

*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 III    Rapport de Soutien (1) sur Étude de Base  
Rapport de Soutien II  
Hydrologie et Reduction des  
Inondations*

***Tables***

**Table II.1.1.1: Agence de bassins des cours d'eau de la DGH**

DRH/DPE	Rivers
1. TETOUAN	
TETOUAN	CHEKKOUR, HAJRA, MARTIL, ASMIR, AMASSA, NAKHLA, EL KERIR
TANGER	TAIFINE, KHAROUB, KHOBZ, AYACHA, HARRICHA
LARRACHE	EL MAKHAZINE, OURROUR, AZLA, EL MAKHAZINE, LOUKKOS
CHEFCHAOUEN	SOURCE, LAOU, M'GHAR, LOUKKOS, OUGHANE, OURINGA
2. OUJDA	
OUJDA	MOULOUYA, ZEGZEL, ISLY, ELHAY
TAZA	ZA, MOULOUYA, M'SOUN, MELLOULOU, EL MANSOUR
AL HOCEIMA	NEKKOR, SI AISSA, BRART, RHISS, BENI BOU FRAH
NADOR	KERT
BOULMANE	MOULOUYA, CHEG EL ARD, ANJIL
KHENIFRA	ANSEGMIR, MOULOUYA, SOURCE, TAARTE
3. FES	
FES	MDEZ, SEBOU, LYHOUDI, SOURCE
MEKNES	MIKKES, SOURCE
TAOUNATE	OUARGHA, LEBENE, S'RA, AMZEZ, AOUDOUR, AOULAI, EL KEBIR, AOUDIAR
BOULMANE	GUI GOU, MAASSER, INAOUENE, LAHDAR, EL ARBAA
TAZA	INAOUENE, LAHDAR, EL ARBAA
IFRANE	GUI GOU, TIGRIGRA, AMGHASS, LAC AGUELMAN, LAC DAYT AOUA, IFRANE
KHENIFRA	AMANGOUSS, LAC AGUELMAN, AGUELMAN
KHEMISSAT	BEHT
SIDI KACEM	SEBOU, OURGHA, R'DAT
KENITRA	SEBOU, M'DA, DRADER
4. BEN SLIMANE	
KHOURIBGA	GROU
KHEMISSAT	HANTATA, AGUENOUR, GROU, MECHRA, TABAHART, BOU REGREG, KORIFLA
RABAT	BOU REGREG, CHERRAT, YKEM
BEN SLIMANE	N'FIFIKH
CASA	
SETTAT	MAZER, EL AHMAR, TAMDROST
5. BENI MELLAL	
BENI MELLAL	SOURCE, OUM ERBIA, DERNA, OUIRINE
KHENIFRA	OUM ERBIA, CHBOUKA, OUAOUMANA, SROU
AZILAL	EL ABID, BERNAT, AHANCAL, GHAZEF, TESSAOUT, LAKHDAR
EL KALAA	TESSAOUT, LAKHDAR
6. MARRAKECH	
MARRAKECH	TESSAOUT, ZAT, OURIKA, RERAYA, N'FIS, AMIZMIZ, ASIF EL MAL, CHICHAOUA, SEKSAOUA, TENSIFT
EL KELAA	R'DAT, BOUCHANE
ESSAOUIRA	TENSIFT, IGROUNZAR, ZELTENE, KSOB
SAFI	
7. AGADIR	
AGADIR	SOUSS, AIT AMER, LAC TIMICHA, LAC TAGUANZA
OUARZAZATE	EL MALEH, IMINI, DADES, OUARZAZATE, N'AIT DOCHEN, M'GOUNE, N'AIT DOCHEN, IRIRI, AMAGHA, BOU IKOULA, OUSSIKIS, IZERKI, DRAA
TAROUDANT	ISSEN, SOUS, IOUZIOUA, IMMARGUEN, BOUDRIOUIL, DRAIN, TIFNOUTE, LEMDAD, ZAGMOUZEN, TARGA, WAAR
TIZNIT	AMAGHOUZ, IFNI, ASSAKA, ADOUDOU
GUELMIM	ASSAKA, ESSAYAD, BOU ISSAFEN, LAC IMMAOUNE
TATA	TATA, ZGUID, TAMANARTE
TANTAN	BEN KHELIL, DRAA
8. ER RACHIDIA	
ERRACHIDIA	RHERIS, SIDI HAMZA, GUIR, AFOUS, ZIZ, IFFER, FERKALA
OUARZAZATE	TODRA
FIGUIG	BOUANANE, GUIR, ZIZ
BOUARFA	SOURCE
9. SAHARA	
LAAYOUNE	
ED DAKHLA	
GUELMIM	ASSAKA, ESSAYAD, BOU ISSAFEN, LAC IMMAOUNE
TANTAN	BEN KHELIL, DRAA
ASSAZAG	
ESSEMARA	
LAGWIRA	
(Remarks)	DRH: Regional Directorate of Hydrology, DPE: Provintioa Directorate of Equipment

**Table II.2.3.1: Conditions Meteorologiques aux Stations Representatives**

<b>FES-SAIS</b>													
ITEM	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC	REMARKS
Tave(°C)	9.0	10.5	12.6	14.2	17.1	21.5	25.8	25.5	22.8	18.1	13.8	10.4	16.8 :Ave.
Tmax(°C)	21.0	23.3	26.6	29.4	32.0	37.6	41.6	40.8	37.4	31.2	26.8	21.3	41.6 :Max.
Tmin(°C)	-2.0	-1.1	0.6	2.3	4.2	8.3	11.5	12.3	9.7	6.1	1.8	-0.8	-2.0 :Min.
Rmon(mm)	50.4	52.8	56.6	53.9	38.7	11.8	0.8	4.3	18.0	38.1	53.0	57.8	436 :Total
H06(%)	81.1	83.1	83.4	85.8	86.3	80.6	67.9	67.8	71.5	76.8	77.5	81.7	78.6 :Ave.
H12(%)	59.7	61.4	58.5	56.8	54.1	47.5	39.1	41.7	44.7	50.1	54.4	59.6	52.3 :Ave.
H18(%)	68.8	66.5	59.4	56.9	50.5	40.9	32.0	34.9	40.0	52.8	65.2	71.3	53.3 :Ave.
Have(%)	69.8	70.4	67.1	66.5	63.6	56.3	46.3	48.1	52.0	59.9	65.7	70.8	61.4 :Ave.
Evap(mm)	70.9	84.0	128.6	149.3	188.9	254.6	356.5	314.2	229.7	159.5	98.7	74.1	2109 :Total
Sun(hr)	209.4	197.1	240.6	241.8	270.5	309.3	337.4	318.1	264.4	246.4	208.5	205.8	3049 :Total
Wsp(m/s)	36	28	28	26	29	29	34	35	31	29	35	35	36.0 :Max.

