

*L'étude de Faisabilité Pour Le Développement des Ressources En Eau
Par Les Barrages Moyens Dans Le Milieu Rurale Au
Royaume Maroc
Rapport Final
Volume II Rapport Principal*

Tables

Tableau 1.11: Liste des Membres du Comité Consultatif de la JICA, des Responsables dans la JICA et du Comité de Pilotage du Gouvernement Marocain

Advisory committee

No	Name	Function	Position
1	Mr.Adachi	Leader/Water Resources Development	JICA
2	Mr.Niwa	- ditto -	- ditto -
3	Mr.Shioya	Flood Control	Ministry of Land, Infrastructure and Transportation
4	Mr.Itaya	- ditto -	- ditto -
5	Mr.Nakajima	Agricultural Development	Japan Institute of Irrigation and Drainage
6	Mr.Karashima	Project Implementation Plan	JBIC
7	Mr.Kimura	- ditto -	- ditto -

Persons in Charge in JICA

No	Name	Position
1	Mr.Matsushima	Deputy Director, JICA Tokyo
2	Mr.Nakamoto	Staff, JICA Tokyo
3	Mr.Kageta	Staff, JICA Tokyo
4	Mr. Yoshizawa	Deputy General Manager
5	Miss Nonoyama	Staff, JICA Morocco
6	Mr.Shibata	Staff, JICA Morocco

Steering Committee

No	Name	Position
1	Mr. Mahfoud	General Directorate of Hydraulics
2	Mr. El Gomari	General Directorate of Hydraulics
3	Mrs. Ouarrak	General Directorate of Hydraulics
4	Mr. Nassouh	General Directorate of Hydraulics
5	Mr. Belghiti	Ministry of Agriculture, Rural Development and Maritime Fisheries
6	Mrs. Idder	National Office of Water Supply
7	Mr. Essaouabi	National Office of Water Supply

Tableau 1.2.1 Caractéristiques Principales des 25 Sites de Barrages Proposés par le MOE

No.	Dam Site Name	Damsite Location		Study Level	River Basin	Purposes	Dam Type	Annual Inflow (MCM)	Dam Height (m)	Storage (MCM)	Dam Volume (m³)	Catchment Area (km²)	Reservoir Surface Area (ha)	Proposed Irrigation Area (ha)
		Province	Circle											
♁	NECKOR	AL HOCEIMA	AL HOCEIMA	APD	Neckor	PE	TERRE	58	36.4	15.6	1,577,500	710	196	-
♂	TIZIMELLAL		TARGUIST	APD	Sebou	PE,I	BCR	57.71	78	21.28	150,000	170	91.11	-
♂	AIT BADDOU	AZILAL		PRE	Oum-er-Rbia	PE	T.Z	93.7	50	52	800,000			-
♂	AIN KWACHIYA	BENSLIMANE	S.Y.ZAER	APD	Yquem	I	BCR	7	30	11	78,000	162	180	500
♂	N'FIFIKH		BENSLIMANE	APD	Nhhkh	I	BCR	26	44	52.5	99,100	606	680	1,200
♂	TAZARANE	CHAOUEN	BAB BERED	APD	Sebou	I,PE	ENR	16.7	64	9.2	416,100	30	51	
♂	AMEZMIZ	EL HAOUZ	AMEZMIZ	APD	Tensift	I	BCR	10	72.5	11	241,800	80	55.2	1,200
♂	BOULAOUANE		S.BOU OUTTMAN	PRE	Tensift	I	BCR	57	82	56	799,000	565	2.4	2,000
♂	TASKOURT		IMIN TANOUT	PRE	Tensift	I	BCR	49	88	106	457,000	439	-	6,900
♂	TIMKIT	ERRACHIDIA	TINJDAD	APD	Rheris	I,AN	BCR	7.5	56	14	136,500	592	164	2,900
♂	TADIGHOUST		TADIGHOUST	PRE	Rheris	I	BCR	35.7	68	54	593,800	2,239	4.5	700
♂	TIOUZAGUINE		GOURRAMA	PRE	Guir	I,AEP	BCR	4.73	58.7	10.2	128,000	258	75	
♂	KHENG GROU	FIGUIG	BENI TAJJIT	APD	Guir	I,AN	BCR	91.5	70	90	310,000	4,900	840	250
♂	ADAROUCHE	IFRANE	AZROU	APD	Sebou	I,AC,AEP	BCR	95	51	48	130,000	630	328	1,500
♂	SIDI OMAR	KHEMISSSET	MAAZIZ	PRE	Boure	I	BCR	17	59	35	222,000	350	165	1,000
♂	TIWINE	OUARZAZATE	OUARZAZATE	PRE	Draa	I,EC	BCR	102	68.5	102.9	405,530	1,540	705	1,500
♂	AZGHAR	SEFROU	RIBAT EL KHEIR	PRE	Sebou	I	BCR	53	55	40	299,280	295.14	263.63	1,000
♂	BOUKARKOUR	SETTAT	BEN AHMED	APD	Mellah	I,AC	BCR	30	59.5	30.1	172,140	1,120	217.5	
♂	AOULAI	TAOUNATE	GHAFAI	PRE	Sebou	I,PE	BCR	247	50	225	310,500	490	710	5,000
♂	SIDI ABBOU		AIN AICHA	PRE	Sebou	I	Beton	82.6	30	58	32,000	363	432	4,220
♂	SIDI EL MOKHFI		SIDI EL MOKHFI	PRE	Sebou	I,AC	BCR	229	64.5	36.7	-	378	-	3,600
♂	BOUSFOUL		SIDI EL MOKHFI	APD	Sebou	I,AC,PE	BCR	2	43.5	2	76,000	5.33	19	45
♂	IGUIN' OUAQA	TAROUDANT	OLD.BERHIL	APD	Sous	PC,AN,I	BCR	7	57	10.5	186,200	161	66.7	300
♂	AMOUNT ABDELMOUMEN		-	PRE	Sous	-	-	-	-	-	-			
♂	SIDI ABDELLAH		TAMALOUKT	APD	Sous	AN,I	TZ	20	69	10.37	2,055,300	233	49.36	900

- Notes
- 1) The mark ♂ or APD means F/S level in Morocco
The mark □ or PRE means Preliminary Study level in Morocco
 - 2) PE : Protection of Landslide, I : Irrigation, AN : Conservation of underground water
AEP : Portable water, AC : water for livestock, PC : Flood control, EC: Hydro-power
 - 3) TERRE : Homogenous type earthfill dam, BCR : RCC type dam, TZ : Zone type earthfill dam
ENR : Rockfill type dam, Beton : Concrete gravity type dam

Tableau 1.3.1 Calendrier des Travaux

Work Stage	Major Study Work	Work Period
(1) Preparation work	Data collection and review Preparation of Inception Report (I/R)	Dec. 8 to 22, 1999
(2) First field work in Morocco	Explanation and discussion of I/R Field investigation Collection and analysis of data required for study Review on the previous studies Investigation for Initial Environmental Examination Baseline Survey for Present Agricultural conditions and development potential Screening criteria of priority project site(s) Formulation of water resources development and water use plans Water demand forecasting Water balance study Preliminary facility plan and design Evaluation of proposed project site(s) in the views of technical, economical, financial and social aspects Preparation of Progress Report (1) Pre-arrangement for technology seminar (1)	Feb. 8 to June 5, 2000
(3) First homework in Japan	Summary of first field investigation and IEE Summary of water resources development plans for proposed project site(s) Summary of project evaluation for proposed project site(s) Summary of selection of priority project(s) Preparation of interim report Preparation of transfer of technology seminar (1)	June 8 to July 22, 2000
(4) Second field work in Morocco	Submission, explanation and discussion of Interim Report Execution of transfer of technology seminar (1) Confirmation of project features for feasibility study Supplemental collection and analysis of data required for feasibility study Topographic survey, geological and soil investigation and river discharge measurement Field investigation for Environmental Impact Assessment water resources development and use plans water demand forecasting and water balance study Optimization study of dam development scale Study on facilities plan and preliminary design Study on construction plan and cost estimate Study on financial plan and fund arrangement Field investigation for Environmental Impact Assessment Preparation of Progress Report (2) Pre-arrangement of technology seminar (2)	Aug. 21, 2000 to Jan. 25, 2001
(5) Second home work in Japan	Summary of investigation works Finalization of preliminary facility design and construction plan Project cost estimate and disbursement schedule Overall project evaluation Institution, organization and management plan of the project(s) Implementation programme Preparation of draft final report Preparation of transfer of technology seminar (2)	Jan. 29 to Mar. 29, 2001
(6) Third field work in Morocco	Submission, explanation and discussion of draft final report Execution of transfer of technology seminar (2)	Mid May to End of May, 2001
(7) Third home work in Japan	Preparation and submission of Final Report	Early July to Mid of July 2001

