila						50~		llecstone	10 - 2 1			СY	abundanı	*. <u>/</u>	./	
89	IIA	Yy-d	Sı	270	Yadl bank	Alluvium	3	· · · · · ·		-	-	CY	-	0~ 20 20~ 35	10YR 7/4 10YR 5/3	SL SI.	-	-	avî avî	CS CS	11. 1			Fara (Rhodes
	N.				Vadviating									35~110	1018 0/3	511,	-	-	18	C¥	COMMON	· .		grass)
														110~		linestone	0.2+0.5	30	s svfl s	CV CV			· · ·	Farm
90	S.	Yc-d	S ₂	290	Flat plain Flat	Alluvium	3	0.2~ 0.5	70	-	-	CY	vind	0~ 2 2~ 20	10YR 5/4	gravelly S SI.	0.2~0.5	10	∎ví	CY	[¢¥	1		(Dates)
														20~ 50	10YR 5/G			-	∎vf =f	C¥ C¥	fev fev			
												CY		50~150+ 0~ 3	10YR 5/8 10YR 6/4	l. S	<u></u>		al .	CY	-			Farm
91	S	Kc-d	Sı	287	Alluviai Fan Undulating	Recent deposition	5	-						3~ 80	7.5YR 5/6	Si.	1.0~2.0	5	nvf	C¥	fex			
										-		CY		80~130 0~ 30	7.5YR 5/6	si. S	3.0~5.0	- 10	aví ai	CS CV	Fev 		· · · · ·	Farm
92	S	Rc≁∎d	Sı	290	Alluviai Pan Undulating	Alluviux	5		-	-		U		0 30 30~ 80	IOVE C/C	gravelly SIL	0.5~5.0		aγ[C¥	· · ·			
<u>.</u>			- 14. -											80~150+	1018 G/G	gravelly SH.	5.0 0.2~0.3	60 70	uvf dl Ri	ev es		· · ·		Near the
93	SDz	Yc-dı	\$2	267	Yadi Flat	Alluvius	3	0.2~0.5	70	grasses	2	CC	bntv	0~ 10 10~ 50	TOYR 5/4 Toyr 6/6	graverry S SL	0.2~0.3	• .	dh evf	ev	а. — 1. —		·	pilot fars
					rial									·]	1.5YR 6/6	SII.	$0.2 \sim 0.3$	15	dvh nf ds svf	ev ev		·		
94	SD,	Ye-di	S ₂	265	Yadi	Altuvius	3	0.5~1.0	80	grasses	3	CG	vind	0~ 5 5~ 60	10YR 5/4	gravelly S Sl.	0.2~0.3	30	dh si	ev	. –		1. A A	
				n e e e. Ni e e	Flat									60~150+	1.5YR 6/6	SH.			dvit ef	er cs				
95	SD2	Ye-d1	Sz	270	Yadi	Altuvium	4	0.2~0.5	70	herbs	1	CC	vind	0~ 20 20~ 70	10YR 5/4 7.5YR 5/6	gravelly S SL	0.2~0.5	80 -	di si dh svf	CS QY				
					Flat					grasses	5			70~150+		1.			dyh #f	CY				
96	SD2	Yc-udz	S,	270	Yadi	Altuvium	4	0.2~0.5	70	grasses	5	CC	vind	0~ 12	10YR 5/4	gravetty S SL	0.2~0.5	30	ds ævf dh mvf	es cv	· · · ·			
i Line and a					Flat									12~ 50 50~	1.5YR 5/6	1 Inestone		tin			· - ·	1. ···		
añ. Heir	12.11			$ F = \{1, \dots, n\}$					1		1 .	10.00	1	 1.1.1. 	1.0	Let the second	1	1			4 .	1	1	L

Auger	Агоа	Soll	Sult	Elevation	Landform	Parent	brainago	Surface StonIness	/gravol	Yerol	ation	Landuse	Eroslon	Depth	M Color	n - 1	Grn	vel	Constatence	Reaction to	Gypsu∎	191	EC	Resarks
No.				(2)		Naterial	Pruringe	Size (cm)	Cover (X)	Совро	Covar (X)			(cm)	COTOT	Texture	Size (ca)	Content (X)	Constance	lici		(1:2.5)	(1:5) mS/cm	
97	SD2	Yc-s	N2	270	Flat plain Flat	Alluviun	3	1.0	70	horbs grasses	<1 <1	CG	vind	0~ 10 10~ 40	10YR 5/4 1.5YR 5/6	gravelly SIL SI.	0.1~2.0	30 10	ds avf dh wvf	CS CV				
98	SD2	Ye-md ₂	S1	270	Nad I	Attuviua	3	0.2~1.0	90	grassos -	<1	CC	Vind	40 0 20	10YR 5/4	liscstone S	0.2~0.5	10 1	dlal	- CS				·
					Flat									20~ 60 60~	10YR 5/6	SI. Ilaestone	-	-	dh avî	C¥	-			Aluna
99	SD2	Ye-di	S2	260	Yadl Flat	Alloviu	3	0.2~1.0	80	trees shrubs	<1 <1	CG	vind	0~ 13 13~ CO	TOYR 5/4	gravelly S SL	0.2~0.	30	dî mi dh avî	es ev	-			Near P-3
										herbs grasses	< 1 5			60~150+	1.5YR 5/G	Si.	-	-	dh mf	OV				· · · ·
100	11 X	Yc-dı	S2	270	Vadl bank Flat	Alluvium	3	_	-			CV	<u>-</u>	0~ 40 40~150	1.5YK 6/6 2.5YK 7/2	gravelly SL SL	2.0 1.0~3.	30 0 10	IVE Rf	CY CY	-			
101	SD₂	¥c-=d ₂	S1	205	Vad t	Alluylum	3	0.2~0.5	90	REASSOS	<1	CC	vind	0~ 6	10YR 5/4	Ŝ	-		di∎i	05				
					Undulating									6~ CO 60~	10YR 5/6	SI, ligestone			dh #f	е у				· .
102	SD2	Yc-d1	S2	266	Yadi Fiat	Altovium		0.2~1.0	70	grasses	20	CC	-	0~ 10 10~ 40	10YR 5/4 10YR 6/6	S Si.	0.2~0.	3 20	я) яу[es ev	-			Near the pliot farm
														40~150+	1.5YR 8/2	SIL.		-	a f	ev			· · · · ·	
															•									
												an antar										-		
												L		<u> </u>								<u> </u>		<u> </u>

^{3X} Color of No.83 ~ 102 are in moist.