<b>MARRAKECH</b>													
ITEM	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC	REMARKS
Tave(°C)	12.1	14.0	16.5	18.1	20.9	24.5	28.7	28.4	25.6	21.3	16.8	13.2	20.0 :Ave.
Tmax(°C)	24.3	27.3	30.6	33.9	35.8	39.7	44.1	42.9	40.2	33.8	29.8	24.6	44.1 :Max.
Tmin(°C)	1.8	3.8	5.7	7.4	9.8	13.6	15.7	16.4	14.6	11.0	5.7	2.7	1.8 :Min.
Rmon(mm)	31.7	32.7	46.9	26.3	10.9	4.3	1.2	2.6	7.4	16.1	28.7	21.7	230 :Total
H06(%)	79.5	82.0	79.9	79.6	78.9	77.7	69.7	69.7	71.8	74.8	77.7	79.9	76.8 :Ave.
H12(%)	54.7	55.8	52.6	49.9	48.3	47.0	40.6	42.1	44.9	49.0	51.2	54.3	49.2 :Ave.
H18(%)	55.3	46.3	41.3	39.5	35.3	32.2	26.1	27.6	32.2	40.3	47.7	51.8	39.6 :Ave.
Have(%)	63.2	61.4	57.9	56.3	54.2	52.3	45.5	46.5	49.6	54.7	58.9	62.0	55.2 :Ave.
Evap(mm)	127.8	134.6	187.8	200.1	247.9	296.2	397.0	385.7	310.1	246.7	175.4	140.9	2850 :Total
Sun(hr)	230.1	214.1	247.5	267.6	300.2	320.7	330.1	310.9	260.3	250.8	231.2	233.9	3197 :Total
Wsp(m/s)	27	22	27	30	28	37	33	28	26	26	27	29	37.0 :Max.

<b>OUARZAZATE</b>													
ITEM	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC	REMARKS
Tave(°C)	9.1	11.8	15.0	18.0	22.1	26.6	29.8	29.1	25.2	19.8	14.3	10.2	19.2 :Ave.
Tmax(°C)	21.4	24.7	27.5	30.3	34.4	38.1	39.8	39.2	36.8	31.3	26.3	22.2	39.8 :Max.
Tmin(°C)	-2.2	0.1	3.3	5.6	9.3	14.2	17.9	17.1	12.9	8.6	2.7	-0.9	-2.2 :Min.
Rmon(mm)	10.7	21.1	15.8	6.4	5.7	4.8	2.4	9.4	10.9	15.7	13.8	13.9	131 :Total
H06(%)	62.1	61.3	54.7	48.8	45.4	39.2	31.9	36.3	46.2	55.3	62.8	64.2	50.7 :Ave.
H12(%)	43.0	40.6	33.0	27.2	24.1	19.8	16.2	19.6	26.5	34.2	41.5	47.0	31.0 :Ave.
H18(%)	32.5	30.2	25.4	21.6	19.0	15.0	12.6	15.6	22.1	27.9	34.6	38.9	24.6 :Ave.
Have(%)	45.9	44.0	37.7	32.5	29.5	24.7	20.2	23.8	31.6	39.1	46.3	50.0	35.4 :Ave.
Evap(mm)	118.7	146.3	210.7	269.1	333.6	380.8	435.8	390.7	285.9	214.9	139.6	110.5	3037 :Total
Sun(hr)	260.3	250.6	288.5	316.1	343.3	339.6	324.6	293.8	268.5	275.2	259.9	256.5	3477 :Total
Wsp(m/s)	34	35	31	45	52	41	38	36	52	30	27	34	52.0 :Max.

<b>RACHIDIA</b>													
ITEM	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC	REMARKS
Tave(°C)	8.3	11.1	14.6	18.2	22.5	27.7	31.3	30.6	25.9	19.4	13.7	9.3	19.4 :Ave.
Tmax(°C)	20.8	23.8	27.2	30.5	34.6	39.1	40.8	40.0	37.3	31.6	25.7	21.8	40.8 :Max.
Tmin(°C)	-2.3	0.2	3.3	6.3	9.2	15.4	19.1	18.8	13.9	8.4	2.0	-1.5	-2.3 :Min.
Rmon(mm)	10.0	16.0	9.1	10.2	8.4	6.9	2.4	2.9	6.9	17.6	14.6	12.6	117 :Total
H06(%)	74.3	69.4	59.6	53.6	49.1	41.0	32.8	35.9	48.1	61.1	70.3	77.5	56.1 :Ave.
H12(%)	47.4	43.7	36.6	33.6	31.4	24.8	20.8	22.5	30.0	38.7	44.2	49.6	35.3 :Ave.
H18(%)	43.3	39.0	32.1	29.8	26.5	20.9	16.0	19.4	26.6	35.7	43.3	47.5	31.7 :Ave.
Have(%)	55.0	50.7	42.8	39.0	35.7	28.9	23.2	25.9	34.9	45.2	52.6	58.2	41.0 :Ave.
Evap(mm)	114.2	135.1	225.3	291.6	360.3	443.4	544.9	497.0	364.1	247.1	156.0	101.9	3481 :Total
Sun(hr)	246.9	239.5	275.3	292.6	316.4	312.0	308.7	285.6	264.0	268.3	253.2	242.6	3305 :Total
Wsp(m/s)	27	50	36	32	35	41	47	38	31	25	24	28	50.0 :Max.

**(Notes)**

- 1) Tave, Tmax and Tmin: Monthly average, maximum and minimum temperatures.
- 2) Rmon: Monthly rainfall.
- 3) H06, H12, H18 and Have: Relative humidities at the times of 6:00, 12:00 and 18:00, and average of them.
- 4) Evap and Sun: Monthly pan evaporation and sun-shine duration.
- 5) Wsp: Monthly absolute maximum wind speed.
- 6) All of the above values except for Wsp are average of data during 1980 to 1999 including some lacking data..