Tableau 1.3.2 Liste des Experts de l'Équipe d'Étude de la JICA et de Leurs Personnel de Counterpartie

No.	JICA Study Team	Function	Counterparts Personnel (GOM)	Function
1	Mr.Kawashima (NK)	-Managing Engineer -Water Resources Development Planner	-Mr.Mahfoud (DGH)	-Managing Engineer
2	Mr.Menjo (NG)	-Co.Managing Engineer/Dam Engineer	-Mr.EL Ghomari (DGH) -Mrs.Hajja (DGH)	-Dam Engineer/Geologist -Dam Engineer/Geologist
3	Mr.Jitsuhiro (NK)	-Hydrologist -Flood Control Engineer	-Mr.Benabdefadil (DGH) -Mrs.Nazik (DGH)	-Hydrologist -Hydrologist
4	Mr.Wada (NK)	-Water Supply Engineer -Rural Electrification Planner	-Mr.Hamzaoui (ONEP)	-Hydraulic Engineer
5	Mr.Zaitu (NK)	-Agronomist/Soil Scientist	-Mr.Chouraichi (MOA)	-Soil Scientist
6	Mr.Adhikary (NK)	-Agricultural Support and Extension Services	-Mr.Hamda (MOA)	-Agricultural Support and Extension Services
7	Mr.Yatabe (NK)	-Irrigation Planner	-Mr.Belghiti (MOA) -Mr.Karfal (MOA) -Mr.Benattia (DGH)	-Rural Development Engineer -Hydrogeologist -Geologist -Geologist
8	Mr.Suga (NG)	-Geologist		
9	Mr.Tanaka (NK)	-Geologist		
10	Mr.Suzumura (NK)	-Hydrogeologist		
11	Mr.Kouno (NG)	-Aero. Topo. Surveyor/Ground Topo. Surveyor		
12	Mr.Sasaki (NG)	-Aero. Topo. Surveyor		
13	Mr.Suzuki (NG)	-Facility Planner	-Mr.Ait Zirri (DGH)	-Civil Engineer
14	Mr.Shiose (NG)	-Facility Planner		
15	Mr.Kuwahara (NG)	-Construction Planner -Cost Estimator	-Mr.El Keddadi (DGH)	-Construction Planner
16	Mrs.Bourarach (NK)	-Sociologist	-Mr.Amrani (DGH)	-Agro. Economist
17	Mr.Hasegawa (NK)	-Environmentalist	-Mrs.Hajja (DGH)	-Dam Engineer/Geologist
18	Mr.Maehara (NK)	-Economist -Project Evaluator	-Mr.Amrani (DGH)	-Agro. Economist
19	Mr.Serizawa (NK)	-Interpreter		
20	Mr.Hassan (NK)	-Logistician		

GOM: Government of Morocco
DGH: Directorate General of Hydraulics
ONEP: National Office for Water Supply
MOA: Ministry of Agriculture
NK: Nippon Koei Co Ltd
NG: Nippon Giken Inc.

Tableau 3.1.1 Population de Provinces et Préfectures dans la Zone d'Étude

Zone	Population in 1971 (1,000)			Population in 1982 (1,000)			Population in 1994 (1,000)			Annual growth (%) 1971 - 1982			Annual growth (%) 1982 - 1994		
	Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total
Zone I	887	2,240	3,127	1,325	2,622	3,947	2,094	2,950	5,044	3.7	1.4	2.1	3.9	1.0	2.1
Zone II	2,187	617	2,804	3,306	731	4,037	4,566	727	5,293	3.8	1.6	3.4	2.7	-	2.3
Zone III	1,033	3,583	4,616	1,692	4,201	5,893	2,547	4,624	7,171	4.6	1.5	2.2	3.5	0.8	1.6
Zone IV	179	1,346	1,525	386	1,599	1,985	896	1,739	2,635	7.2	1.6	2.4	7.3	0.7	2.4
Zone V	51	370	421	101	421	522	206	433	639	6.4	1.2	2.0	6.1	0.2	1.7
Total	4,337	8,156	12,493	6,811	9,575	16,386	10,310	10,473	20,783	4.2	1.5	2.5	3.5	0.7	2.0

Source: - Recensement 1994, Population Legale du Maroc, Direction de la Statistique
 - Population Legale du Maroc, D'Après le Recensement General de la Population et de l'Habitat de 1982

**Tableau 3.1.2 Population et Nombre de Foyers par Provinces et
Préfectures dans la Zone d'Étude**

Provinces and Prefectures	Population in 1994 (1,000)			Household in 1994 (1,000)			Average Size of Family		
	Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total
Zone I									
SIDI - KACEM	175	471	646	33	71	104	5.3	6.7	6.2
IFRANE	61	67	128	13	11	24	4.7	5.9	5.3
MEKNES EL MENZEH	191	103	294	37	17	53	5.2	6.2	5.5
AL ISMAILIA	274	41	315	54	6	60	5.1	6.8	5.3
EL HAJEB	65	115	180	12	18	30	5.3	6.4	6.0
BOULEMANE	37	125	162	7	20	27	5.1	6.4	6.0
FES JDID - DAR - DBIBAGH	243	14	256	48	2	50	5.1	6.9	5.2
FES - MEDINA	267	18	285	49	3	52	5.4	6.7	5.5
SEFROU	102	135	237	21	22	43	4.9	6.2	5.6
ZOUAGHA - MOULAY.YACOUB	265	117	383	47	16	63	5.7	7.2	6.1
AL HOCEIMA	113	270	383	20	41	61	5.5	6.7	6.3
TAOUNATE	52	577	629	10	89	98	5.4	6.5	6.4
TAZA	206	502	708	36	72	108	5.7	7.0	6.5
CHEFCHAOUEN	43	396	439	8	61	70	5.1	6.5	6.3
Total of Zone I	2,094	2,950	5,044	395	447	842	5.3	6.6	6.0
Zone II									
BENSLIMANE	65	149	213	12	23	35	5.5	6.4	6.1
AIN-CHOCK-HAY HASSANI	438	78	516	79	14	93	5.6	5.6	5.6
AIN SEBAA-HAY MOHAMMADI	521	0	521	92	0	92	5.7	-	5.7
AL - FIDA - DERB SULTAN	387	0	387	73	0	73	5.3	-	5.3
BEN M'SICK-SIDI OTHMANE	688	16	704	116	3	119	5.9	5.8	5.9
CASABLANCA - ANFA	523	0	523	110	0	110	4.8	-	4.8
MACHOUAR CASABLANCA	4	0	4	1	0	1	4.9	-	4.9
MOHAMMADIA	170	0	170	32	0	32	5.4	-	5.4
SIDI BERNOUSSI ZENATA	210	59	269	37	10	47	5.7	5.8	5.7
KHEMISSSET	175	311	486	35	50	84	5.0	6.3	5.8
RABAT	623	0	623	127	0	127	4.9	-	4.9
SALE	586	45	632	109	6	116	5.4	7.1	5.5
SKHIRATE TEMARA	176	69	245	32	11	44	5.4	6.0	5.6
Total of Zone II	4,566	727	5,293	854	118	972	5.3	6.2	5.4
Zone III									
KHOURIBGA	295	186	481	54	28	82	5.5	6.6	5.8
SETTAT	236	612	847	44	87	131	5.4	7.1	6.5
EL KELAA DES SRAGHNA	131	551	682	23	78	101	5.7	7.1	6.8
ESSAOUIRA	75	358	434	16	60	76	4.8	6.0	5.7
AL HAOUZ	33	402	435	6	61	67	5.2	6.6	6.4
CHICHAOUA	32	280	312	6	47	53	5.3	5.9	5.9
MARRAKECH-MENARA	333	99	433	62	15	77	5.4	6.4	5.6
MARRAKECH-MEDINA	189	0	189	37	0	37	5.1	-	5.1
SIDI YOUSSEF BEN ALI	157	82	239	27	13	40	5.7	6.4	5.9
EL JADIDA	240	731	971	48	113	161	5.0	6.5	6.0
SAFI	376	447	823	71	68	139	5.3	6.6	5.9
AZILAL	62	393	455	12	57	69	5.0	6.9	6.6
BENI-MELLAL	387	483	870	73	69	141	5.3	7.0	6.2
Total of Zone III	2,547	4,624	7,171	480	696	1,176	5.3	6.6	6.1
Zone IV									
AGADIR-IDA-OU-TANANE	263	103	366	54	17	71	4.9	6.1	5.2
CHTOUKA AIT BAHA	26	214	240	5	38	43	5.0	5.6	5.5
INEZGANE-AIT MELLOUL	262	31	293	52	5	57	5.1	5.8	5.1
OUARZAZATE	142	553	695	22	68	90	6.5	8.1	7.7
TAROUDANNT	134	560	694	25	85	110	5.3	6.6	6.3
TIZNIT	70	278	348	14	49	63	4.9	5.7	5.5
Total of Zone IV	896	1,739	2,636	172	262	434	5.2	6.6	6.1
Zone V									
FIGUIG	51	66	117	10	11	21	5.3	6.0	5.7
ERRACHIDIA	155	367	522	26	51	76	6.1	7.2	6.8
Total of Zone V	206	433	639	35	62	97	5.9	7.0	6.6
Grand Total (Zone I to V)	10,310	10,473	20,783	1,936	1,585	3,522	5.3	6.6	5.9