Results of Auger Boring in the Pilot Farm Site

Iger	Soli	Suit	Eleva	Landform	Parent	Drain	Surface al	Resul			to the second								heneve	рН Ш	C (1:5) R	temarke
lo,			tion (m)		Malerlal	-age		Coverage Co	ompo- C ition a	over-	Qe <u>pih</u> (om)	ргу ргу	Moist	lexiure	Grave) Size(mm)(Concisienc	to HC1	Сурвим	(1:2.5)	mS/cm	Cinal No
	Ye-dl	\$2	282.6	Vad I	Alluvium	3	0.5-0.8	70 gr	rasees	<u>(</u> 1	15-55	10YB8/4. 10YB8/2	10YR7/3	S SI,	3	60	d).ml dh.ml	es ev		8.5	0.108	
2	Yc-d1	52	282.5	Yad l	Alluvium	3	0.3-0.5	80 81	rasses	<u>(</u>]	0-15	10YR7/4	10YR7/2 10YR6/4	CL S	3	50	<u>dvh.mí</u> dl.ml	ev C5		8.6	0.087	
3	Ye-vs	N2	282.5	Toeslope of	Limestone	2	0,2-0.3	70 81	rasses	<u> </u>	70-120+	10YH7/6	10YR6/6 10YR6/6 10YR6/6		3-5 3-5 2-3	<u>60</u> 20 30	<u>dh,mf</u> dvh,mf dl,ml	ev ev es		8.7	0.085	
	Yć-vs			eroded gravel hill Toeslope of	Limestone	2	0.2-3.0		rasses		15-	10YR8/3	10YR6/6	SL	20-30	- 60	deh dh.mf	ev	-	/ 8.5		imesto
5	Yc-va	N2	282.5	<u>eroded gravel hill</u> Toeslope of	Limestone	2	0.5-5.0	70 gi	rasses	-	30-		10YR6/6	SL	2-3	- 60	deh dh.mf	ev 66		8.5	0.08	imesto
6	L-V6	N2	283.0	<u>croded grave</u> hi) Toeslope of	Limestone	2	1.0-5.0	60 nc		(1	20- Q-8	10YR7/3	10YR6/6	SL.	- 30	- 60	deh di.ml	ev ev		8,2	0.123	imesto
7	L-VS	N2	283.5	<u>eroded gravel hll</u> Toeslope of eroded gravel hill	limestone	2	0.3-0.8	80 st	raases hrubs raases		8-		10YR6/4	<u>sl</u>	2-3	- 40	dl.ml dh.mf	ev es ev		8.4	0.071	imesto
8	Yc-di	S2	283.5		Alluvlum	3	0,3-0.6		rasses	<u></u>	10-		7.5YR5/0	1 1 1 H 1 1 1	- 6		dliml			8.5	0.074	imesto
9	Ye-d)		284.0		Alluvium	3	0.2-0.3		rasses		20-130+	7,5YR8/	47.5YR6/0		2-3	10 60	dh.mf dl.ml	ev es		8.7 8.5	0.09	
			de la constance processione					ana ang ang ang ang ang ang ang ang ang	e e l				47.5YR5/0 47.5YR6/0		<u>2-5</u> 2-10	15 10	ds,mvf dh,mf	eb év		////		
10	Yc-d1	52	283.5	Wadi	Alluvium	3	0.3-5.0	80 gt	rasses	<u>(1)</u>	0-20	10YR7/3	37.5YR6/0 10YR5/3	S	2-6	60	dvh,mf d),ml	ev es		8.6	0.136	
11	Yc-d1	62	282.5	u a l	Alluvium	3	0.2-0.3		rasses	(1	50-120+	7.5YR8/	57.5YR5/6	S11	1-2	- - 60	<u>dh, mf</u> <u>dvh, mf</u> dl, ml	ev ev es		8.4	0.267	
	10-01	.52	202.0	*801			0.2-0.5	00 B1	abses		4-30	10YR8/4	10YR5/4 10YR6/6 10YR7/4	<u>S</u> SIL	1-8	60	db,mf dvh,mf	<u>ev</u>		8.5	0.131	
12	Yc-d1	52	282.5	Wadi	Alluvium	3	0.2-0.3	80 gr	rasses	<1	0-20	10YR7/3	10YR5/4	S SL	1-2	- 50	dl,ml dh,mf	es ev		8.6	0.077	-
13	Nc-dl	52	282.5	Wadi	Alluvium	3	0.2-0.3	80 81	rasses	<u> </u>	0-20	10YR7/3	10YR6/4 10YR6/4	L S	1-2	- 40	dvh;mf dl;ml	е ү е в		8.6	0.318	
											35-55	7.5YR8/	47.5YR6/0 37.5YR7/0	5 L	<u>1-3</u> <u>1-3</u>	40 20	dh,mf dh,mf	ev ev		8.6	0.08	
14	Yc-d1	52	282.5	Wadi	Alluvium	3	0.1-0.5	80 gi	rasses	(1	0-10	7.5YR8/	37.5YR7/0 47.5YR5/	(S	1-3	- 	dh,mf dh,mf dvh,mf	ev es ev		8.5	0.085	
15	Yc-d1	52	282.5	Radi	Alluvium	3	0.2-0.3	80 61	TASSES	<u>रा</u>	35-70+	7.5YR8/	67.5YR6/1 310YR7/4 7.5YR5/4	L L	1-2	30	dvh,mf dh,mf	ev es		8.3	0.308	rust
											5-30	7.5YR8/	47.5YR6/	5 1		-	dvh,mf dvh,mf	ev ev		8.1 8.2	0.545	
16	Yc-dl	52	282.5	Wadi	Alluvium	3	0.1-0.5	80 gi	rasses	(1	10-35	7.5YR7/	617.6YR6/(417.5YR5/(5 SL	1-3	30	dh.mf dvh.mf	es ev		8.5	0.122 0.323	rust
17	Yc-d1	52	283.5	Wad i	Alluvium	3	0.1-0.5	80 gi	rasses	<u>(1</u>	0-15	10YR7/4	47.5YR6/(10YR5/4	\$	1-5	- 60	dvb,mf dl,ml	ev es ev		8.5	0.112	
1.0			200 5			3	0.1.0.5	60 7	rasses	- <u></u>	40-120+	7.5YR8/	67.5YR6/(47.5YR7/(10YR6/4	5 <u> </u>	1-5	- 60	dh.mi dvh.mf dl.m)	ev	-	8.4	0.461	
19	Ye-d1	52	283.5	W801	Alluvium		0.1-0.5	UV 8.	1 86665		20-50	10YR8/4	10YR6/6 37.5YR6/0	5 L			dh,mf dvh,mf	ev ev		8.6 8.4	0.087	
19	Yć-đi	52	283.5	Wadi	Alluvium	3	0.1-0.5	60 gi	rasses	0	0~5 5-100+	10YR7/4 7.5YR7/	10YR6/4	5 <u>SI</u>	1-5	<u>60</u>	dl.mldh,mf	es ev		8.3	0.182	
20	Yc-d1	52	284.0	Wadi	Alluvium	3	0.1-0.5	70 gi	rasses	<u> </u>	0-15	10YR7/3	47.5YR5/1 10YR6/4	S	1-2	60	<u>dvh.mf</u>	<u>ev</u> <u>es</u>		8.1 8.1 8	1.085 0.481 1.089	
	Yc-d1	1.000	282.5		Alluvium	3	0.2-0.3	70 81	rasses	(1	0-8	10YR7/3	10YR7/4	SL.	- 2-3 1-3	30	dvh,mf dl,ml dh,mf	ev es ev		8.5	0.87	
										<1	20-100+	10Y88/4	7.5YR6/0 10YR7/4 10YR6/4	Sil	2-3	- 40	<u>dvh,mf</u> dl,ml	ev es		8.2 8.5	0.716	<u> </u>
22	Yc-di	S2	282.5	Wadi	Alluvlum	3	0.2-0,3	70 gi	rasses		8-20	7.5YR8/	47.5YR5/0	SL .	1-3	- 30	dh,mf dvh,mf	ev ev		8.5	0.171	
23	Yc-d1	52	282.5	Wadl	Alluvlum	3	0.1-1.0	70 gi	гаввев	4	12-26	10YR8/4	10YR5/4 7.5YR6/0	5 SL	<u>1-10</u> <u>1-3</u>	<u>60</u> 30	dl.ml dh.mf	es	-	8.2	0.109	
24	Yc-d1	52	283.0	¥adi	Alluvium	3	0.1-0.5	80 gi	rasses	(1)	0-7	10YR7/3	47.5YR5/0 10YR6/4	SL	2-3	- 30	dvh,mí dl,ml dh,mí	ev es ev		8.1 / 8.3	0.303	
	[25-45	7.5YR8/	47.5YR6/(37.5YR6/(37.5YR6/(5 SL		5	dvh,mf	ev ev		8.3	<u>/</u> 0.12	
25	Ye-d1	S2	283.0	Wadi	Alluvium	3	0.2-0.3	80 gi	rasses	0	<u>0-3</u>	<u>10YR7/3</u>	1 OYR6/4	<u> </u>	1-3	40 60	d1.m) dh.mf	es ev	-	8.3	0,101	<u></u>
<u>.</u>	 		202 2		A 1 1		0.1-0.3	80 -	TABBEB	(1	<u>30-100+</u> 0-8	7.5YR8/ 10YR7/3	47.5YR6/1 10YR6/4	6 <u>S1L</u> S	1-3	- 30	dvh.mf dl.ml	ev es		8.3	0.23	<u></u>
	Ye-dl		283.0		Alluvium Alluvium	3	0.1-0.3		rasses	<1	8-130+	<u>10YR8/3</u> 7.5YR8/	<u>1 0YR6/6</u> 41 0YR6/4	L 	<u>1-20</u> 2-3	5 30	dvh.mf dl.ml	еv еб		8.6	0.841 0.091	
61	Yc-dl	Ð6	283.5	m çatlığı Alanı							60-120+	7 6YR8/	1 0YR7/4 37.5YR6/0		1-3	- 50	<u>dvh.mf</u> <u>dvh.mf</u> dl.ml	ev ev cs		<u>8.1</u> 7.8	1.08	<u></u>
28	Yc-d1	S 2	283.5	Wad i	Alluvium	3	0.1-0.3	[_	rasses		8-100+	7 SYR8/	1 OYR6/4 2) OYR7/3 1 OYR5/4	SIL	1-3	- 60	dvh.mf dl.ml	ev es	iew	7.7	2.08 0.132	
	Yc-d1	age to the	284.0		Aliuvium	3	0,1-0,3	<u>[</u>	rasses		10-100+	10YR8/2	10YR7/3	SIL	1-5	- 50	dvh,mf dl,ml	ev es		<u>8.1</u> 7.7	1.792 0.115	
30	Ye-d1	S2	284.0	Wadi	Alluvium	3	0.1-1.0	80 gr	rasse8	(1	<u>4-60</u> 60-100+	7.5YR8/ 7.5YR8/	47.5YR6/1 37.5YR7/	S SL	1-3	- 10	dh.mf dvh.mf	ev ev		8.3	0,105	
31	Yc-d1	S 2	282.0	Wadi	Alluvium	3	0.1-0.5	80 gi	rassea	<1	0-12	1 OYR7/3 1 OYR8/4	1 OYR6/4 1 OYR6/6	SIL	1-3	60	<u>dl.ml</u> <u>dh.mí</u>	es ev		8.3	0,102 0,675 a	int's
	Yc-d1		282.0		Aliuvium	3	0.1-0.6		rasses	<1		7.5YR8/ 10YR7/3	47.5YR6/0		1-3	- 60	<u>dyh,mf</u> <u>dl,m</u>] dh.mf	ev es		8.2	0.136	