**Table II.3.2: Comparaison des dispositifs Meteorologiques**

<b>Station</b>	<b>Jan</b>	<b>Feb</b>	<b>Mar</b>	<b>Apr</b>	<b>May</b>	<b>Jun</b>	<b>Jul</b>	<b>Aug</b>	<b>Sep</b>	<b>Oct</b>	<b>Nov</b>	<b>Dec</b>	<b>Average</b>
<b>MONTHLY TEMPERATURE (°C)</b>													
Fes	9.0	10.5	12.6	14.2	17.1	21.5	25.8	25.5	22.8	18.1	13.8	10.4	16.8
Marrakech	12.1	14.0	16.5	18.1	20.9	24.5	28.7	28.4	25.6	21.3	16.8	13.2	20.0
Ouarzazate	9.1	11.8	15.0	18.0	22.1	26.6	29.8	29.1	25.2	19.8	14.3	10.2	19.2
Rachidia	8.3	11.1	14.6	18.2	22.5	27.7	31.3	30.6	25.9	19.4	13.7	9.3	19.4
<b>MONTHLY RAINFALL (mm/mon)</b>													
Fes	50.4	52.8	56.6	53.9	38.7	11.8	0.8	4.3	18.0	38.1	53.0	57.8	436.1
Marrakech	31.7	32.7	46.9	26.3	10.9	4.3	1.2	2.6	7.4	16.1	28.7	21.7	230.4
Ouarzazate	10.7	21.1	15.8	6.4	5.7	4.8	2.4	9.4	10.9	15.7	13.8	13.9	130.5
Rachidia	10.0	16.0	9.1	10.2	8.4	6.9	2.4	2.9	6.9	17.6	14.6	12.6	117.3
<b>MONTHLY RELATIVE HUMIDITY (%)</b>													
Fes	69.8	70.4	67.1	66.5	63.6	56.3	46.3	48.1	52.0	59.9	65.7	70.8	61.4
Marrakech	63.2	61.4	57.9	56.3	54.2	52.3	45.5	46.5	49.6	54.7	58.9	62.0	55.2
Ouarzazate	45.9	44.0	37.7	32.5	29.5	24.7	20.2	23.8	31.6	39.1	46.3	50.0	35.4
Rachidia	55.0	50.7	42.8	39.0	35.7	28.9	23.2	25.9	34.9	45.2	52.6	58.2	41.0
<b>MONTHLY EVAPORATION (mm/mon)</b>													
Fes	70.9	84.0	128.6	149.3	188.9	254.6	356.5	314.2	229.7	159.5	98.7	74.1	2,109
Marrakech	127.8	134.6	187.8	200.1	247.9	296.2	397.0	385.7	310.1	246.7	175.4	140.9	2,850
Ouarzazate	118.7	146.3	210.7	269.1	333.6	380.8	435.8	390.7	285.9	214.9	139.6	110.5	3,037
Rachidia	114.2	135.1	225.3	291.6	360.3	443.4	544.9	497.0	364.1	247.1	156.0	101.9	3,481
<b>MONTHLY SUNSHINE DURATION (hr)</b>													
Fes	209.4	197.1	240.6	241.8	270.5	309.3	337.4	318.1	264.4	246.4	208.5	205.8	3,049
Marrakech	230.1	214.1	247.5	267.6	300.2	320.7	330.1	310.9	260.3	250.8	231.2	233.9	3,197
Ouarzazate	260.3	250.6	288.5	316.1	343.3	339.6	324.6	293.8	268.5	275.2	259.9	256.5	3,477
Rachidia	246.9	239.5	275.3	292.6	316.4	312.0	308.7	285.6	264.0	268.3	253.2	242.6	3,305

**Table II.3.3: Directions et frequences des vitesses maximales du vent (1/2)**

Station: **FES-SAIS**

Wind	Jan.		Feb.		Mar.		Apr.		May		Jun.		Jul.		Aug.		Sep.		Oct.		Nov.		Dec.		Summary	
rose	Freq.	Wmax	Freq.	Wmax	Freq.	Wmax	Freq.	Wmax	Freq.	Wmax	Freq.	Wmax	Freq.	Wmax	Freq.	Wmax	Freq.	Wmax	Freq.	Wmax	Freq.	Wmax	Freq.	Wmax	FREQ	WMAX
	(yr)	(m/s)	(yr)	(m/s)	(yr)	(m/s)	(yr)	(m/s)	(yr)	(m/s)	(yr)	(m/s)	(yr)	(m/s)	(yr)	(m/s)	(yr)	(m/s)	(yr)	(m/s)	(yr)	(m/s)	(yr)	(m/s)	(%)	(m/s)
2			1	11							1	12									1	14			1.3	14
4	1	12										1	24				1	13							1.3	24
6	1	13			1	14			1	15					1	23	3	22	1	14					3.4	23
8	1	12			1	20			1	13	2	15			1	16					2	24	2	16	4.2	24
10			1	14	1	18							1	13											1.3	18
12					1	25							1	34	1	14			2	21					2.1	34
14															2	22	2	23					1	20	2.1	23
16							1	20	1	19	2	29	1	21	1	16			2	21	1	17			3.8	29
18	1	31	1	26	2	24	1	25					3	24					1	22	1	20			4.2	31
20	3	32			1	23	1	21	1	24	3	20	4	24	3	27	1	16	1	21			2	21	8.4	32
22	1	15	1	25	2	28	2	21	3	21	3	28	5	30	6	27	4	26	1	19					11.8	30
24	5	26	4	22	2	21	1	16	4	29	3	20			1	35	3	31	3	25	5	27	7	35	16.0	35
26	2	22	1	25			1	19													1	16			2.1	25
28	4	29	8	28	7	27	11	26	6	23			1	31	1	19	3	23	5	29	7	35	5	23	24.4	35
30			1	21			1	17	2	19					2	31	2	22			2	22	2	20	5.0	31
32	1	36	1	19	2	16					4	17	2	24	1	21					3	20			5.9	36
34											1	13									1	20			0.8	20
36							1	22			1	14	1	16				1	29				1	31	2.1	31

Station: **MARRAKECH**

Wind	Jan.		Feb.		Mar.		Apr.		May		Jun.		Jul.		Aug.		Sep.		Oct.		Nov.		Dec.		Summary	
rose	Freq.	Wmax	Freq.	Wmax	Freq.	Wmax	Freq.	Wmax	Freq.	Wmax	Freq.	Wmax	Freq.	Wmax	Freq.	Wmax	Freq.	Wmax	Freq.	Wmax	Freq.	Wmax	Freq.	Wmax	FREQ	WMAX
	(yr)	(m/s)	(yr)	(m/s)	(yr)	(m/s)	(yr)	(m/s)	(yr)	(m/s)	(yr)	(m/s)	(yr)	(m/s)	(yr)	(m/s)	(yr)	(m/s)	(yr)	(m/s)	(yr)	(m/s)	(yr)	(m/s)	(%)	(m/s)
2					1	19	2	14	1	25			3	14	2	25	1	20	2	13					5.0	25
4	1	9									2	15			1	13			1	15					2.1	15
6					1	15			1	28	3	16													2.1	28
8	1	13	1	12			1	13			1	32			2	25							4	19	4.2	32
10																					1	8	1	10	0.8	10
12	1	8	2	15			2	19			1	22									1	14			2.9	22
14													2	26	4	23					1	15			2.9	26
16					2	22			1	13			1	25					2	25	1	18	1	8	3.4	25
18							1	20			1	18	1	20	4	28	2	23	2	22			1	20	5.0	28
20			2	20	1	17	1	17			2	16	1	24			1	20	1	14					3.8	24
22	2	27	1	18					1	18	2	23	1	22	2	23	1	21	3	26	2	18	1	18	6.7	27
24	1	27	1	19	3	27	2	23	6	23			2	25	2	17	1	18	1	22	2	20	4	29	10.5	29
26																									0.0	0
28	8	27	5	22	5	18	4	30	7	20	1	17	3	23	1	18	3	16	1	18	5	21	3	20	19.3	30
30	2	20	3	18	2	15	5	22	2	14	3	37	2	19	1	18	2	19			3	27	2	25	11.3	37
32	2	16	3	15	1	17	1	23	1	22	3	17					3	15	4	20	3	20	2	19	9.7	23
34	1	15			1	19					1	15	2	22			1	13			1	20			2.9	22
36	1	14	2	16	3	23	1	17					1	25	1	23	4	26	3	20			1	12	7.1	26

(Note) Freq: Number of years of monthly maximum wind by directions during past 20 years. Wmax: Absolute monthly maximum wind speed by directions during past 20 years.  
 FREQ: Percentage of occurrence of monthly maximum winds by directions. WMAX: Absolute maximum wind speed by directions during past 20 years.