Source: - Recensement 1994, Population Legale du Maroc, Direction de la Statistique

**Tableau 3.1.3 Projection de la Population par Provinces et
Préfectures dans la Zone de l'Étude**

Provinces and Prefectures	Population Census in 1994	Population Projection(1,000)		Annual Average Growth Rate		
		2000	2010	1994-2000	2000-2010	1994-2010
Zone I						
SIDI - KACEM	646	700	779	1.4%	1.1%	1.2%
IFRANE	128	139	159	1.4%	1.4%	1.4%
MEKNES EL MENZEH	294	316	349	1.2%	1.0%	1.1%
AL ISMAILIA	315	340	375	1.3%	1.0%	1.1%
EL HAJEB	180	200	230	1.7%	1.4%	1.5%
BOULEMANE	162	173	193	1.1%	1.1%	1.1%
FES JDID - DAR - DBIBAGH	256	332	486	4.4%	3.9%	4.1%
FES - MEDINA	285	301	323	0.9%	0.7%	0.8%
SEFROU	237	251	269	1.0%	0.7%	0.8%
ZOUAGHA - MOULAY.YACOUB	383	460	618	3.1%	3.0%	3.0%
AL HOCEIMA	383	411	452	1.2%	1.0%	1.0%
TAOUNATE	629	659	692	0.8%	0.5%	0.6%
TAZA	708	745	792	0.9%	0.6%	0.7%
CHEFCHAOUEN	439	505	623	2.4%	2.1%	2.2%
Total of Zone I	5,044	5,532	6,340	1.6%	1.4%	1.4%
Zone II						
BENSLIMANE	213	230	251	1.3%	0.9%	1.0%
AIN-CHOCK-HAY HASSANI	516	629	890	3.3%	3.5%	3.5%
AIN SEBAA-HAY MOHAMMADI	521	582	686	1.9%	1.7%	1.7%
AL - FIDA - DERB SULTAN	387	378	358	-0.4%	-0.5%	-0.5%
BEN M'SICK-SIDI OTHMANE	704	796	908	2.1%	1.3%	1.6%
CASABLANCA - ANFA	523	528	531	0.1%	0.1%	0.1%
MACHOUAR CASABLANCA	4	5	5	4.0%	0.0%	1.5%
MOHAMMADIA	170	205	272	3.2%	2.9%	3.0%
SIDI BERNOUSSI ZENATA	269	299	390	1.8%	2.7%	2.4%
KHEMISSSET	486	520	574	1.1%	1.0%	1.1%
RABAT	623	658	699	0.9%	0.6%	0.7%
SALE	632	788	1,118	3.8%	3.6%	3.6%
SKHIRATE TEMARA	245	314	466	4.2%	4.0%	4.1%
Total of Zone II	5,293	5,932	7,148	1.9%	1.9%	1.9%
Zone III						
KHOURIBGA	481	491	497	0.3%	0.1%	0.2%
SETTAT	847	916	989	1.3%	0.8%	1.0%
EL KELAA DES SRAGHNA	682	732	796	1.2%	0.8%	1.0%
ESSAOUIRA	434	441	449	0.3%	0.2%	0.2%
AL HAOUZ	435	460	492	0.9%	0.7%	0.8%
CHICHAOUA	312	324	338	0.6%	0.4%	0.5%
MARRAKECH-MENARA	433	519	687	3.1%	2.8%	2.9%
MARRAKECH-MEDINA	189	184	179	-0.5%	-0.3%	-0.4%
SIDI YOUSSEF BEN ALI	239	291	388	3.3%	2.9%	3.1%
EL JADIDA	971	1,057	1,204	1.4%	1.3%	1.4%
SAFI	823	877	945	1.1%	0.7%	0.9%
AZILAL	455	482	518	1.0%	0.7%	0.8%
BENI-MELLAL	870	953	1,079	1.5%	1.2%	1.4%
Total of Zone III	7,171	7,727	8,561	1.3%	1.0%	1.1%
Zone IV						
AGADIR-IDA-OU-TANANE	366	447	611	3.4%	3.2%	3.3%
CHTOUKA AIT BAHA	240	252	265	0.8%	0.5%	0.6%
INEZGANE-AIT MELLOUL	293	391	638	4.9%	5.0%	5.0%
OUARZAZATE	695	490	566	-5.7%	1.5%	-1.3%
TAROUDANNT	694	748	822	1.3%	0.9%	1.1%
TIZNIT	348	355	365	0.3%	0.3%	0.3%
Total of Zone IV	2,636	2,683	3,267	0.3%	2.0%	1.4%
Zone V						
FIGUIG	117	122	132	0.7%	0.8%	0.8%
ERRACHIDIA	522	562	618	1.2%	1.0%	1.1%
Total of Zone V	639	684	750	1.1%	0.9%	1.0%
Grand Total (Zone I to V)	20,783	22,558	26,066	1.4%	1.5%	1.4%

Source: Projections au 1er juillet de l'année (évolution de 2000 à 2010), Direction de la Statistique

Tableau 3.1.4 Population Economiquement Active en 1994

1994	Economically active population			Inactive population	Not Stated	Total	Unemployment rate
	Employed	Unemployed	Sub-total				
Male	5,652,869	926,877	6,579,746	6,201,400	1,111	12,782,257	14.10%
Female	1,347,542	405,111	1,752,653	11,314,525	404	13,067,582	23.10%
Total	7,000,411	1,331,988	8,332,399	17,515,925	1,515	25,849,839	16.00%

Source: Recensement 1994, les Caracteristiques Socio-economiques et
Demographiques de la Population, Niveau National

Tableau 3.1.5 Chômage au Maroc en 1982 et 1994

unit: 1000 persons

	Male			Female			Total		
	1982	1994	Growth rate (82-94)	1982	1994	Growth rate (82-94)	1982	1994	Growth rate (82-94)
Urban	232	577	249%	91	343	377%	323	920	285%
Rural	285	350	123%	35	62	177%	320	412	129%
Total	517	927	179%	126	405	321%	643	1,332	207%

Source: Recensement 1994, les Caracteristiques Socio-economiques et Demographiques de la Population, Niveau National.