Auger No.	Sōl	۲s	uit		Landform	Parent			tone/grave			Depth	Co		Texture	Gravel		Concisience		Gypsum	PH
	1.1.1			-lion (m)		Naterial	-age	Size (cm)	Coverage (X)		axe(X)	(cm)	Dry	Molst		Size(mm)	Conl.(%)		LO HCI		(1:2.5)
33	Yc-	d I	S2	282.0	Wadl	Alluvium	3	0.1-0.5	80	grasses	(A)			10YR6/4	S	1-3	30	dl.ml 🧠	es		
unati.	1945 - A	<u>.</u>	문문								$\mathbb{P}_{n}[x_{i}] \to \mathbb{P}_{n}$			10YR6/6	SIL	1-3	40	dh.mi dvh.m(ev		8
34	Yc~	d 1	S2 -	283.0	Wadl	Alfuvlum	3	0.1-0.5	80	grasses	(1			10YR5/4	S	1-3	30	dl.ml	es		8.3
														510YR7/6	i de la Calendaria	1-3	40	dhimf	ev	-	1
	Yc-		69	283.0	ALC I		3	0.1-0.5	90	grasses	10			47.5YR6/ 10YR5/4		· • • • •		dvh.mr	ev	-	8.4
		٠ų	36	203.0		Alluvlum		0.1-0.3		K1 09066	10			HOYR7/4	SL SIL		20	dl,ml dh,mf	es ev	fev	8.2
36	Yc-	d 1	S2	284.0	Wadi	Alluvium	3	0.1-0.5	80	grassee	(1			10YR5/6	Ś	1-3	10		es	-	8
	15		<u>. 1977</u>			n ka dan kada S					1			10YR7/3	SIL	1 <u>1</u> 963 (197	1999 - 1997	dh.mf	ev		7.7
37	L-v	8	N2	284.0	loeslope of	Alluvium	S 1	10	30	grasses	s (1			10YR7/4	S	1-3	30	ds mi	es -	-	7.9
20	Yc-	3 10	6.0	284.0	eroded gravel hil		- موجية الخ	0.1-0.5	70	Krasses	20		white					dvh.mi	¢V	labundan	
30	10-	۱۵	32	284.0	.W80[////////////////////////////////////	Alluvium	3	0.1-0.3		glasses	20			10YR5/4	SIL	1-3	20	dl.ml dh.mf	68 6 V	fev	8.2
39	Yc-	di	S2	284.0	Wadi	Alluvium	3	0.1-0.5	70	grasses	(1			10YR5/6	SL	1-5	20	dl ml	ės		17
1.1	6 A .	d gr												IOYR5/6	SL	- 1		dh mf	év	-	8.2
	<u>.</u>													10YR7/4	SIL		-	dvh.mt	ev	-	8.1
40	۲c-	a II	52	284.0	Wadi	Alluvium	3	0.2-1.0	SV.	grasses				10YR5/4	S	1-5	20_		es	-	8.3
	З.,	21												10YR6/6		1-2	- 20	dh,mf dvh,mf	ev ev		8.1
41	Yc-	d 1	S2	282.0	Wadi	Alluvium	3	0.1-0.5	80	grasses	4			10YR6/4	S State	1-5	10	dian	es		8.2
							in an					7-30	10YR8/3	10YR6/6	80° 1 , 67			dh.mf	es	-	1.
	<u></u>			100			-			1 1.94 12				10YR7/4	SiL			dvh.mf	ev		7.8
42	jYc-i	d 1	S2	282.0	Wadi	Alluvium	3	0.1-0.5	80	grasses	s <1			10YR5/4	<u>SL</u>	1-2		dl.ml	es		8.4
														1018676	L S1L		<u>- X = 5-3-3</u> 11. - 5 -1	dvh.mf	CS ev		8.2
43	Yc-	ail	S2	282.0	Wadi	Alluvium	3	0.2-0.3	80	grasses	s (1			10YR5/4	SL	2-3	60	d1,m1	es	-	1 1
	÷.,						100							ILOYR6/6	L I	2-3	20	ds,mvi	es	-	8.5
<u></u>	11		<u> (175</u>						1					10YR6/6	SIL	-	<u></u>	lm, dvb	ev	-	8.3
44	Yc-	ai	S2	282.0	Wadi	Alluvium	3	0.1-0.5	/0	grasses	5 (1			10YR5/6	S	2-3	30	<u> d m </u>	es -		8.5
														47.5YR6/		1-2	10	ds,mvi dvh,mi	ev		8.1
45	Yc-	ai	\$2	283.0	Mad i	Alluvium	2	0.1-0.5	70	grasses	(1			10YR5/4	SL	1-3	20	dl,ml	es		8.6
				[]]]					일이 가지 않는					10186/6	SL	1-3	- 60	dh, mf	es	- 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1	1
en en												30-100+	10YR8/3	10YR676	SIL		<u> </u>	dvh,mí	ev	· · · •	8.6
46	Yc	d1	S2	283.0	Wadi	Alluvium	3	0.1-0.5	80	grasses	41			10YR5/6	S	2-3	10 60	dl ml	es	-	8.5
									and the part of the	- <u>1</u> 1				10YR5/6	S SIL	2-3	- 00	ds, mví dvh, mí	es ev	fev	8.3
17	Yc-		\$2	284.0	Wadi	Alluvium	2	0.1-0.5	80	grasses	1			10YR5/4	S	1-3	40	dimi	es	<u> </u>	8.6
	ľ.	" 19		ĺ	Maur		. 1877		a da ana ang	F				47.5YR5/		1	30	dh.mf	ev		1
			1.14	$(1, 1, 2) \in \mathbb{Z}$										10YR6/4		-	-	dvh mí	ev		8.5
48	Yc-	d 1	S2	283.5	Wadi	Alluvium	3	0.2-0.3	80	grasses	a (1			10YR5/4	<u> </u>	1-5	40	di mi	es		8.1
							e lestere							10YR6/4	SIL			dh.mf dvh.mf	es	few	8
40	Yc-		52	283.5	Madi	Alluvium	3	0.1-1.0	80	grasses	3 5			10YR5/6		1-5	20	dl, ml	es		1
. 41 2	10-											2-40	7.5YR8/	17.5YR6/	SIL .	-	-	dvh mi	ev	-	8.3
1944				<u> </u>							_			7.5YR6/				dvh_mf	ev	common	8
50	Yc-	dl	S2	284.0	Wadi	Alluvium	3	0.1-0.5	80	grasses	\$ 10			410YR5/6		3-10	30	d 1 m 1	<u>es</u>	- fev	8.5
	1.1								1	.] [*]	1	40-150+		17.5YR7/		~ '	<u>-</u>	mvf mvf	ev	common	8.2