**Table II.3.3: Directions et frequences des vitesses maximales du vent (2/2)**

Station: **OUARZAZATE**

Wind	Jan.		Feb.		Mar.		Apr.		May		Jun.		Jul.		Aug.		Sep.		Oct.		Nov.		Dec.		Summary	
rose	Freq.	Wmax	Freq.	Wmax	Freq.	Wmax	Freq.	Wmax	Freq.	Wmax	Freq.	Wmax	Freq.	Wmax	Freq.	Wmax	Freq.	Wmax	Freq.	Wmax	Freq.	Wmax	FREQ	WMAX		
	(yr)	(m/s)	(yr)	(m/s)	(yr)	(m/s)	(yr)	(m/s)	(yr)	(m/s)	(yr)	(m/s)	(yr)	(m/s)	(yr)	(m/s)	(yr)	(m/s)	(yr)	(m/s)	(yr)	(m/s)	(%)	(m/s)		
2	2	16	1	25			1	34	2	35			1	16	1	30								3.8	35	
4					1	30			1	19	1	23			1	21									1.9	30
6			1	12															1	22					1.0	22
8			1	24	1	22											1	17	1	16					1.9	24
10																									0.0	0
12			1	22							1	22	2	28											1.9	28
14											1	22	1	27	1	30	1	15							1.9	30
16													1	29											0.5	29
18			1	29					1	21	3	41			2	27			1	18					3.8	41
20	1	34					2	28	1	27			1	28	1	26			1	17					3.3	34
22					2	21			2	30			4	31	1	28	2	25			1	16	1	26	6.2	31
24			2	30	1	22	1	19	2	27	4	33					1	27			2	20			6.2	33
26	3	27	3	33	1	31	2	27	1	32	2	32	3	33	4	36	7	35	4	30	1	25	2	29	15.7	36
28	1	19					1	45	1	27			2	26	1	27	2	30			1	27			4.3	45
30	2	27	1	27	4	31	2	29	1	24			1	38	1	26	1	21	4	23	3	20	3	34	11.0	38
32	1	20	4	35	4	31			1	52	1	26	1	26	2	32			1	22	3	27	5	27	11.0	52
34	7	26	3	32	3	29	6	31	2	28	3	38	1	33			1	29	2	21	4	25	3	21	16.7	38
36	2	21	1	12	2	29	4	27	2	41	2	24			2	25			1	20			3	26	9.0	41

Station: **RACHIDIA**

Wind	Jan.		Feb.		Mar.		Apr.		May		Jun.		Jul.		Aug.		Sep.		Oct.		Nov.		Dec.		Summary	
rose	Freq.	Wmax	Freq.	Wmax	Freq.	Wmax	Freq.	Wmax	Freq.	Wmax	Freq.	Wmax	Freq.	Wmax	Freq.	Wmax	Freq.	Wmax	Freq.	Wmax	Freq.	Wmax	FREQ	WMAX		
	(yr)	(m/s)	(yr)	(m/s)	(yr)	(m/s)	(yr)	(m/s)	(yr)	(m/s)	(yr)	(m/s)	(yr)	(m/s)	(yr)	(m/s)	(yr)	(m/s)	(yr)	(m/s)	(yr)	(m/s)	(yr)	(m/s)	(%)	(m/s)
2	4	18	1	17			3	26	4	29	2	27	1	38					3	17	1	13			8.2	38
4									1	20	1	38							1	19	1	14			1.7	38
6	1	7	1	10	2	36	2	28																	2.6	36
8			1	20					3	32			1	24			1	29	2	23	1	22	1	8	4.3	32
10																									0.0	0
12	1	15	1	15																					0.9	15
14	2	17																				1	6		1.3	17
16	1	13	2	50																	1	21			1.7	50
18															1	38	2	18							1.3	38
20			1	16	1	24	3	32	3	28			3	23	1	31			3	25					6.5	32
22	1	11	1	20	1	15	2	22	1	31	2	28			6	29	2	27	2	23	2	15			8.7	31
24	1	10			2	22	1	18	3	28	4	29	4	47			2	19			1	15	3	19	9.1	47
26	1	16			1	20					4	28									5	21			4.8	28
28	1	24	4	21	4	28			1	27			3	29	4	35	4	31	4	25			2	22	11.7	35
30			1	14	1	22	1	16							3	35	4	27			1	21	2	17	5.6	35
32	2	24	4	26	2	28			1	26	2	37	3	27			3	30	2	22	2	24	3	28	10.4	37
34	2	15	1	23			2	26	1	24	1	22	1	25	2	29	1	19	2	20	1	21	2	17	6.9	29
36	3	27	1	21	4	27	5	29	2	35	4	41	4	26	2	30	1	20	1	20	2	19	4	21	14.3	41

(Note) Freq: Number of years of monthly maximum wind by directions during past 20 years. Wmax: Absolute monthly maximum wind speed by directions during past 20 years.  
 FREQ: Percentage of occurrence of monthly maximum winds by directions. WMAX: Absolute maximum wind speed by directions during past 20 years.