Tableau 3.1.6 Produit Intérieur Brut du Maroc

Year	At Current Market Price				At 1980 Constant Price				Mid-year Population (1000)
	GDP		GDP Per Capita		GDP		GDP Per Capita		
	Amount (Million DH)	Growth Rate	Amount (DH)	Growth Rate	Amount Million DH	Growth Rate	Amount (DH)	Growth Rate	
1988	181,583		7,818		101,496		4,370		23,227
1989	193,931	6.8%	8,182	4.7%	104,031	2.5%	4,389	0.4%	23,703
1990	213,803	10.2%	8,843	8.1%	107,642	3.5%	4,452	1.4%	24,177
1991	242,360	13.4%	9,832	11.2%	115,579	7.4%	4,689	5.3%	24,649
1992	242,912	0.2%	9,671	-1.6%	110,920	-4.0%	4,416	-5.8%	25,117
1993	249,223	2.6%	9,742	0.7%	109,797	-1.0%	4,292	-2.8%	25,582
1994	279,323	12.1%	10,713	10.0%	121,170	10.4%	4,647	8.3%	26,074
1995	281,702	0.9%	10,676	-0.3%	113,197	-6.6%	4,290	-7.7%	26,386
1996	319,340	13.4%	11,894	11.4%	127,027	12.2%	4,731	10.3%	26,848
1997	318,346	-0.3%	11,657	-2.0%	124,168	-2.3%	4,547	-3.9%	27,310
1998	341,385	7.2%	12,291	5.4%	132,276	6.5%	4,762	4.7%	27,775
Average Annual Growth Rate									
1988 - 1998	6.5%		4.6%		2.7%		0.9%		
1994 - 1998	5.1%		3.5%		2.2%		0.6%		

Source: Annuaire Statistique du Maroc 1993, 1996, and 1999

Tableau 3.1.7 Produit Intérieur Brut du Maroc par Origine Industrielle (Million de DH, Prix Actuel)

	1988		1989		1990		1991		1992		1993		1994		1995		1996		1997		1998	
	Amount	Distr.	Amount	Distr.	Amount	Distr.	Amount	Distr.	Amount	Distr.	Amount	Distr.	Amount	Distr.	Amount	Distr.	Amount	Distr.	Amount	Distr.	Amount	Distr.
Primary Industry	31,347	17%	33,370	17%	37,675	18%	48,703	20%	37,369	15%	36,602	15%	51,759	19%	41,161	15%	61,634	19%	49,140	15%	56,690	17%
Agriculture, forestry, and fishery	31,347	17%	33,370	17%	37,675	18%	48,703	20%	37,369	15%	36,602	15%	51,759	19%	41,161	15%	61,634	19%	49,140	15%	56,690	17%
Secondary Industry	60,492	33%	64,335	33%	70,050	33%	74,818	31%	78,523	32%	80,475	32%	86,103	31%	92,931	33%	99,120	31%	104,975	33%	109,266	32%
Mining	5,243	3%	5,172	3%	5,343	2%	5,313	2%	5,073	2%	4,958	2%	5,151	2%	5,060	2%	5,603	2%	7,132	2%	7,217	2%
Energy	14,220	8%	14,067	7%	13,069	6%	15,706	6%	17,359	7%	18,665	7%	21,305	8%	23,722	8%	25,568	8%	26,867	8%	28,106	8%
Manufacturing	31,891	18%	34,554	18%	40,284	19%	41,739	17%	44,050	18%	44,851	18%	47,586	17%	51,715	18%	54,500	17%	56,212	18%	58,497	17%
Building and public works	9,139	5%	10,542	5%	11,354	5%	12,060	5%	12,040	5%	12,000	5%	12,062	4%	12,434	4%	13,449	4%	14,764	5%	15,447	5%
Tertiary Industry	69,838	38%	73,417	38%	80,736	38%	89,582	37%	96,041	40%	99,639	40%	107,327	38%	110,531	39%	117,848	37%	120,840	38%	128,195	38%
Commerce and import taxes	35,913	20%	37,769	19%	43,530	20%	49,354	20%	51,168	21%	51,313	21%	55,274	20%	55,780	20%	61,496	19%	62,072	20%	66,103	19%
Transport and communication	12,030	7%	12,735	7%	13,205	6%	13,907	6%	15,408	6%	16,465	7%	16,631	6%	17,508	6%	17,980	6%	18,555	6%	20,102	6%
Other services	21,895	12%	22,912	12%	24,002	11%	26,321	11%	29,465	12%	31,861	13%	35,421	13%	37,243	13%	38,372	12%	40,212	13%	41,991	12%
Sub-total	161,677	89%	171,122	88%	188,462	88%	213,102	88%	211,933	87%	216,716	87%	245,189	88%	244,623	87%	278,602	87%	274,955	86%	294,152	86%
Public Administration	19,906	11%	22,809	12%	25,341	12%	29,258	12%	30,979	13%	32,507	13%	34,134	12%	37,079	13%	40,738	13%	43,391	14%	47,234	14%
Total	181,583		193,931		213,803		242,360		242,912		249,223		279,323		281,702		319,340		318,346		341,386	

Source: Annuaire Statistique du Maroc 1993, 1996, and 1999

Tableau 3.1.8 Taux Brut de PIB par Origine Industrielle (Million de DH, Prix Constant de 1980)

	GDP by Industrial Origin (Million DH on 1980 Constant Price Basis)											Average Annual Growth Rate										
	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	'88-'89	'89-'90	'90-'91	'91-'92	'92-'93	'93-'94	'94-'95	'95-'96	'96-'97	'97-'98	10 years '88-'98
Primary Industry	19,885	20,798	19,760	24,048	15,163	14,457	23,333	13,078	23,280	17,120	21,166	4.6%	-5.0%	21.7%	-36.9%	-4.7%	61.4%	-43.9%	78.0%	-26.5%	23.6%	0.6%
Agriculture, forestry, and fishery	19,885	20,798	19,760	24,048	15,163	14,457	23,333	13,078	23,280	17,120	21,166	4.6%	-5.0%	21.7%	-36.9%	-4.7%	61.4%	-43.9%	78.0%	-26.5%	23.6%	0.6%
Secondary Industry	29,252	28,853	31,502	31,599	32,347	32,018	33,298	34,787	36,463	38,535	39,240	-1.4%	9.2%	0.3%	2.4%	-1.0%	4.0%	4.5%	4.8%	5.7%	1.8%	3.0%
Mining	3,983	3,195	3,518	3,115	3,262	3,156	3,426	3,467	3,544	4,088	3,942	-19.8%	10.1%	-11.5%	4.7%	-3.3%	8.5%	1.2%	2.2%	15.3%	-3.6%	-0.1%
Energy	3,360	3,528	3,754	3,928	4,183	4,125	4,448	5,157	5,849	6,276	6,361	5.0%	6.4%	4.6%	6.5%	-1.4%	7.8%	16.0%	13.4%	7.3%	1.3%	6.6%
Manufacturing	17,137	17,031	19,061	19,573	20,099	19,911	20,665	21,429	22,058	22,806	23,360	-0.6%	11.9%	2.7%	-0.9%	3.8%	3.7%	2.9%	3.4%	2.4%	3.1%	
Building and public works	4,772	5,099	5,169	4,983	4,804	4,827	4,760	4,734	5,012	5,365	5,577	6.9%	1.4%	-3.6%	0.5%	-1.4%	-0.5%	5.9%	7.0%	4.0%	1.6%	
Tertiary Industry	36,929	38,077	39,807	42,113	45,068	44,076	45,357	45,059	45,992	46,744	49,406	3.1%	4.5%	5.8%	7.0%	-2.2%	2.9%	-0.7%	2.1%	1.6%	5.7%	3.0%
Commerce and import taxes	19,477	20,476	21,936	23,531	24,974	23,549	23,821	23,429	24,468	24,582	26,463	5.1%	7.1%	7.3%	6.1%	-5.7%	1.2%	-1.6%	4.4%	0.5%	7.6%	3.1%
Transport and communication	5,308	5,381	5,697	5,930	6,864	7,083	7,436	7,568	7,777	7,961	8,497	1.4%	5.9%	4.1%	15.8%	3.2%	5.0%	1.8%	2.8%	2.4%	6.7%	4.8%
Other services	12,145	12,220	12,174	12,653	13,230	13,445	14,100	14,062	13,747	14,200	14,446	0.6%	-0.4%	3.9%	4.6%	1.6%	4.9%	-0.3%	-2.2%	3.3%	1.7%	1.8%
Sub-total	86,065	87,728	91,070	97,760	92,578	90,551	101,988	92,924	105,735	102,399	109,811	1.9%	3.8%	7.3%	-5.3%	-2.2%	12.6%	-8.9%	13.8%	-3.2%	7.2%	2.5%
Public Administration	15,521	16,303	16,572	17,819	18,342	19,246	19,182	20,273	21,292	21,769	22,465	5.0%	1.7%	7.5%	2.9%	4.9%	-0.3%	5.7%	5.0%	2.2%	3.2%	3.8%
Total	101,586	104,031	107,642	115,579	110,920	109,797	121,170	113,197	127,027	124,168	132,276	2.4%	3.5%	7.4%	-4.0%	-1.0%	10.4%	-6.6%	12.2%	-2.3%	6.5%	2.7%