EC (1:5) Remarks mS/cm / 0.247 1.056 0.116 / 0.359 2 0.366 2.14 0.455 / Gypsum 0.199	
mS/cm / 0.247 1.056 0.116 / 0.512 0.359 2 0.646 2.14 0.455 / Gypsum	
0.247 1.056 0.116 2 0.359 2 0.646 2.14 0.455 2 0.656	
0.247 1.056 0.116 7 0.512 0.359 2 0.646 2.14 0.455 7 Gypsum	
0.247 1.056 0.116 7 0.512 0.359 2 0.646 2.14 0.455 7 Gypsum	
1.056 0.116 / 0.512 0.059 2 0.646 2.14 0.455 / Gypsum	
0.116 / 0.612 0.1359 2 0.646 2.14 0.455 / Gypsum	
0.512 0.369 2 0.646 2.14 0.455 / Gypsum	
0:369 2 0:646 2:14 0:455 7 Gypsum	-
2 0.646 2.14 0.455 / Gypsum_	_
0.646 2.14 0.455 / Gypsum_	-
0.455 / Gypsum	
0.455 / Gypsum	-
/ Gypsum	-
	-
	-
0.358	÷
/	~
0.141	d
0.141	1
n dag 👔 🔤 👘 test data 👘	
0.114	
0.947	1
0.213	_
/	
2.55	4
	-
0.123 0.548	4
<u> </u>	-
0.169	┥
0.776	1
7	1
0.21	
1.54	
0.136	
0.268	-1
0.143	-
1.032	-
0.122	1
7	1
0.272	1
0.619	
/	
2.2	1
/	-
0.255	
0.255	
0.255 1.835 0.373	
0.255	

APPENDIX A		
Agricultur		
		Page
TABLE A-3.3.1	Agricultural Situation of Hilat Al-Rakah	3 -156
TABLE A-3.3.2	Agricultural Situation of Dauka-1	3 -157
TABLE A-3.3.3	Agricultural Situation of Dauka-2	3 -158
TABLE A-3.3.4	Agricultural Situation of Shasr-1	3 -159
TABLE A-3.3.5	Agricultural Situation of Shasr-2	3 -160
TABLE A-3.3.6	PAMAP's Total Purchase Average Price and Volume in Salalah	
	and Banana Factory for the Year 1987	3 -161
FIG. A-3.3.1	P.D.O Farm Profile	3 -162
TABLE A-3.3.7	Summary of P.D.O Farm Facility	3 ~163
TABLE A-3.3.8	Constraints and Countermesures for Crop Cultivation	3 -165
TABLE A-3.3.9	List of Crop Cultivation in P.D.O Parm	3 -165
TABLE A-3.3.10	Results of Crop Trial in P.D.O Farm	3 -166

1411.14

.

TABLE A-3.3.1 Agricultural Situation of Hilat Al-Rakah

ltem	Datails sum up ning farms	ltem	Datails sum up nine farm
1. Owner Owner's Address	 9 persons 4 persons are living in Salalah. 5 persons are living 	7. Farm Area ltems :	225.00 fd Area Numbers 15.0 fd : 6 farms
	in Thumrait. No one is living in his farm.		30.0 fd : 0 farms 30.0 fd : 2 farms 75.0 fd : 1 farms
Farm Establishment	1984 - 1988	8. Cultivation (1) Cultivated Area	56.78 fd
2. Laborers Foreigners	17 persons (9 farms)	/ Farm Area %	25.2 %
Wage: RO / month	60 - 70 RO	(2) Forage crops fd (2)/(1) %	27.20 fd 47.9 %
3. vel1	All are using the shallow wells.	lthodes grass Alfalfa	26.50 fd 0.70 fd
Number of Wells	10 wells (using in 9 farms)	(3) Vegetable fd	13.58 fd
Depth of Well Depth of Water	Aver. 62.6 feet <i>n</i> 17.1 <i>n</i>	(3)/(1) %	23.9 %
Irrigation system	Almost using local	Tomato Egg-plant	4.43 fd 0.40 fd
	furrow irri. system. Some farms use	Onion Sweet potato	1.15 fd 1.85 fd
	sprinkler and drip irri. systems.	Potato Turnip	1.30 fd 0.76 fd
4. Machinery	No Mach.: 2 farms	Cucumber Carrot	0 0.10 fd
Itens:	Cooperative : 6 farms	Water melon Sweet melon	2.63 fd 0.10 fd
	Independent : 1 farm	others	0.10 Id 0.86 fd
5. Appli. of Ferti.		(4) Fruit plants fd (4)/(1) %	16.00 fd 28.2 \$
Compost Che. Ferti. NPK	100 \$ 67 \$	Date palm	13.85 fd
" Urea	78 %	others	2.15 fd
8. Livestock	Farms with Livestock :	(5) Preparing for next crops fd	b 0 fd
	5 farms	(5)/(1) \$	0 \$

Summation of Nine Farms * surveyed in Feb. 1989

Note : JICA Team survey in Feb. 1989 *: Some parts of 42 farms in Hailat Al-Rakah

	Summation of	Four Local Farms	
Item	Local Farms (sum up 4 farms)	ltem	Local Farms (sum up 4 farms)
1. Owner Name Owner's Address	All the land-owners are not living in	8. Cultivation (1) Cultivated Area / Farm Area %	9.82 fd 9.8 \$
Farn Establishment	farms. 1984-1987 esta.	(2) Forage crops fd (2)/(1) \$	3.98 fd 40.5 \$
2. Farm Area (Total of 4 farms)	Total : 100.0 fd Aver. : 25.0 fd	Rhodes grass Alfalfa	3.95 fd 0.03 fd
3. Laborer : Foreigner Wage : RO / month	1-2 persons / farm 60-70 RO / month	(3) Yegetable fd (3)/(1) %	3.72 fd 37.9 g
1. Well Irrigation system	All using abandoned flowing well. Using local furrow irrigation system. But some new systems are also introduced.	Tomato Egg-plant Union Sweet potato Cucumber others	1.05 fd 0.23 fd 0.37 fd 1.39 fd 0.38 fd 0.30 fd
5. Machinery Tractor Attachment	00	(4) Fruit plants fd (4)/(1) \$ Date palm	1.20 fd 12.2 \$ 0.95 fd
3. Live-stock	Farm with Livestock :	others	0.25 \$
7. Appli. of Ferti.		(5) Preparing for next crops fd (5)/(1) \$	0.94 fd 9.4 \$
Compost Che. Ferti. NPK " Urea	For all farms Compost : yes Che.NPK : no Urea : yes	(6) Developing new field fd / Farm Area \$	3.00 fd 3.0 \$