**Table II.3.1: Stations d'écoulement jaugeage selectionnees pour etude**

River system	Candidate dam	Reference flow station	Basin area (km2)			Period of data		
			Dam	Sta.	Ratio	Avail.	Used	Yrs.
<b>REGION-I: MOROCCO NORTH BASINS</b>								
Neckor R.	No.01: Neckor	Takenfoust	710	292	0.4	85/95	89/94	6
<b>REGION-II: SEBOU RIVER BASIN</b>								
Sebou R.								
- Ouerrha R.								
- Aoudour R.	No.06: Tazarane	Tabouda	30	861	28.7	78/96	78/95	18
- Aoulai R.	No.19: Aoulai	Rhafsai	490	770	1.6	49/96	76/95	20
- Amezetz R.	No.21: Sidi El Mokhfi	Galez	378	440	1.2	83/96	83/95	13
- Mengou R.	No.02: Tizimellal	Tamchachete	170	138	0.8	75/82	75/81	7
- Lebene R.	No.20: Sidi Abbou	Boukarkour/Tissa	363	736	2.0	85/96	86/95	10
- Zloul R.	No.17: Azghar	Dar Hamra	295	670	2.3	83/96	84/95	12
- Beht R.								
- Tigriga R.	No.14: Adarouch	Sidi Mokhfi	630	282	0.4	77/86	77/86	6
<b>REGION-III: BOU REGREG RIVER BASIN AND ATLANTIC COASTAL AREA OF CASABLANCA</b>								
Bou Regreg R.								
- Tabahart R.	No.15: Sidi Omar	Sidi Amar	350	329	0.9	77/96	78/96	18
Iqem R.								
- Khellata R.	No.04: Ain Kwachiya	Cheikh Reguig	162	518	3.2	74/95	76/95	20
- Nefifikh R.	No.05: Lower N'fifikh	Feddane Taba	606	606	1.0	75/96	77/96	20
- Daliya R.	No.05: Upper N'fifikh	Feddane Taba	300	606	2.0	75/96	77/96	20
Mellah R.								
Zamrine R.	No.18: Boukarkour	Feddane Taba	1,120	606	0.5	75/96	77/96	20
<b>REGION-IV: OUM ER RBIA RIVER BASIN</b>								
Oum Er Rbia R.								
- El Abid R.	No.22: N'ouantz	Tizi N'isly	204	1,444	7.1	75/97	77/96	20
- Tessaout R.								
- Lakhdar R.	No.03: Ait Baddou	Ait Segmine	194	461	2.4	70/96	77/96	20
<b>REGION-V: TENSIFT RIVER AND ESSAOUIRA COASTAL BASINS</b>								
Tensift R.								
- N'fiss R.	No.07: Amezmiz	Sidi Hssain	80	115	1.4	87/96	88/95	8
- Assif el Ma R.	No.09: Taskourt	Sidi Bouathmane	439	510	1.2	84/96	85/95	11
- El Rhira R.	No.08: Boulaouane	Illoudjane	565	436	0.8	76/95	76/94	19
<b>REGION-VI: SOUSS, MASSA RIVER BASINS</b>								
Souss R.								
- Issen R.	No.24: Amont Abdel.	Aguenza	938	1,130	1.2	79/96	80/96	17
- L'ouaar R.	No.25: Sidi Abdellah	Amsoul	233	480	2.1	77/97	78/97	19
- Aguerd R.	No.23: Igui N'ouaqa	Amsoul	161	480	3.0	77/97	78/97	19
<b>REGION-VII: GUIR, ZIZ, RHERIS AND DRAA RIVER BASINS</b>								
Guir R.								
- Bouanane R.	No.12: Tiouzaguine	Tazouguert	258	2,392	9.3	61/97	77/97	20
- Rheris R.	No.13: Kheng Grou	Beni Yatti	4,900	6,788	1.4	54/96	72/91	20
- Ferklo R.	No.11: Tadighoust	Tadighoust	2,239	2,345	1.0	61/97	77/96	20
- Draa R.	No.10: Timkit	Ait Boujjane	592	702	1.2	75/96	76/95	20
- Draa R.	No.16: Tiouine	Tamdrouste	1,540	1,693	1.1	74/97	77/96	20

(Remarks) Basin areas upstream of dams and stations are quoted from DGH reports.

Table II3.2: Caracteristiques des ecoulements de rivieres aux sites de barrages

Candidate dam	Reference flow station	Basin area (km <sup>2</sup> )			Data (yrs.)	Mean annual flow			Monthly flow pattern												Mean flow duration (m <sup>3</sup> /s)			50%-Q day	Max. Qday	
		Dam	Sta.	Ratio		(m <sup>3</sup> /s)	(Mm <sup>3</sup> /yr)	(mm/yr)	S	O	N	D	J	F	M	A	M	J	J	A	Max	95d	185d		275d	(m <sup>3</sup> /s)
<b>REGION-I: MOROCCO NORTH BASINS</b>																										
No.01: Neckor	Takenfoust	710	292	0.4	6	0.37	11.7	16	-	o	o	●	o	o	⊙	o	o	-	-	3.22	0.51	0.28	0.18	99	6	0.01