Source: Annuaire Statistique du Maroc 1993, 1996, and 1999

Tableau 4.7.1 Liste d'Agences du Gouvernement sur l'Eau

Activities	MCFE		MOA				MOF				MOI				SCE			MSP			OFFICES					PRIVATE SECTORS		
	DDF	DCRF	AGR-DDGI	AGR-DAH	DRED	DPV	DPA	DGH-DAH	DGH-DRPE	DMN	DGCL-DEA	DAR	DRSC	DSPR	DRC	DPP	INH	DES	DE	ONEP	ORMVA	ONE	IAV-H-I	INRA	EMI	EHTP	Contractors	Others
1. Water Resources Development																												
Surface Water																												
Ground Water																												
River Basins Utilization																												
Sediment Control																												
Groundwater Resources Control																												
2. Water Resources Management																												
Supply and Demand Balance																												
Water Allocations																												
Experimentation																												
Irrigation																												
Feeding domesticates																												
Industrial Utilization																												
Hydroelectric Production																												
Dams Maintenance																												
Maintenance of Irrigation Land																												
3. Controls																												
Flood Speed																												
Flood Quantities																												
Water Quality																												
Water Drainage																												
4. Agriculture and Environment																												
Agriculture																												
Technology Transfer																												
Breeding																												
Fishery																												
Pesticide																												
5. Tourism and Rivers Environmental																												
Lakes and Rivers Preservation																												
Eco-tourism and Forest																												
Biodiversity																												

PI : Planning OM : Operation/Maintenance M : Monitoring RE : Regulation C : Coordination I : Implementati E : Framing R : Research

Tableau 4.7.2 Liste des Abréviations des Agences du Gouvernement

Abbreviations	French	English
MCEF	Ministère Chargé des Eaux et Forêts	Ministry in Charge of Water and Forests
DDF	Direction de Développement Forestier	Directorate of Forest Development
DCRF	Direction de la Conservation des Ressources Forestières	Directorate of Forest Resources Conservation
MOA	Ministère de l'Agriculture, du Développement Rural, et des Pêches Maritimes	Ministry of Agriculture, Rural Development and Maritime Fisheries
AGR	Administration de Genie Rurale	Civil Rural Administration
DDGI	Direction du Développement et de Gestion de l'Irrigation	Directorate of Development and Irrigation Management
DAH	Direction des Aménagements Hydrauliques	Directorate of Hydraulic Development
DERD	Direction de l'Enseignement, de la Recherche, et de Développement	Directorate of Development, Research, and Education
DPV	Direction des Aménagements Végétale	Directorate of Vegetable Production
DPA	Direction de la Production Animale	Directorate of Animal Production
MOE	Ministère de l'Équipement	Ministry of Equipment
DGH	Direction Générale de l'Hydraulique	General Directorate of Hydraulic
DAH	Direction des Aménagements Hydrauliques	Directorate of Hydraulic Development
DRPE	Direction de Recherche et de Planification en Eau.	Directorate of Water Research and Planning
DMN	Direction de Météorologie Nationale	Directorate of National Meteorology
MOI	Ministère de l'intérieur	Ministry of Interior
DGCL	Direction Générale des Collectivités Locales	General Directorate of Local Collectives
DEA	Division des Eaux et d'Assainissement	Division of Water and Sanitation
DAR	Direction des Affaires Rurales	Directorate of Rural Affairs
DRSC	Direction des Régies et des Services Concédés	Directorate of Regis and Concedes Service
SECE	Secrétariat d'Etat Chargé de l'Environnement	Ministry in Charge of Environment
DSPR	Direction de Surveillance et de la Prévision des Risques.	Directorate of Follow up and Risk Prevention
DRC	Direction de Régulation et de Contrôle	Directorate of Control and Regulation
DPP	Direction de Planning et de Protection	Directorate of Protection and Planning
MSP	Ministère de la santé publique	Ministry of Public Health
INH	Institut National d'Hygiène	National Institute of Hygiene
DES	Direction d'Education Sanitaire	Directorate of Sanitation Education
DEI	Direction d'Epidémiologie et Lutte Contre les Maladies	Directorate of Epidemology and Disease Protection
offices		
ONEP	Office National de l'Eau Potable	National Office of Water Supply
ORMVA	Office Régional de la Mise en Valeur Agricole	Regional Office of Agriculture Development
ONE	Office National d'Electricité	National Office of Electricity
IRF	Instituts De Recherche Et De Formation.	Institute of Research and Education
institutes		
IAV H II	Institut Agronomique et Vétérinaire Hassan II	Institution of Agronomy and Veterinary Hassan II
INRA	Institut National de la Recherche Agronomique	National Institute of Agronomic Research
EMI	Ecole Mohammedia des Ingénieurs	Engineering School of Mohammedia
EHTP	Ecole Hassania des Travaux Publics	Public Works School of Hassania