TABLE A-3.3.2 Agricultural Situation of Dauka-1

Note: JICA Team survey in Feb. 1989

Item	Details	ltem	Details
L. Owner's Name Owner's Address Farm Establishment	Thumrait 1988	8. Cultivation (1) Cultivated Area / Farm Area %	32.10 fd 75.0 \$
2. Farm Area	42.8 fd	(2) Forage crops fd (2)/(1) %	32.05 fd 99.8 \$
J. Laborer Foreigners Wage : RO / month	4 4 60 RO	Nhodes grass Alfalfa	32.05 fd 0
1. Well	Using Abandoned flowing well	3) Vegetable fd (3)/(1) \$	0.05 fd 0.2 \$
Irrigation system	Center Pivot sys. 240m rad. with 5 spans	Tomato Egg-plant Onion Sweet potato Cucumber	0.03 fd 0 0.01 fd 0.01 fd 0
Working time	morning - 3 hrs evening - 2 hrs	others	0
5. Machinery Tractors Attachments	Tractors 2 Attachments 11	(4) Fruit plant fd (4)/(1) \$	b1 0 \$ 0
). Live-stocks Camels	65	Date palm others	0
Goat Cattle	0 0	(5) Preparing for next crops fd (5)/(1) \$	0 fd 0 %
7. Appli. of Ferti. Compost Che. Ferti. NPK	Yes Yes (15:15:15)	(6) Developing new field fd	10.70 fd 25.0 %

TABLE A-3.3.3 Agricultural Situation of Dauka-2

Note: JICA Team survey in Feb. 1989

ltem	Inside Farm	Iten	Insido Farm
1. Owner Owner's Address	6 persons (cooperation) All the owners are	7. Cultivation (1) Cultivated Area / Farm Area %	11.00 fd 73.3 \$
Farm Establishment	living in or near the village. Est. in 1970's	(2) Forage crops fd (2)/(1) \$	1.00 fd 9.1 \$
2. Farm Area	15.0 fd	Nhodes grass Alfalfa	0.55 fd 0.45 fd
3. Laborers (items) : Land-owners Foreigners Wage : RO / month	2 persons 4 persons 60 RO	(3) Yegetable fd (3)/(1) %	2.00 fd 18.2 \$
4. Well Irrigation system Water quality	Using the Spring (Oasis) Using local furrow irrigation system. Good	Tomato Egg-plant Onion Sweet potato Turnip Cucumber others	0 0.40 fd 0 0.05 fd 0.30 fd 0.76 fd 0.49 fd
5. Machinery Tractor Attachment 6. Appli. of Ferti.	0 0	(4) Fruit plants fd (4)/(1) \$ Date palm others	6.50 fd 59.1 \$ 5.50 fd 1.00 fd
Compost Che. Ferti. NPK "Urea	Yes No No	(5) Preparing for next crops fd (5)/(1) %	1.50 fd 13.6 \$

TABLE A-3.3.4 Agricultural Situation of Shasr-1

Old Farm inside the village

Note : JICA Team survey in Feb. 1989

lten	Outside Farms (sum up 3 farms)	Item	Outside Farms (sum up 3 farms)
1. Owner Owner's Address	4 persons 3 persons are living in the village. 1 person is living	7. Cultivation (1) Cultivated Area / Farm Area %	6.50 fd 5.9 \$
Farm Establishment	in Thumrait. 1986 - 1988	(2) Forage crops fd (2)/(1) %	1.00 fd 15.4 %
2. Farm Arca	110.0 fd	Nhodes grass Alfalfa	1.00 fd 0
3. Laborers (items) : Land-owner Foreigners Wage : RO / wonth	1 person 3 persons 60 - 70 RO	(3) Vegetable fd (3)/(1) % Tomato	2.55 fd 39.2 %
4. Well	Using the Spring : 1 farm Using the Shallow Well : 2 farms	Egg-plant Onion Sweet potato Turnip	0.65 fd 0.20 fd 0 0.13 fd
Irrigation system	Using local furrow irrigation system.	Cucumber others	0.25 fd 0.12 fd
5. Machinery Tractor	0	(4) Fruit plants fd (4)/(1) \$	1.80 fd 27.7 \$
Attachment	0	Date palm others	1.80 fd 0
6. Appli. of Ferti. Compost Che. Ferti. NPK	Yes No	(5) Preparing for next crops fd	1.15 fd
" Urea	No	(5)/(1) %	17.7 \$

TABLE A-3.3.5 Agricultural Situation of Shasr-2

Note : JICA Team survey in Feb. 1989

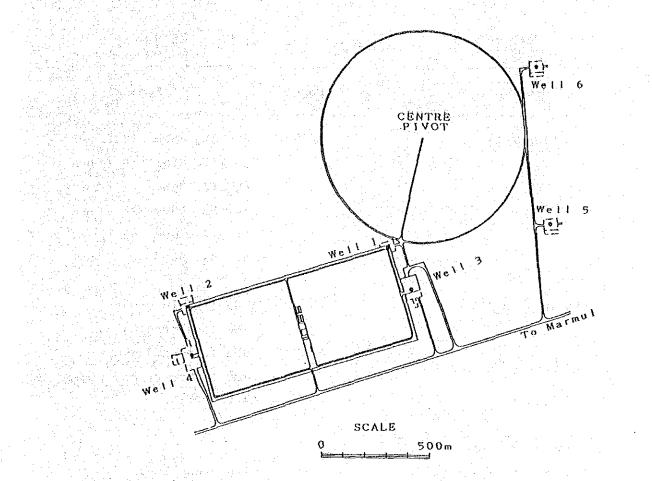
*R*5 (

	Pric	e (R.O.)	Volu	ume (kg)
Produce	Local	Imported	Local	Imported
lanana	0, 163	0. 383	21, 271	88, 435
anana Green	0, 139		3, 330, 567	
oconut Bry	0. 171		8, 424	
oconut Green	0 162		55, 318	
20870	0. 139		246, 624	
me	0. 254	0.354	388, 395	665
bbage Chinese	0. 220		9, 521	
bhage Green	0. 158	0. 142	905.274	43, 670
bbage Red	0. 179	0. 241	34, 425	380
<u>1111</u>	0. 312	(1, 368	179, 584	3, 117
cumber	0, 158		54	
sumber Long	0. 253	0, 295	202, 541	3, 000
cumber Small	0. 288	0, 266	117, 361	23, 206
cumber Yellow	0. 176	0. 231	1, 046	780
mato	0, 207	0. 173	1, 463, 030	277, 681
ip†ant	0. 171		341	
plant Black Long	0.086	0, 125	43, 714	2, 880
plant Black Round	0. 085	0, 120	483, 004	9, 483
plant White	0. 112	0. 189	17, 578	160
uash	0.159		717	
uesh Blg	0. 148	0. 490	80, 556	8(1
esh Small	0. 229	0. 259	190, 872	9, 777
er Melon	0. 111	0. 104	944, 907	20, 735
ullflower	0. 234	0. 476	114, 528	19, 119
8	0. 272	0. 475	95, 794	1, 573
nto	0. 182	0, 171	446, 105	153, 385
rot	0.187	0. 215	40, 237	55, 466
an Dry	0.080	0. (184	118, 361	177, 502
on Spring Leaves	0. 128	0, 462	4, 650	10
Ion Spring	0. 145	0. 205	48, 244	5, 294
et Pepper Long	0. 110 D. 127	0. 150	68, 150	5
eet Pepper Round	0. 239	0. 201	73, 910	9, 301
et Corn	0. 144	0. 246	32, 725	1, 777
tuce	0. 273	0. 240		
ange			86, 261	15, 225
inge tee Dry	(l, 157	0, 185	95, 934	205, 840
tes Dry Powder	0. 824		30, 732	
	0.010	D APA		
tee Freeh	0. 318	0, 350	43, 185	165