<b>REGION-II: SEBOU RIVER BASIN</b>																										
No.06: Tazarane	Tabouda	30	861	28.7	18	0.38	11.9	397	-	-	o	o	o	●	o	-	-	-	-	11.89	0.25	0.06	0.01	16	36	1.21
No.19: Aoulai	Rhafsai	490	770	1.6	20	5.63	177.7	363	-	-	o	o	o	●	o	o	-	-	-	143.89	4.23	0.85	0.13	21	374	0.76
No.21: Sidi El Mokhfi	Galez	378	440	1.2	13	5.75	181.4	480	-	-	o	o	o	●	o	o	-	-	-	142.07	4.29	1.17	0.25	21	279	0.74
No.02: Tizimellal	Tamchachete	170	138	0.8	7	1.22	38.4	226	-	-	-	o	o	●	o	o	-	-	-	18.18	1.50	0.46	0.26	48	50	0.30
No.20: Sidi Abbou	Boukarkour/Tissa	363	736	2.0	10	1.10	34.8	96	-	-	-	o	o	●	o	o	-	-	-	40.38	0.63	0.16	0.03	13	84	0.23
No.17: Azghar	Dar Hamra	295	670	2.3	12	1.24	39.1	133	-	-	-	o	o	●	o	-	-	-	-	33.02	0.91	0.19	0.05	19	79	0.27
No.14: Adarouch	Sidi Mokhfi	630	282	0.4	6	2.04	64.4	102	-	⊙	-	o	o	●	o	o	-	-	-	7.36	1.55	1.18	0.91	101	15	0.02
<b>REGION-III: BOU REGREG RIVER BASIN AND ATLANTIC COASTAL AREA OF CASABLANCA</b>																										
No.15: Sidi Omar	Sidi Amar	350	329	0.9	18	0.88	27.8	79	-	-	-	o	●	o	-	-	-	-	-	35.87	0.43	0.17	0.01	9	149	0.43
No.04: Ain Kwachiya	Cheikh Reguig	162	518	3.2	20	0.21	6.6	41	-	o	-	o	●	o	-	-	-	-	-	10.17	0.03	0.01	0.00	9	48	0.30
No.05: Upper N'fifikh	Feddane Taba	300	606	2.0	20	0.28	8.8	29	-	-	o	o	o	●	o	-	-	-	-	19.18	0.07	0.04	0.02	6	50	0.17
No.18: Boukarkour	Feddane Taba	1,120	606	0.5	20	1.05	33.0	29	-	-	o	o	o	●	o	-	-	-	-	71.61	0.26	0.15	0.07	6	185	0.17
<b>REGION-IV: OUM ER RBIA RIVER BASIN</b>																										
No.22: N'ouantz	Tizi N'isly	204	1,444	7.1	20	0.57	17.8	87	-	-	⊙	-	o	o	●	o	-	-	-	44.43	4.56	2.08	1.06	54	130	0.64
No.03: Ait Baddou	Ait Segmine	194	461	2.4	20	0.89	27.9	144	-	-	o	-	o	o	●	o	o	⊙	o	30.80	0.74	0.33	0.14	25	191	0.98
<b>REGION-V: TENSIFT RIVER AND ESSAOUIRA COASTAL BASINS</b>																										
No.07: Amez Miz	Sidi Hssain	80	115	1.4	8	0.49	15.5	194	-	o	-	⊙	o	o	●	o	-	-	-	5.29	0.62	0.37	0.20	82	14	0.17
No.09: Taskourt	Sidi Bouathmane	439	510	1.2	11	1.17	37.0	84	-	o	⊙	o	-	o	●	-	-	-	-	31.42	1.34	0.56	0.10	41	154	0.35
No.08: Boulaouane	Illoudjane	565	436	0.8	19	1.33	41.8	74	-	o	⊙	o	o	o	●	o	o	o	o	19.72	1.70	0.64	0.24	51	85	0.15
<b>REGION-VI: SOUSS, MASSA RIVER BASINS</b>																										
No.24: Amont Abdel.	Aguenza	938	1,130	1.2	17	1.89	59.603	64	-	-	⊙	o	o	o	●	o	-	-	-	68.52	1.69	0.55	0.03	23	238	0.21
No.25: Sidi Abdellah	Amsoul	233	480	2.1	19	0.38	11.8662	52	-	-	⊙	o	●	o	o	-	-	-	-	22.48	0.20	0.04	0.00	12	113	0.49
No.23: Igui N'ouaqa	Amsoul	161	480	3.0	19	0.26	8.3	52	-	-	⊙	o	●	o	o	-	-	-	-	15.53	0.14	0.03	0.00	12	78	0.49
<b>REGION-VII: GUIR, ZIZ, RHERIS AND DRAA RIVER BASINS</b>																										
No.12: Tiouzaguine	Tazouguert	258	2,392	9.3	20	0.13	4.1	16	o	o	●	o	o	-	-	⊙	o	-	-	9.51	0.03	0.02	0.01	5	42	0.16
No.13: Kheng Grou	Beni Yatti	4,900	6,788	1.4	20	2.08	65.5	13	o	⊙	o	o	o	-	-	●	o	-	-	221.92	0.34	0.23	0.15	3	873	0.18
No.11: Tadighoust	Tadighoust	2,239	2,345	1.0	20	1.17	36.8	16	o	●	o	o	o	o	o	o	o	⊙	o	77.77	0.63	0.33	0.17	9	452	0.20
No.10: Timkit	Ait Boujjane	592	702	1.2	20	0.68	21.4	36	o	●	o	o	o	o	o	o	⊙	o	o	16.32	0.75	0.56	0.39	96	87	0.15
No.16: Tiouine	Tamdrouste	1,540	1,693	1.1	20	3.07	96.8	63	-	-	o	o	o	o	●	o	-	⊙	-	115.75	2.03	0.57	0.14	17	322	0.21