Tableau 5.2.1 Liste des 53 Sites de Barrages de Taille Moyenne Proposés par MOE

No.	JICA No.	Site	Province	Objective	Available water (MCM)	Dam		Volume (m3)	Reservoir vol. (MCM)	Regularised vol.(MCM)	Study for Dams	Study for Agriculture	Authorised by	Others	
						Type	Height (m)								
Legend (for objective)	1	2	TIZMELLAL	AL HOCEIMA	PS, I	57.71	RCC	78	150,000	21.28	12.5	FS		MP	
PS ;protection against siltation	2	1	NECKOR		REG	58	HF	36.4	1,577,500	15.6	-	FS		MP	
	3		TOUIZGUI REMZ	ASSA ZAG	I, SL	13.5	M	17.7	45,900	78	-			MP	
I ;irrigation	4	4	AIN KWACHIYA	BENSLIMANE	I, SP	7	RCC	30	78,000	11	0.6	FS	PS	SYP	
SP;supply of potable water	5		CHERRAT(1)	#	I, SP	16	RCC	29	52,000	7	3			MP	
SL;supply of livestock water	6	5	N'FIFIKH	#	I, SP,SL	26	RCC	44	99,100	52.5	-	FS for downstream site, PS for upstream site	IS	MP,SYP	dimension of each items are for downstream site
SG;supply for ground water	7	6	TAZARANE	CHAOUEN	I, PS	16.7	CF	64	446,100	9.2	7	FS		MP	
FC;flood control	8	10	TIMKIT	ERRACHIDIA	I, SG	7.5	RCC	56	136,500	14	-	FS	IS	MP,SYP,PJJ	
REG;regulation for downstream dam	9	12	TIQUIZAGUINE(2)	#	I, SP	4.73	RCC	58.7	128,000	10.2	-	PS	IS	MP	
PC;	10	14	ADAROUCHE	IFRANE	I, SL,SP	95	RCC	51	130,000	48	16	FS	RCC(e)	SYP	
	11		KHANNOUSSA	KHEMISSET	SP	15	RCC	41.5	105,000	22.7	6.8			MP	
	12	7	AMEZMIZ	EL HAOUZ	I, REG	10	RCC	72.5	241,800	11	6	FS	IS	MP	
Legend (for dam type)	13	18	BOUKARKOUR	SETIAT	I, SP,SL	30	RCC	59.5	172,140	30.1	13.6	FS		MP	
RCC;roller compacted concrete	14		AIN ABDOUN	TAOUNATE	I, PS	20.87	RCC	57.5	299,900	10.5	9			MP	
	15	22	N'OUANTZ	BENSLIMANE	I, PS	2	RCC	43.4	76,000	2	-	FS	IS	LR	
	16	23	IGUI N'OUAQA	TAROUDANT	FC,SG,I	7	RCC	57	186,200	10.5	4	FS		MP	
NC;normal concrete	17	25	SIDI ABDELLAH	#	SG,I	20	ZF	69	2,005,300	10.37	8.2	FS		MP	
HF ;homogeneous fill type	18	3	AIT ABDDOU	AZIRLAL	PS	93.7	ZF	50	800,000	52	-	PS	IS	MP	
ZF;zoned fill type	19		AIN KSOB	BENSLIMANE	I, SL	12.9	RCC	60	170,000	25	-			MP	
CF;concrete facing	20		MY BOUCHTA	CHEFCHAOUEN	REG	-	RCC	-	-	-	-			MP	
M ;masonry	21	11	TADIGHOUST	ERRACHIDIA	I	35.7	RCC	63	504,060	37	-	PS		MP	
	22		IGOUZOLANE	ESSAOUIRA	SP	17	RCC	40	930,000	13	-			MP	
	23	13	KHENG GROU	FIGUIG	SG,I	91.5	RCC	70	325,000	90	-	FS	IS	MP	
	24	15	SIDE OMAR	KHEMISSET	I	17	RCC	59	222,000	35	-	PS	IS	MP	
Legend (for study)	25		SIDE AMAR	KHENIFRA	REG	55.8	RCC	47.5	120,000	62.83	28			MP	
FS;feasibility study finished	26		CHACHA N'MELAH	#	PS,REG	320	RCC	87.7	542,140	168.3	-			MP	
FSO;feasibility study on going	27	8	BOULAOUANE	CHICHAOUAN	I	57	RCC	82	799,000	56	28	PS	IS	MP,SYP	
PS;preliminary study finished	28	9	TASKOURT	#	I	49	RCC	88	457,000	106	-	PS(e)	IS	MP,SYP	
IS;initial preliminary study	29	16	TIQUINE	OUERZAZATE	I, FC	102	RCC	68.5	405,530	102.9	-	PS	IS	MP	
	30	17	AZGHAR	SEFROU	I	53	RCC	55	299,280	40	-	PS	IS	LR	
	31	19	AOULAI	TAOUNATE	I, PS	247	RCC	50	310,500	225	99	PS		MP	
	32	20	SIDI ABBOU	#	I	82.6	RCC	30	32,000	58	32	PS(e)		MP	
	33	24	ABDEL MOUMEN AMONT	TAROUDANT	-	-	RCC	-	-	-	-	PS(e)	IS	MP	
			Compensation dam for downstream MANSSOUR	OUERZAZATE	I	-	NC		20	135000	7.8	-		MP	
Legend (for authorization)	34		EDDAHBI Dam												
MP;master plan for each main water basin	35		HERRISSEN	MARRAKECHE	I	10.4	HF	48	335,000	19	-			MP	
5FP;5 year plan(1999-2003)	36		TILIOUINE	OUERZAZATE	SG	9.5	CF	25	230,000	9.7	-			MP	
PJJ;master plan study by JICA	37		ALLOUGOUM	TATA	FC	37	CF	30	930,000	28	-			MP	
	38		IMI OUZLAGH	#	SG,I	8.8	CF	37	700,000	10.8	-			MP	
	39		TIMALIZANE	MARRAKECHE	I	141	HF	53	1,600,000	20	-			MP	
	40	21	SIDI EL MOKHFI	TAOUNATE	I, SL	195	RCC	65	1,500,000	26	-	PS		PJJ	
	41		FOUM LAHCEN	ASSA ZAG	I, SL	30	CF	25	425,000	40	-			MP	
	42		IMIZER	MARRAKECHE	I	96	HF	55	1,500,000	60	-			MP	
	43		HANEDOUR	OUERZAZATE	I, SL	2.5	RCC	40	100,000	17	-			MP	
	44		SARHRO	ERRACHIDIA	I	1	HF	32	400,000	4	-			PJJ	
	45		MY BRAHIM	MARRAKECHE	I	34	HF	55	2,425,000	36.4	-			MP	
	46		IMEDER	ERRACHIDIA	I	20.5	RCC	31	258,000	38	-			MP	
	47		MENZOURA	LARACHE	I, SP	by Provinces	HF	60	670,000	80	-			MP	
	48		EL LIAM	TANGER	SP	34	CF	60	1,200,000	60	-			MP	
	49		IMIN TOURZA	OUERZAZATE	I	3.5	CF	30	300,000	45	-			MP	
	50		ALILA	TETOUAN	SP	3	HF	25	120,000	4	-			MP	
	51		LALLA LOUMA	KENITRA	I	21	HF	25	1,300,000	27	-			MP	
	52		OUIZEIT	BOULMANE	I	12.5	RCC	47	120,000	20	-			MP	
	53		MSALIT	TATA	FC	34	CF	30	350,000	52	-			MP	

**Tableau 5.3.1 Référence Évapotranspiration (Eto) pour Chaque Zone
(Méthode de Penman Modifiée)**

Zone	Zones I and II		Zone III		Zone IV		Zon
Month/Unit	mm	mm/day	mm	mm/day	mm	mm/day	mm
January	73	2.45	86	2.87	87	2.91	81
February	87	3.05	102	3.59	105	3.68	98
March	134	4.32	155	4.99	157	5.07	150
April	157	5.24	184	6.13	185	6.17	179
May	196	6.32	221	7.14	232	7.48	225
June	233	7.77	247	8.25	256	8.52	250
July	261	8.42	271	8.76	261	8.43	264
August	223	7.20	232	7.49	222	7.15	220
September	174	5.79	184	6.14	180	5.99	179
October	141	4.54	155	4.99	156	5.03	152
November	94	3.13	108	3.61	106	3.52	100
December	70	2.25	85	2.73	84	2.71	79
Annual Mean	1,843	(60.48)	2,030	(66.69)	2,031	(66.66)	1,977
Monthly Mean	154	(5.04)	169	(5.56)	169	(5.56)	165

- Notes:
- (1) ETo for Zones I and II is calculated using the meteorological data observed at the Fes-Sais Station.
 - (2) ETo for Zone III is calculated using the meteorological data observed at the Marrakech Station.
 - (3) ETo for Zone IV is calculated using the meteorological data observed at the Quarzazate Station.
 - (4) ETo for Zone V is calculated using the meteorological data observed at the Rachidia Station.
 - (5) Meteorological data used for the calculation of Eto for each zone are 20 years from 1980 to 1999.

Tableau 5.3.2 Besoins d'Alimentation par le Projet pour Chaque Zone

(Unit : mm/month)

Zone Month	Zone I				Zone II				Zone III				Zone IV				Zone V			
	Etcrop	Po	In	V	Etcrop	Po	In	V	Etcrop	Po	In	V	Etcrop	Po	In	V	Etcrop	Po	In	V
September	12.4	5.0	7.4	14.2	6.7	5.0	1.7	3.3	3.4	1.5	1.9	3.7	6.3	2.4	3.9	7.5	11.7	4.2	7.5	14.4
October	24.7	10.5	14.2	27.3	22.0	10.5	11.5	22.1	19.9	4.3	15.6	30.0	22.4	9.1	13.3	25.6	24.3	10.7	13.6	26.2
November	38.2	25.1	13.1	25.2	38.9	25.1	13.8	26.5	39.9	10.3	29.6	56.9	40.3	8.0	32.3	62.1	37.2	8.9	28.3	54.4
December	49.4	33.2	16.2	31.2	50.9	33.2	17.7	34.0	59.1	11.6	47.5	91.3	56.3	8.0	48.3	92.9	50.6	7.7	42.9	82.5
January	69.2	29.0	40.2	77.3	69.0	29.0	40.0	76.9	84.0	19.8	64.2	123.5	75.6	6.2	69.4	133.5	69.2	6.1	63.1	121.3
February	90.1	30.3	59.8	115.0	86.9	30.3	56.6	108.8	112.1	20.5	91.6	176.1	96.6	12.2	84.4	162.3	92.3	9.8	82.5	158.6
March	110.5	32.5	78.0	150.0	105.9	32.5	73.4	141.1	133.4	35.5	97.9	188.3	114.2	9.1	105.1	202.1	112.5	5.5	107.0	205.8
April	85.2	31.0	54.2	104.2	80.0	31.0	49.0	94.0	100.1	25.1	75.0	144.2	86.6	3.7	82.9	159.4	88.4	6.2	82.2	158.1
May	46.5	22.2	24.3	46.7	43.0	22.2	20.8	40.0	43.5	5.8	37.7	72.5	46.4	3.3	43.1	82.9	48.6	5.1	43.5	83.7
June	28.5	-	28.5	54.8	29.8	-	29.8	57.3	12.5	-	12.5	24.0	30.1	2.8	27.3	52.5	27.8	4.2	23.6	45.4
July	30.2	-	30.2	58.1	33.9	-	33.9	65.2	11.1	-	11.1	21.3	31.3	1.4	29.9	57.5	27.8	-	27.8	53.5
August	21.5	-	21.5	41.3	20.4	-	20.4	39.2	7.3	-	7.3	14.0	18.6	5.4	13.2	25.4	19.3	-	19.3	37.1
Annual Mean	606.4	218.8	387.6	745.3	587.4	218.8	368.6	708.4	626.3	134.4	491.9	945.8	624.7	71.6	553.1	1,063.7	609.7	68.4	541.3	1,041.0