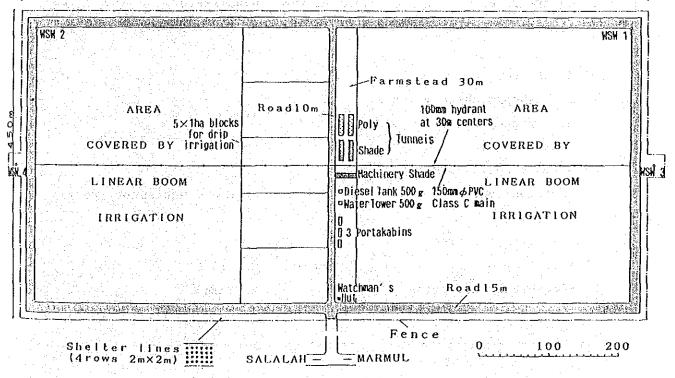
TABLE A-3.3.6 PAMAP's Total Purchase Average Price and Volume in Salalah and Banana Factory for the Year 1987

Source: PAMAP (Salalah), 1987

FIG. A-8.3.1 P.D.O Farm Profile



900m



Description	Q'ty	Remarks
A. Production Well	6 Nos	'85 MAY, 450m 19 1/sec
		'85 MAY, 450m 15 1/sec
		'86 FEB, 540m 46 1/sec
		'86 FEB, 590m 15 1/sec
		'87 APR, 540m 46 1/sec
		'87 JUN, 540m 64 1/sec
B. Field Area in 1984	38 ha	30ha : Field crops
		lha : Vegetables
		3ha : Orchard crops
		4ha : Amenity and timber tre
Field Area in 1987	63 ha	Centre Pirot
C. Irrigation Facilities		
(1) Linear boom irrigator	6 sets	After Feb. 1987
(2) Trickle system	1 set	Vegetables & Trees
(3) Centre Pivot	1 set	63ha field
(4) Linear irrigator	2 sets	Up to Feb. 1987
D. Buildings etc.	· .	
(1) Worksshop/machinery shade		
(2) mobile hausing unit	2	
(3) Generator	1	
(4) Water supply & sewerage	1	
(5) Container unit	3	Seed and equipment storage
	n an tao 1997. An tao 1997 - Angelandar	
E. Appurtenant Facilities		
(1) Road	3,150 m	RCR 15 m
(2) Wind-break facilities		4 Lines

TABLE A-3.3.7 Summary of P.D.O Farm Facility

Description	Q'ty	Remarks
Machinery		
(1) Tractors	3 Nos 4WD	
(2) Baler	1 No	
(3) Forklift	1 No	
(4) Subsoiler	1 No	
(5) Gultivator	1 No	
(6) Seeder	2 Nos	
(7) Mower	1 No	
(8) Rake	2 Nos	
(9) Trailer	1 No	
(10) Weighbridge	2 Nos	a da anti-anti-anti-anti- Recentar esta anti-anti-anti-anti-anti-
(11) Communications	1 set Weld	er (gas/electric)
(12) Tools & Equipment	Tool	kit
	Jack	(5 ton)
	Mobi	le compressor
(13) Pick-up truck	2 Nos	
(14) Stationwagon	1 No	

TABLE A-3.3.8 Constraints and Countermesures for Crop Cultivation

Constrait	lt	Damages	Countermeasures
Meteorology -	Wind velocity Nigh temperature	Soil erosion, Crop lodging Low growth rate of temperate crops	Shelter belt, Fence, Vinyl tunne Crop selection, selection of cropping period
	Low temperature (Dec. Jan.) Rapid rise in temperature in March	Low yield of forage crop, and Limit the production of temperate and sub-tropical vegetables, and growing season for wheat and barley	Selection of growth period - ditto -
· · · · · · · · · · · · · · · · · · ·	lligh humidity (from Sept. to April)	Difficult to product dry hay, disease injury	- ditto - Application of agricultural chemicals
<u>Vater</u>	lligh salinity content (low Na content) lligh salfate content	Salt injury especially for annual crops	Introduction of crops with hig salinity tolerance, leaching
Soil -	Low CDC Nigh bulk density	Nutrient losses by leaching Restriction of root development	Fertilizer application Top soil ploughing with one- heavy disc harrow
	Development of crust Puffy lead to development of algae	low germination rate Lodging of crop	- ditto - - ditto - Frequent irrigation schedulin
, de la deservación d De la deservación de l	Low available water capacity		LI CARCIE TITI BORINI SCHOUTH

TABLE A-3.3.9 List of Crop Cultivation in P.D.O Farm

Porage Crops	Cereals	Vegetaables	Orchards
Rhodes grass	Wheat	Tomato	Dates palm
6 varieties	16 varieties	lgg plant	4 varieties
Alfalfa		Water melon	Lines
2 varieties	Barley	Cucumber	Lenions
Italian ryegrass	12 varieties	Squash	Grapefurit
1 varieties		Okra	Algerian Tangerine
Oats		Canteloupe	Valencia Orange
3 varieties		Cabbage	Figs
		Onion	
Others:		Sweet Corn	
Tropical grass		Green Pepper	
6 crops	an de la construction de la constru La construction de la construction d	Califlower	
		Others: 3 crops	

Source : Study team hearing, 1987

The Desert Agricultural Project, A Report on Project Development on March 1988. PDO 1988

													-	1.1.1.1.1.1		S - 1 ¹	S		Sec. 2.		5 - 5 July -	
			1.1.1.1	- A		·							1.1.1.1	- 11			2.17		- 11 s		· . ·	
		- 11 J.	- 11 a la composition de la composition de la composition de la c	1.1.1	- 19 A.	10	12.	1911 - S. 1911 -			1.		1.1.1.1	1. C	10 A 10 A 10	1.1.1.1.1.1	1.1.1.1.1.1.1.1	1.1.1.1				
1.00		- 1		1.1.1		1.4					· · · ·	1.1.1.1	14 C				1. S.	- 16 ja 1		· •		
			- 64 A.A.A.A.	1.1	19.11									14 J. C. C. M.	1.1	· · · ·	72 N S P	1. 1.1	1 a ta -	1. T		
- e. 1.	1.1.1			- 1. s	1.24.2	1.1	1.1	1. A. A.							1.1.1	- 8 M	1.111	1.50	1.1.1		18 J. A.	
· ` .	-		1.51	1.	· · · ·							1.1.1.1.1.1.1.1		· / /	1.1		C					
	- C	12.1	10.41		- 1		1.1	10 A. 1945			1.1.1.1							, K. K		1.11.1		10 M A 1
5 X.	- 1 - E - E -	- 1. S.	1	al an f	11 a (a se									1.1.1.1.1.1		1. 2.1		· · ·		- N		
· .	·	1.1.1.1		e en en en										1.1	1.1.1	1.11	1.1.1	1.27775	1960 - Ca			
	- 1 A			1 C. A.		1111	11 A. J.	1. N. S.	1.1.1		1.1		· .	1.1		3.20.2			. * *		1. A. A. A. A.	· · · · · ·
	1.1.1	No. 114	5. TA	- 1 di -			- 11 - 13 g	·		1.1.1.1.1			1	1.		11.1				1 A A	S	
-4. C	10.02	-72 M 3	9 - E - E	1 1	1.0			- A - C - A					1 i a a		· ·		1	. S. 194	승규 주말		1.1	· · ·
. C D	. A. T.	de la seco	. ,	10.000		÷.,						- 18 A.	1 N N 1		4 C C	1.1.1	1.1.1	·· · .	1.00	5. St. 1		
	1.225	12025	102	17 A. A.	1.4			1 A A			1.1			12	1	11 11 11 11	- N		- K.S.	5 N. 1	1. J. S. S.	1.1.1.1
1.44	10.00					e	-		1.2.2.1.2		1.21	1.1		- 11 - 11 - 11 - 11 - 11 - 11 - 11 - 1	- 1 - L		1 N. H.					
S. (1	10 J. J.	1.1.2	N 1 1 1	1.1.1.1	1000	A. S.A.	- 1 J - 1	i y s			6		5	11.0	- 14 C 7	5 A A	24 - L	1 . A	1.11	· "•		1. No. 1
27.7 × .	115 3	1. 1	**		<u>^</u>	1 1	· .					1.11	· · ·	1 2 - 1	.: 114.,			1.1.1.1	2. STO	10.00		· · · ·
	ч сл	141	10. 1		. V.	· 11	1 .	Una	ا تغذ	~	P	\mathbf{n}		m	1	- ÷ •	1.1	n (n	^	$\mathbf{D} = \mathbb{C}$	
- M.	1:0	1217	15 1	1 0	. 0		, .	IN ES	111.4	S.	ΩL	- E : T	กก	\cdot \mathbf{r}	1 9 1	1	·n ·	ν	11	11	вят	m ·
1.1.1								Res		00	V.	· • 1	VP.		1 11 1	.		- I - e	12.0	v	1 41	111 ·
Sec. 1							- N. C.										1 A A			1.11.1		
	125		1.11		- N. E		212	2 C			1. A. A. A.								1.4	1.0	- 1 - 1 - 2 1	
141			120			~ 100		2 C	1.14		- 14 A			· . · ·	$(-e) \in F$	• • : •	۰.			1.1	19.17	1.1
			10					a na si Tan ƙasar		an an l	and an State		1	·	1997 - 1997 1997 - 1997	• . • ·	1					
											and an					• • • • •						