1) "●"denotes month of the peak flow and "⊙"the secondary peak. "o"denotes the month in which monthly discharge more than "●"occurred in the past.  
 2) 50%-Q day: The 50%-flow day which accumulates 50% of annual flow in the ordinal series of daily discharge.



**Table II3.3.3: Ecoulement moyen mensuel de la rivier (1/9)**

No.	Year	Monthly average discharge (m <sup>3</sup> /s)												Mean annual flow		
		Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	m <sup>3</sup> /s	Mm <sup>3</sup> /yr	mm/yr
<b>DAM: NECKOR (No.1)</b>		<b>B.A. (km<sup>2</sup>): 710</b>												<b>Reference station: Takenfoust</b>		
	Ave.	0.24	0.33	0.44	0.53	0.47	0.44	0.45	0.37	0.35	0.27	0.22	0.37	11.67	16.4	
	Max.	0.49	0.88	0.97	0.89	0.89	0.90	0.78	0.83	1.04	0.76	0.42	0.44			
	Min.	0.07	0.11	0.10	0.16	0.17	0.11	0.15	0.09	0.00	0.17	0.15	0.11			
1	1989	0.07	0.11	0.10	0.47	0.24	0.11	0.27	0.83	1.04	0.76	0.42	0.11	0.38	11.94	16.8
2	1990	0.49	0.28	0.50	0.63	0.50	0.47	0.78	0.30	0.21	0.17	0.15	0.15	0.38	12.13	17.1
3	1991	0.25	0.33	0.30	0.29	0.29	0.16	0.29	0.13	0.00	0.17	0.23	0.19	0.22	6.94	9.8
4	1992	0.14	0.16	0.19	0.16	0.17	0.13	0.15	0.09	0.32	0.24	0.19	0.19	0.18	5.61	7.9
5	1993	0.19	0.20	0.61	0.72	0.74	0.85	0.61	0.46	0.35	0.33	0.31	0.44	0.48	15.23	21.5
6	1994	0.31	0.88	0.97	0.89	0.89	0.90	0.63	0.17	0.29	0.45	0.30	0.27	0.58	18.16	25.6
7																
8																
9																
10																
11																
12																
13																
14																
15																
16																
17																
18																
19																
20																
<b>DAM: TIZIMELLAL (No.2)</b>		<b>B.A. (km<sup>2</sup>): 170</b>												<b>Reference station: Tamchachate</b>		
	Ave.	0.27	0.37	0.40	0.78	1.80	3.18	2.72	2.46	1.62	0.55	0.40	0.22	1.22	38.40	54.1
	Max.	0.46	0.80	0.66	3.20	7.46	7.78	5.41	4.68	4.42	0.86	1.06	0.32			
	Min.	0.11	0.18	0.11	0.13	0.24	0.31	0.29	0.68	0.34	0.14	0.13	0.12			
1	1975	0.18	0.25	0.27	0.34	0.40	1.15	1.88	4.09	4.42	0.86	1.06	0.29	1.27	39.90	56.2
2	1976	0.29	0.32	0.52	3.20	7.46	7.78	4.54	2.23	0.92	0.59	0.36	0.27	2.35	73.97	104.2
3	1977	0.39	0.45	0.35	0.56	1.33	4.62	3.62	2.58	1.75	0.73	0.38	0.26	1.40	44.03	62.0
4	1978	0.27	0.32	0.30	0.42	2.41	6.74	5.41	4.68	1.76	0.84	0.50	0.32	1.96	61.90	87.2
5	1979	0.46	0.80	0.66	0.47	0.51	1.24	2.23	1.53	0.97	0.37	0.23	0.18	0.80	25.27	35.6
6	1980	0.19	0.29	0.58	0.33	0.27	0.31	0.29	0.68	0.34	0.14	0.14	0.12	0.31	9.67	13.6
7	1981	0.11	0.18	0.11	0.13	0.24	0.39	1.04	1.45	1.14	0.32	0.13	0.12	0.45	14.06	19.8
8																
9																
10																
11																
12																
13																
14																
15																
16																
17																
18																
19																
20																
<b>DAM: AIT BADDOU (No.3)</b>		<b>B.A. (km<sup>2</sup>): 194</b>												<b>Reference station: Ait Segmine</b>		
	Ave.	0.46	0.52	1.11	0.59	0.94	1.48	1.81	1.44	0.82	0.45	0.67	0.40	0.89	27.94	39.4
	Max.	1.77	1.37	7.68	1.15	3.49	6.74	4.77	5.83	3.30	2.36	9.55	2.14			
	Min.	0.03	0.09	0.06	0.04	0.07	0.04	0.15	0.26	0.08	0.00	0.00	0.00			
1	1977	0.54	0.89	0.78	1.09	1.51	1.86	0.82	1.55	1.02	0.25	0.10	0.10	0.87	27.41	38.6
2	1978	0.10	0.43	0.34	0.62	0.98	2.87	3.13	1.47	0.61	0.54	0.63	0.08	0.97	30.67	43.2
3	1979	0.68	1.27	0.39	0.93	0.67	1.29	3.44	1.12	0.40	0.17	0.12	0.31	0.90	28.34	39.9
4	1980	1.00	0.53	7.68	0.32	0.33	0.48	0.75	1.06	0.30	0.21	0.06	0.04	1.05	33.20	46.8
5	1981	0.05	0.15	0.25	0.45	0.89	0.93	0.79	3.34	2.91	0.49	0.30	0.25	0.90	28.32	39.9
6	1982	1.19	0.81	0.82	1.12	1.02	1.70	1.21	0.72	0.75	0.07	0.02	0.01	0.78	24.60	34.7
7	1983	0.28	0.39	1.42	0.84	0.69	0.39	1.64	0.52	3.30	0.35	0.18	0.20	0.86	27.01	38.0
8	1984	0.20	0.22	0.75	0.45	3.49	1.65	1.17	1.10	1.47	0.36	0.35	0.15	0.94	29.79	42.0
9	1985	0.24	0.38	0.71	0.67	0.75	1.71	1.88	1.10	0.47	0.22	0.46	0.13	0.72	22.71	32.0
10	1986	0.25	0.89	0.90	0.25	1.44	6.74	1.23	0.38	0.22	1.93	0.06	0.04	1.15	36.35	51.2
11	1987	0.74	0.96	3.40	1.15	2.87	4.06	3.73	0.69	0.51	0.18	0.36	0.41	1.57	49.58	69.8
12	1988	0.48	0.43	2.15	0.11	0.09	0.56	2.10	5.83	0.83	0.75	9.55	2.14	2.10	66.07	93.1
13	1989	0.33	1.37	0.59	0.62	0.43	0.04	2.21	0.57	0.42	0.14	0.26	0.20	0.60	19.08	26.9
14	1990	1.77	0.18	0.17	0.71	0.56	1.27	3.20	1.70	0.86	0.51	0.47	1.73	1.09	34.51	48.6
15	1991	0.69	0.56	0.30	0.49	0.15	0.21	0.69	1.38	1.01	0.28	0.06	1.54	0.62	19.45	27.4
16	1992	0.03	0.14	0.36	0.18	0.13	0.41	1.28	0.26	0.26	0.10	0.09	0.06	0.27	8.64	12.2
17	1993	0.05	0.12	0.72	0.38	0.53	1.89	1.71	0.44	0.08	0.03	0.01	0.19	0.50	15.87	22.3
18	1994	0.03	0.09	0.06	0.04	0.07	0.33	0.36	1.54	0.17	0.04	0.05	0.38	0.26	8.24	11.6
19	1995	0.34	0.30	0.16	0.55	1.44	1.08	4.77	0.93	0.60	2.36	0.30	0.14	1.08	34.14	48.1
20	1996	0.18	0.22	0.26	0.90	0.65	0.13	0.15	3.06	0.12	0.00	0.00	0.00	0.47	14.83	20.9