- Notes:
- (1) ETCrop : Crop water requirement
 - (2) Pe : Effective rainfall
 - (3) In : Net irrigation requirement
 - (4) V: Project supply requirement

Tableau 6.1.1 Résultat d'Evaluation des Aspects Sociaux

		I		II		III		IV		Total Score	Rank
		Project Function and its Conformity with Basic Development	Status in the Government Development Program	Urgency for Project Implementation	Effects on Stabilization of Social Condition						
		Level	Score	Level	Score	Level	Score	Level	Score		
1	NECKOR	B	1	B	1	A	2	C	0	4	B
2	TIZIMELLAL	C	0	B	1	B	1	C	0	2	C
3	AIT BADDOU	B	1	B	1	B	1	C	0	3	C
4	AIN KWACHIYA	A	2	A	2	B	1	A	2	7	A
5	N'FIFIKH	A	2	A	2	A	2	A	2	8	A
6	TAZARANE	B	1	B	1	B	1	B	1	4	B
7	AMEZMIZ	A	2	B	1	B	1	B	1	5	B
8	BOULAOUANE	A	2	A	2	B	1	B	1	6	B
9	TASKOURT	A	2	A	2	B	1	A	2	7	A
10	TIMKIT	A	2	A	2	A	2	A	2	8	A
11	TADIGHOUST	B	1	B	1	C	0	A	2	4	B
12	TIOUZAGUINE	B	1	B	1	C	0	B	1	3	C
13	KHENG GROU	B	1	B	1	C	0	A	2	4	B
14	ADAROUCHE	B	1	A	2	B	1	B	1	5	B
15	SIDI OMAR	B	1	B	1	C	0	A	2	4	B
16	TIWINE	B	1	B	1	B	1	A	2	5	B
17	AZGHAR	A	2	B	1	A	2	A	2	7	A
18	BOUKARKOUR	B	1	B	1	B	1	A	2	5	B
19	AOULAI	B	1	B	1	B	1	B	1	4	B
20	SIDI ABBOU	B	1	B	1	B	1	B	1	4	B
21	SIDI EL MOKHFI	A	2	B	1	B	1	A	2	6	B
22	N'OUANTZ	B	1	B	1	B	1	C	0	3	C
23	IGUIN' OUAQA	A	2	B	1	A	2	B	1	6	B
24	AMOUNT ABDELMOUMEN	A	2	B	1	B	1	B	1	5	B
25	SIDI ABDELLAH	A	2	B	1	A	2	A	2	7	A

Note : Total score and relevant rank

<4 : C (Poor)
 4,5,6 : B (Fair)
 7,8 : A (Good)

Tableau 6.1.2 Résultat d'Evaluation de la Faisabilité Technique

		I	II	III	IV	V			
	Dam	Irrigation	Water Supply	Groundwater Restoration	Flood and Sediment	Total Score	Level	Insufficient Maturity in Planning and/or Study	
1	NECKOR	15				17	32	C	
2	TIZIMELLAL							X	
3	AIT BADDOU	23	6			20	49	B	
4	AIN KWACHIYA	28	22	4		3	57	B	
5	N'FIFIKH	25	28	4		7	64	A	
6	TAZARANE	18	31	3		0	52	B	
7	AMEZMIZ	23	31	3		10	67	A	
8	BOULAOUANE	28	31	3		7	69	A	
9	TASKOURT	23	31	3		7	64	A	
10	TIMKIT	30	28	4	3	2	67	A	
11	TADIGHOUST	23	35	4		2	64	A	X
12	TIOUZAGUINE	28	24	8		3	63	A	X
13	KHENG GROU	35	26	4		2	67	A	X
14	ADAROUCHE	35	23	7		3	68	A	X
15	SIDI OMAR	30	26	3		3	62	A	
16	TIWINE	28	22	3		5	58	B	X
17	AZGHAR	33	33	4		3	73	A	
18	BOUKARKOUR	35	13	2		5	55	B	X
19	AOULAI	25	20	3		2	50	B	
20	SIDI ABOU	30	18	3		7	58	B	X
21	SIDI EL MOKHFI	30	20	3		5	58	B	
22	N'OUANTZ							X	
23	IGUIN' OUAQA	28	16	4	0	3	51	B	X
24	AMOUNT ABDELMOUMEN	30				33	63	A	X
25	SIDI ABDELLAH	20	18	5	0	3	46	B	X

Note: Serious problem is identified. : X
 <40 : C
 40 < <60 : B
 60 < : A

**Tableau 6.1.3 Résultats de Recherche Environnementale de
l'Impact Négatif sur l'Environnement Naturel**

Dam Sites	A ⁽¹⁾ (×2)		B ⁽²⁾ (×3)		C ⁽³⁾ (×4)		D ⁽⁴⁾ (×1)		Total Points	Rank*
	No	Points	No	Points	No	Points	No	Points		
1	15	30	5	15	1	4	5	5	54	A
2	18	36	3	9	0	0	8	8	53	A
3	22	44	1	3	0	0	7	7	54	A
4	25	50	0	0	0	0	5	5	55	A
5	21	42	0	0	1	4	9	9	55	A
6	19	38	1	3	0	0	6	6	47	A
7	19	38	3	9	0	0	7	7	54	A
8	18	36	3	9	1	4	6	6	55	A
9	17	34	6	18	0	0	6	6	58	B
10	21	42	0	0	0	0	6	6	48	A
11	19	38	2	6	0	0	8	8	52	A
12	25	50	0	0	0	0	4	4	54	A
13	19	38	3	9	1	4	4	4	55	A
14	19	38	4	12	0	0	8	8	58	B
15	24	48	0	0	1	4	6	6	58	B
16	16	32	5	15	1	4	7	7	58	B
17	22	44	1	3	0	0	5	5	52	A
18	19	38	1	3	0	0	9	9	50	A
19	16	32	4	12	4	16	7	7	67	C
20	19	38	5	15	0	0	6	6	59	B
21	20	40	3	9	3	12	6	6	67	C
22	19	38	0	0	0	0	7	7	45	A
23	18	36	0	0	0	0	6	6	42	A
24	14	28	1	3	0	0	7	7	38	A
25	19	38	2	6	2	8	7	7	59	B

- (1) A: Minor impact (No of As x 2 = Points)
(2) B: Moderate impact (No of Bs x 3 = Points)
(3) C: Significant impact (No of Cs x 4 = Points)
(4) D: Impact is unknown (No of Ds x 1 = Points)

- * A: Minor impact (<55 points)
B: Moderate impact (56 – 60)
C: Significant impact (>61 points)

Tableau 6.1.4 Sites Classifiés Selon l'Impact Négatif Potentiel Social

Dam Sites	A ⁽¹⁾ (×4)		B ⁽²⁾ (×3)		C ⁽³⁾ (×2)		D ⁽⁴⁾ (×1)		Total Points	Rank
	No	Points	No	Points	No	Points	No	Points		
1	12	48	5	15	33	66	7	7	136	H
2	0	0	4	12	26	52	4	4	68	C
3	4	16	11	33	30	60	4	4	103	H
4	0	0	2	6	9	18	2	2	26	A
5*	2	8	9	27	5	10	3	3	38	A
5**	15	60	6	18	15	30	3	3	111	H
6	0	0	6	18	20	40	3	3	61	C
7	3	12	7	21	21	42	2	2	77	C
8	1	4	1	6	17	34	2	2	46	B
9	1	4	5	15	18	36	3	3	58	B
10	0	0	3	9	11	22	6	6	37	A
11	0	0	0	0	6	12	5	5	17	A
12	0	0	4	12	9	8	6	6	36	A
13	2	8	4	12	17	34	5	5	59	B
14	0	0	0	0	16	32	4	4	36	A
15	0	0	1	3	16	32	2	2	37	A
16	1	4	3	9	6	12	2	2	27	A
17	0	0	0	0	15	30	2	2	32	A
18	0	0	0	0	14	28	2	2	30	A
19	7	28	8	24	8	16	2	2	70	C
20	0	0	8	24	8	16	2	2	42	B
21	0	0	5	15	13	26	2	2	43	B
22	11	44	4	12	8	16	3	3	75	C
23	0	0	3	0	18	36	2	2	47	B
24	8	32	2	6	7	14	2	2	54	B
25	0	0	0	0	14	28	2	2	30	A