		0	@	٩	(4)
	Corp	Rhodes Gram	Alfalfa	Sweet Corn	Tomatoes
	Varlety	Katambora	Xaryatl or Granada	Herit	Pearsons Al
	Sowing or Planting Date	Spring or Autumn	Nov-Jan	mid-Sep, early-Jan	early-Oct
	Seed	35-40kg/ha	34kg/ha		
	Harvert	60-80 days	60days, then montly	70—80 days	late Jan to Hay
	Total Days	60-80 days	60 days	70—80 days	170 — 180 days
otal days	Fertileser	2,000 kgN/ha/a 500 kgP20H5/ha/a	500 kgP205/ha/a	20 g TSP/hole/week	20 g TSP/plant/week 4 g Urea/plant/week
4010	Plant Protection	Shoot fly gras fopoers	catervillars aphids, mites	stem borer caterpillor	birds, caterpillars sun scald
	Yield	45 t/ha	Granada:17 t/ha Karyati:15.6 t/ha	4~6 t/ha	50— 125 t/ha
	Comments	Recommendable as	Better to sow after	Now naige 9rain	Labour denand is
		the mort puitable crop.	soil reciaimed.	are now considered	high.

	ander forste sold effe Maar oor die sold effe	6	6	Ø	Ø
	Согр	Squash	Cucumber	Cabbage	Cailliflower
	Variety	Grey Zuchini	Sprint	Coponhagen	Snow ball
	Sowing or Planting Date	wid-Oct	Later-Oct	mid-Nov	early-Xov
	Seed		-		
	Harvert	Dec to Jan	Dec-Harch	Jan-Harch	early Nov
	Total Days	100 — 200 days	120 — 130 days	100 — 130 days	90— 100 days
otal days	Fertileser	20 g TSP/plant/week 4 g Urea/plant/week	20 g TSP/plant/week 4 g Urea/plant/week	20 g TSP/plant/week 4 g Urea/plant/week	20 g TSP/plant/week 4 g Urea/plant/wee
1479	Plant Protection	white fly caterpillars A	white fly Aphio	Birds Caterpillars	Birds,miners Caterpillers
	Yleld	25—40 t/ha	8-19 t/ha	15—32 t/ha	7 22 t/ha
	Coments	The two celder months are good	-	Proved as excellent winter crop.	
		fruits provede.			

$\mathbf{APPENDIX=4}$

GROUNDWATER RESOURCES

APPENDIX A-4.1

Groundwater Survey

A-4.1.1	Location of Exploration Bore Hole	4	1
٨-4.1.2(1)	Summary of Exploration Bore Holes in the Nejd :		
	Avallability of Logging Data	4	2
Λ-4.1.2(2)	Summary of Exploration Bore Holes in the Nejd :	*	0
	Geological Division in Bore Hole	4	3
A-4.1.3(1)-(31) Composite Bore Hote Log	4 ~	Å
A-4.1.4(1)-(2)	Chemical and Isotopic Contents of Neid Groundwater	1	25

Page

Pago

4 --1

4 2

4

4 4 - 35

3 14

4

A-4.1.1	Location of Exploration Bore Hole
Λ-4.1.2(1)	Summary of Exploration Bore Holes in the Neid :
	Availability of Logging Data
Λ-4.1.2(2)	Summary of Exploration Bore Loles in the Neid :
	Geological Division in Bore Hole
Λ-4.1.3(1)-(31)	Composite Bore Hole Log
A-4.1.4(1)-(2)	Chemical and Isotopic Contents of Neid Groundwater
Electrical Prospe	<u>GU108</u>
A-4.2.1	Location of VES Point
A-4.2.2(1)-(7)	VES Curve and Analysed Resistivity Structure
A-4.2.3(1)-(7)	Original Print-out of VES Data and Analytical Results

..... 4 - 52 Specification of JICA Bore Holes A-4.3.1(1)-(4) Structure of JICA Bore Holes 4 - 56 A-4.3.2(1)-(2)A-4.3.3(1)-(4) Geological Column of Jica bore Holes 4 - 58 Geophysical Bore Hole Log 4 - 62 A-4.3.4(1)-(8)A-4.3.5(1)-(42) Pumping Test Data of JICA Bore Hole 4 - 70 Sampling Position of Micro-Paleontological A-4.3.6 Bore Hole Specime 4 -112 A-4.3.7(1)-(16) Micro-Paleontology of JICA Bore Hole 4 -113

Groundwater Resources Evaluation 4.4

(None)

4,1

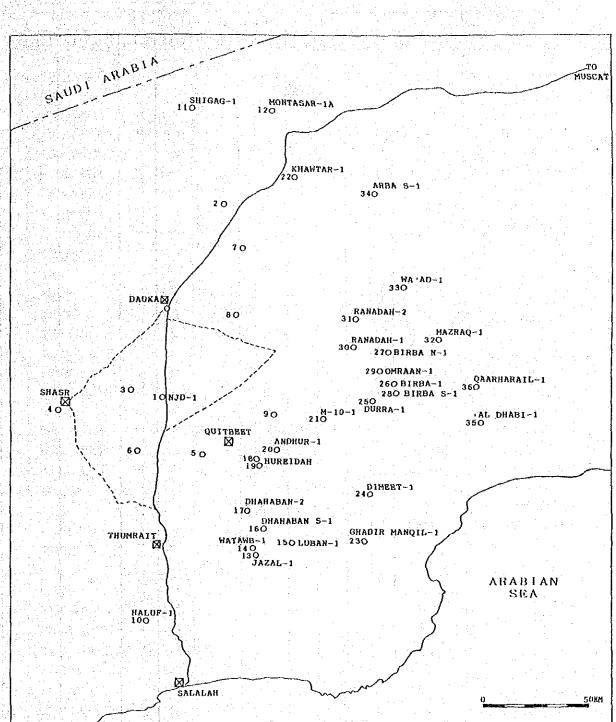
4.2

4.3

Influence Radius of Groundwater umpage and Intra-well Drawdown 4.5 (None)

Directory for the Conservation and the Development of the Nejd Groundwaters 4.6

A-4.6.1	Field Data Sheet for Dauka Meteorological Station 4 -129
A-4.6.2	Data Filing Sheet for Dauka Meteorological Station
Λ-4.8.3	Maintenance Schedule Sheet for JICA Facilities
	In the Nejd 4 -131
A-4.6.4	Arabic Manual for JICA Meteorological Facilities
	in the Nejd 4 132



A-4.1.1 Location of Exploration Bore Hole

PAWR BORE HOLES 2. BG117784AA 4. YA715978AA 6. ZV099779AA 8. BF263460AA 3. ZA035301AA 5. BE094486AA 7. BF298464AA 9. BF410641AA

		Summary of Exp	lowation	Bore Ho	les in t	ne Neja:
	A-4.1.2(1)	Summary of sap	itor acton	10+ C	김희 김 씨는 영상을 얻을 수 있다.	
		Availability o	f Locaina	Data		
4.		Availability o	II TOAArna			

1.1	Ser.	Bore llote	1		Data	Avai	lability	(+)		
	Ser. No.	I DOLC HOLE	Lithology	FossII	Callpor	Camma		S.P.	Dénslty.	Porosit
- 22	1101	JICA								
	1	NJD-1	+		+	+		j, j + n		+
		PANR								
	2	BC117784AA	+		-		+			
	3	ZA035301AA	+		-	+ 				
	4	YA715978AA	+			(T +			-	
	5 e	ВЕ094486ЛЛ ZV099779ЛЛ	+			+	+	la dist. Hartin	ran a sea Leis a sea Altar (199 4), Leis	na da i Parte d ata
	6 7	BF298464AA	+		+	Ŧ	+	+		/
	8	BF263460AA	+	_	+	+		-	, 1997, 1997, 1997, 1997, 1997, 1997, 1997, 1997, 1997, 1997, 1997, 1997, 1997, 1997, 1997, 1997, 1997, 1997, 1 1997, 1997, 1997, 1997, 1997, 1997, 1997, 1997, 1997, 1997, 1997, 1997, 1997, 1997, 1997, 1997, 1997, 1997, 1997	
	9	BF410641AA	+		+	+	÷.	+		
		PDO								
	10	HALUF-1	+	4		\overline{a}		—	-	
	11	SILIGAG-1	+	+	+	+				
. (12	MONTASAR-1A	+	+			.	с. П		
	13	JAZAL-1	+	+		+			+	
	14	WATANB-1	+	+		+			+	
	15	LUBAN-1		+ +	+ ,	+ . + .		- s	4	
	16 17	DIIAHABAN S-1 Diiahaban-2	+ / ⁽ , 1) ⊥		+				+	
	17	HUREIDAN-2	+	-		+		_	4	
	19	HURELDAH-2	+		+ 	+			+	
	20	ANDHUR-L	+	+	÷	+		<u> </u>		the second
	21	11-10-1	+	4						-
	22	KHA¥TAR-1	+	+		+		—	- x	
	23	CHADIR MANQIL-1	+	+		+	—			i parte Secondaria
	24	DINEET-1	+	+		+	—		+	-
	25	DURRA-1	+	+	+	+			+	
	26	BIRBA-1		+	a — Elana Marina Marina	+ +		-	+	
	27 28	BIRBA NORTH-1 BIRBA SOUTH-1	+	+ +						
	28 29	OHRAAN-1	+	т —	+	н т. 	_	-		_
	30	RANADAII-1			Ŧ	+	$\frac{1}{2} = \frac{1}{2} \left[\frac{1}{2} \left[\frac{1}{2} \left[\frac{1}{2} \left[\frac{1}{2} \right] + \frac{1}{2} \left[\frac{1}{2} \left[\frac{1}{2} \left[\frac{1}{2} \right] + \frac{1}{2} \left[\frac{1}{2} \left[\frac{1}{2} \left[\frac{1}{2} \right] + \frac{1}{2} \left[\frac{1}{2} \left[\frac{1}{2} \left[\frac{1}{2} \right] + \frac{1}{2} \left[\frac{1}{2} \left[\frac{1}{2} \left[\frac{1}{2} \right] + \frac{1}{2} \left[\frac{1}{2} \left[\frac{1}{2} \left[\frac{1}{2} \right] + \frac{1}{2} \left[\frac{1}{2} \left[\frac{1}{2} \left[\frac{1}{2} \right] + \frac{1}{2} \left[\frac{1}{2} \left[\frac{1}{2} \left[\frac{1}{2} \right] + \frac{1}{2} \left[\frac{1}{$	-	n en	_
	31	RANADAII-2	+	+	+	- -			+	
	32	MAZRAQ-1	+	+	-	-				
	33	WA'AD-1	+	+	<u>-</u>	+	-		_	
	34	ARBA SOUTII-1	+	+	+	+ ***			+	-
	35	AL DHABI-1	+	-	+				+	-
	36	QAARIIARA IL-1	+	+	$\pi = 1$	-		-	π $\overline{\tau}$	—

oration Bore war A-4.1.2(2) Summary of Exploration Bore Holes in the Nejd: Geological Division in Bore Hole Geological Division in Bore Hole

Ser.	Bore llol e	Ground	1 Division	n (Sole Depth In meters)				
No,	1,D.	Level (m)	Alluvium	Fars	Dammam	Rus	Upper UER	Lover UER
	JICA							
1	NJD-1	282	<u> </u>	n <u>de</u> est	30	140	270	>400
	PAWR							
2	BG117784AA	142		-	42	>95	nd	nd
3	ZA035301AA	265		—	—	143	239	>300
4	YA715978AA	290			-	128	206	>250
5	BE094486AA	310	-		48	126	260	>553
6	ZV099779AA	330			22	116	224	>300
7	BF298464AA	180	-	—	74	218	346	>400
8	BF283460AA	220	-		46	116	308	>400
9	BF410641AA	270	-		52	112	268	>287
	P D O						a parata Na mangkana para	
10	HALUP-1	663	-	—	-	270	280	564
11	SH1GAG-1	141	15	—	30	254	381	673
12	MONTASAR-1A	113	nd	nd	nd	nd	nd	629
13	JAZAL-1	509		-	20	97	306	637
14	WATAWB-1	507	-	—	82	258	406	721
15	LUBAN-1	501		-	18	92	319	657
16	DHAHABAN S-1	441		 . 	65	143	323	668
17	DHAHABAN-2	399	-	—	—	76	213	534
18	HUREIDAH-1	339		-		73	227	541
19	HURE1DAH-2	326	-			65	220	549
20	ANDHUR-1	309	-	-	23	92	259	583
21	M-10-1	259			51	81	240	567
22	KHAWTAR-1	190	59		69	245	380	673
23	CHADIR MANQIL-1	504		· · · · · · · · · · · · · · · · · · ·	_		231	582
24	DINEET-1	344		-		77	306	666
25	DURRA-1	248	—	_	32	106	240	580
26	B1RBA-1	238		-	12	85	308	634
27	BIRBA NORTH-1	216			· · · · · · · · · · · ·	30	229	561
28	BIRBA SOUTH-1	237	9	-	21	95	277	622
29	OMRAAN-1	228		·	34	119	237	595
30	RANADAII-1	237	· · ·	-	17/60	96	247	557
31	RANADAH-2	224		-	32	97	232	529
32	MAZRAQ-1	204	_	_	63	93	nd	570
33	WA'AD-1	215	20	-	68	97	222	nd
34	ARBA SOUTH-1	179	_	24	34	143	272	547
35	AL DHABI-1	279	_		137	291	549	900
36	QAARHARA1L-1	300	_	-	24	144	388	685