Rank-A: Site having a minor negative social impact (<40)

Rank-B: Site having a moderate negative social impact (40 – 60)

Rank-C: Site having a significant negative social impact (>60)

Rank-H: Site having critical negative social impact exceeding Class C (>100)

5* N'Fifikh (Upstream)

5** N'Fifikh (Downstream)

Tableau 6.1.5 Résultats d'Analyse Économique

Project	EIRR (%)	B/C DR=5%	NPV(Unit: million DH)			
			DR=5%	DR=6%	DR=8%	DR=10%
ZONE I						
No. 6 Tazarane	4.2%	0.89	-24.2	-47.9	-82.3	-105.2
No. 19 Aoulai	9.3%	1.64	441.8	300.5	94.7	-43.8
No. 21 Sidi El Mokhfi	9.1%	1.61	316.2	212.5	61.4	-40.2
No. 17 Azghar	8.1%	1.45	118.8	71.6	3	-43
ZONE II						
No. 4 Ain Kwachiya	6.1%	1.14	14.7	0.7	-19.6	-33.2
No. 5 N'Fifikh (Upper)	7.8%	1.39	60.4	34.2	-3.9	-29.5
No. 15 Sidi Omar	7.2%	1.31	84.4	40.5	-23.4	-66.3
ZONE III						
No. 7 Amezmiz	7.4%	1.35	72.5	37.6	-13	-46.7
No. 8 Boulaouane	6.5%	1.21	36.6	10.8	-26.6	-51.6
No. 9 Taskourt	7.6%	1.37	234.7	129.1	-24	-127.3
ZONE V						
No. 10 Timkit	5.7%	1.09	19.6	-9.3	-24.3	-79.1

Note: DR means discount rate applied for calculation of B/C and NPV.

Tableau 6.2.1 Résultat d'Identification des Priorités (1/3)

Classification	D				C		A & B						GROUPING
	Serious Problem in;				Maturity in Planning and/or Low Economic Viability (EIRR less than		Scoring						
	Social Aspects	Technical Aspects	Natural Environmental Aspects	Social Environmental Aspects			Social Aspects (max. 20)	Technical Feasibility (max.20)	Natural Environmental Impact (max.10)	Social Environmental Impact (max. 10)	Economic Viability (max. 40)	Total Score	
Evaluation Factor	7.1	7.2	7.3	7.4	7.2	7.5	7.1	7.2	7.3	7.4	7.5		
Relevant Chapter	7.1	7.2	7.3	7.4	7.2	7.5	7.1	7.2	7.3	7.4	7.5		
No. Name													
Zone I													
1 Neckor		X	-	X	-	-	-	-	-	-	-	-	D
2 Tizimellal		X	-	-	-	-	-	-	-	-	-	-	D
6 Tazarane						X	-	-	-	-	-	-	C
19 Aoulai							10	10	0	0	40	60	B
21 Sidi El Mokhfi							10	10	0	5	40	65	B
20 Sidi Abbou					X	-	-	-	-	-	-	-	C
14 Adarouch					X	-	-	-	-	-	-	-	C
17 Azghar							20	20	10	10	20	80	A
Zone II													
4 Ain Kwachiya				X	-	-	20	10	10	10	20	70	B
5 N'fifikh (lower)							-	-	-	-	-	-	D
5 N'fifikh (upper)							20	20	10	10	20	80	A
15 Sidi Omar							10	20	5	10	20	65	B
18 Bourkarkour					X	-	-	-	-	-	-	-	C

Points for Scoring

- | | |
|---------------------------------|---|
| 1 Social Aspects: | Good; 20, Fair; 10, Poor; 0 |
| 2 Technical Feasibility: | Good; 20, Fair; 10, Poor; 0 |
| 3 Natural Environmental Impact: | Minor Impact; 10, Moderate Impact; 5, Significant Impact; 0 |
| 4 Social Environmental Impact: | Minor Impact; 10, Moderate Impact; 5, Significant Impact; 0 |
| 5 Economic Viability: | EIRR more than 8% and NPV (DR=5%) more than 200 mil. DH; 40
EIRR 8%-5%; 20
NPV (DR=5%) less than 200mil. DH; 20 |

Tableau 6.2.1 Résultat d'Identification des Priorités (2/3)

Classification	D				C		A & B						GROUPING
	Serious Problem in;				Insufficient Maturity in Planning and/or Study	Low Economic Viability (EIRR less than 5%)	Scoring						
	Social Aspects	Technical Aspects	Natural Environmental Aspects	Social Environmental Aspects			Social Aspects (max. 30)	Technical Feasibility (max.20)	Natural Environmental Impact (max.10)	Social Environmental Impact (max. 10)	Economic Viability (max. 30)	Total Score	
Evaluation Factor	7.1	7.2	7.3	7.4	7.2	7.5	7.1	7.2	7.3	7.4	7.5		
Relevant Chapter	7.1	7.2	7.3	7.4	7.2	7.5	7.1	7.2	7.3	7.4	7.5	Total Score	GROUPING
No. Name													
Zone III													
3 Ait Baddou				X	-	-	-	-	-	-	-	-	D
22 N'ouantz		X	-	-	-	-	-	-	-	-	-	-	D
7 Amezmiz							15	20	10	0	15	60	B
8 Boulaouane							15	20	10	5	15	65	B
9 Taskourt							30	20	5	5	15	75	A
Zone IV													
23 Igui N'ouaqa					X	-	-	-	-	-	-	-	C
24 Amont Abdelmoumen					X	-	-	-	-	-	-	-	C
25 Sidi Abdellah					X	-	-	-	-	-	-	-	C
16 Tiouine					X	-	-	-	-	-	-	-	C

Points for Scoring

- 1 Social Aspects: Good; 20, Fair; 10, Poor; 0
- 2 Technical Feasibility: Good; 20, Fair; 10, Poor; 0
- 3 Natural Environmental Impact: Minor Impact; 10, Moderate Impact; 5, Significant Impact; 0
- 4 Social Environmental Impact: Minor Impact; 10, Moderate Impact; 5, Significant Impact; 0
- 5 Economic Viability: EIRR more than 8% and NPV (DR=5%) more than 200 mil. DH; 30
EIRR 8%-5%; 15
NPV (DR=5%) less than 200mil. DH; 15

Tableau 6.2.1 Résultat d'Identification des Priorités (3/3)

Classification	D				C		A & B						GROUPING	
	Serious Problem in;				Insufficient Maturity in Planning and/or Study	Low Economic Viability (EIRR less than 5%)	Scoring							
	Social Aspects	Technical Aspects	Natural Environmental Aspects	Social Environmental Aspects			Social Aspects (max. 40)	Technical Feasibility (max.20)	Natural Environmental Impact (max.10)	Social Environmental Impact (max.10)	Economic Viability (max.20)	Total Score		
Evaluation Factor Relevant Chapter	7.1	7.2	7.3	7.4	7.2	7.5	7.1	7.2	7.3	7.4	7.5			
No. Name														
Zone V														
10 Timkit							40	20	10	10	10	90	A	
11 Tadighoust					X	-	-	-	-	-	-	-	C	
12 Tiouzaguine					X	-	-	-	-	-	-	-	C	
13 Kheng Grou					X	-	-	-	-	-	-	-	C	

Points for Scoring

- 1 Social Aspects: Good; 20, Fair; 10, Poor; 0
- 2 Technical Feasibility: Good; 20, Fair; 10, Poor; 0
- 3 Natural Environmental Impact: Minor Impact; 10, Moderate Impact; 5, Significant Impact; 0
- 4 Social Environmental Impact: Minor Impact; 10, Moderate Impact; 5, Significant Impact; 0
- 5 Economic Viability: EIRR more than 8% and NPV (DR=5%) more than 200 mil. DH; 20
EIRR 8%-5%; 10
NPV (DR=5%) less than 200mil. DH; 10