**Table II3.3.3: Ecoulement moyen mensuel de la rivier (2/9)**

No.	Year	Monthly average discharge (m <sup>3</sup> /s)											Mean annual flow			
		Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	m <sup>3</sup> /s	Mm <sup>3</sup> /yr	mm/yr
<b>DAM: AIN KWACHIYA (No.4)</b>		<b>B.A. (km<sup>2</sup>): 162</b>											<b>Reference station: Cheikh Reguig</b>			
	Ave.	0.01	0.08	0.09	0.46	0.78	0.70	0.32	0.07	0.02	0.01	0.00	0.00	0.21	6.61	40.8
	Max.	0.05	0.81	0.53	4.85	5.71	5.26	2.01	0.27	0.15	0.04	0.02	0.01			
	Min.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
1	1976	0.00	0.81	0.02	4.85	4.32	2.81	0.11	0.02	0.01	0.01	0.01	0.01	1.08	34.04	210.1
2	1977	0.01	0.02	0.02	0.05	0.33	0.63	0.18	0.11	0.06	0.01	0.01	0.01	0.11	3.62	22.4
3	1978	0.01	0.02	0.02	1.18	2.43	5.26	0.77	0.12	0.04	0.02	0.02	0.01	0.80	25.15	155.3
4	1979	0.02	0.59	0.10	0.08	0.52	0.08	1.02	0.10	0.05	0.02	0.01	0.01	0.22	6.92	42.7
5	1980	0.01	0.02	0.23	0.09	0.04	0.02	0.03	0.02	0.01	0.00	0.00	0.00	0.04	1.21	7.5
6	1981	0.00	0.00	0.00	0.01	0.27	0.16	0.02	0.15	0.02	0.00	0.00	0.00	0.05	1.66	10.2
7	1982	0.00	0.00	0.02	0.01	0.00	0.16	0.02	0.01	0.00	0.00	0.00	0.00	0.02	0.61	3.7
8	1983	0.00	0.01	0.02	0.10	0.00	0.00	0.05	0.01	0.15	0.00	0.00	0.00	0.03	0.92	5.7
9	1984	0.00	0.00	0.14	0.02	0.22	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.03	1.06	6.6
10	1985	0.00	0.00	0.04	0.03	0.06	1.40	0.11	0.06	0.00	0.00	0.00	0.00	0.13	4.20	25.9
11	1986	0.00	0.00	0.13	0.00	0.14	0.60	0.01	0.00	0.00	0.00	0.00	0.00	0.07	2.22	13.7
12	1987	0.00	0.00	0.03	0.24	0.55	0.62	0.13	0.02	0.01	0.00	0.00	0.00	0.13	4.12	25.4
13	1988	0.00	0.00	0.07	0.01	0.03	0.02	0.11	0.24	0.01	0.00	0.00	0.00	0.04	1.29	8.0
14	1989	0.00	0.00	0.21	2.40	0.94	0.06	0.01	0.04	0.00	0.00	0.00	0.00	0.31	9.79	60.4
15	1990	0.00	0.00	0.02	0.11	0.00	0.56	2.01	0.27	0.01	0.00	0.00	0.00	0.25	7.85	48.5
16	1991	0.05	0.11	0.00	0.02	0.00	0.01	0.01	0.21	0.00	0.04	0.00	0.00	0.04	1.19	7.3
17	1992	0.00	0.02	0.00	0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.01	0.16	1.0
18	1993	0.00	0.00	0.53	0.02	0.10	0.50	0.34	0.00	0.00	0.00	0.00	0.00	0.12	3.84	23.7
19	1994	0.00	0.00	0.06	0.00	0.00	0.01	0.00	0.00	0.00	0.02	0.00	0.00	0.01	0.24	1.5
20	1995	0.00	0.00	0.06	0.00	5.71	0.99	1.48	0.06	0.05	0.00	0.00	0.00	0.70	22.13	136.6
<b>DAM: UPPER N'FIFIKH (No.5)</b>		<b>B.A. (km<sup>2</sup>): 300</b>											<b>Reference station: Feddane Taba</b>			
	Ave.	0.02	0.07	0.28	0.51	0.77	0.93	0.41	0.25	0.08	0.03	0.02	0.01	0.28	8.79	54.3
	Max.	0.10	0.63	1.31	4.22	3.96	7.99	1.90	0.75	0.42	0.22	0.19	0.12			
	Min.	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00			
1	1977	0.02	0.05	0.08	0.21	0.89	3.34	0.06	0.21	0.10	0.02	0.01	0.00	0.39	12.43	76.7
2	1978	0.04	0.09	0.07	1.37	3.53	7.99	0.99	0.36	0.24	0.22	0.19	0.12	1.22	38.61	238.3
3	1979	0.09	0.63	0.16	0.14	0.42	0.16	1.82	0.18	0.13	0.05	0.02	0.00	0.32	10.11	62.4
4	1980	0.04	0.08	0.36	0.06	0.06	0.04	0.17	0.05	0.03	0.02	0.01	0.01	0.08	2.47	15.2
5	1981	0.02	0.02	0.02	0.15	0.37	0.32	0.09	0.66	0.03	0.02	0.02	0.01	0.14	4.45	27.5
6	1982	0.02	0.02	0.08	0.09	0.04	0.39	0.07	0.05	0.04	0.03	0.03	0.02	0.07	2.23	13.8
7	1983	0.02	0.02	0.21	0.27	0.03	0.02	0.29	0.17	0.42	0.02	0.01	0.01	0.12	3.91	24.1
8	1984	0.01	0.01	1.22	0.08	0.44	0.10	0.02	0.01	0.03	0.01	0.01	0.01	0.16	5.06	31.2
9	1985	0.02	0.01	0.34	0.07	0.24	1.23	0.09	0.16	0.01	0.00	0.00	0.00	0.17	5.47	33.7
10	1986	0.00	0.00	1.31	0.02	0.12	0.97	0.02	0.02	0.00	0.00	0.00	0.00	0.20	6.25	38.6
11	1987	0.01	0.07	0.30	0.74	0.73	1.67	0.31	0.03	0.03	0.02	0.01	0.00	0.32	10.03	61.9
12	1988	0.01	0.02	0.18	0.02	0.17	0.24	0.46	0.66	0.01	0.00	0.00	0.00	0.15	4.61	28.5
13	1989	0.00	0.01	0.70	1.28	0.58	0.03	0.10	0.02	0.01	0.01	0.00	0.00	0.23	7.30	45.1
14	1990	0.00	0.04	0.06	0.60	0.04	0.77	1.01	0.75	0.04	0.03	0.02	0.01	0.28	8.77	54.1
15	1991	0.10	0.19	0.04	0.10	0.04	0.09	0.08	0.64	0.10	0.08	0.01	0.01	0.12	3.87	23.9
16	1992	0.01	0.08	0.07	0.04	0.04	0.01	0.24	0.04	0.01	0.01	0.01	0.01	0.05	1.51	9.3
17	1993	0.01	0.02	0.03	0.08	0.04	0.20	0.42	0.49	0.19	0.03	0.02	0.01	0.13	4.00	24.7
18	1994	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.14	0.9
19	1995	0.00	0.01	0.32	0.68	3.96	0.98	1.90	0.08	0.12	0.04	0.01	0.00	0.68	21.46	132.4
20	1996	0.01	0.01	0.04	4.22	3.69	0.15	0.11	0.36	0.04	0.03	0.02	0.01	0.73	23.15	142.9
<b>DAM: TAZARANE (No.6)</b>		<b>B.A. (km<sup>2</sup>): 30</b>											<b>Reference station: Tabouda</b>			
	Ave.	0.01	0.06	0.39	0.70	0.99	1.07	0.60	0.39	0.34	0.04	0.01	0.00	0.38	11.94	73.7
	Max.	0.04	0.59	2.26	3.08	6.75	4.27	2.77	1.02	1.97	0.22	0.04	0.02			
	Min.	0.00	0.00	0.00	0.01	0.02	0.01	0.04	0.01	0.00	0.00	0.00	0.00			
1	1978	0.00	0.00	0.01	0.68	1.80	3.84	1.51	0.54	0.09	0.05	0.03	0.02	0.69	21.88	135.1
2	1979	0.04	0.59	0.22	0.09	0.32	0.13	0.41	0.12	0.75	0.07	0.01	0.00	0.23	7.30	45.1
3	1980	0.01	0.02	0.56	0.10	0.05	0.03	0.05	0.54	0.74	0.04	0.01	0.00	0.18	5.63	34.8
4	1981	0.00	0.00	0.00	1.00	1.40	0.53	0.29	0.83	0.18	0.03	0.01	0.00	0.36	11.25	69.4
5	1982	0.00	0.02	0.53	0.23	0.10	0.83	0.24	0.14	0.08	0.01	0.00	0.00	0.18	5.57	34.4
6	1983	0.00	0.00	0.76	3.00	0.28	0.16	0.80	0.26	1.10	0.22	0.04	0.01	0.56	17.61	108.7
7	1984	0.00	0.00	0.42	0.22	0.75	1.35	0.26	0.12	0.10	0.03	0.01	0.00	0.27	8.38	51.7
8	1985	0.00	0.00	0.40	0.21	1.24	4.27	1.24	0.78	0.12	0.02	0.00	0.00	0.66	20.96	129.4
9	1986	0.00	0.04	0.07	0.02	2.00	2.85	0.37	0.17	0.03	0.01	0.00	0.00	0.45	14.14	87.3
10	1987	0.01	0.01	0.15	0.91	0.92	0.28	0.11	0.23	0.08	0.02	0.01	0.00	0.23	7.17	44.2
11	1988	0.00	0.02	0.20	0.19	0.07	0.84	0.43	1.00	0.20	0.06	0.01	0.00	0.25	7.74	47.8
12	1989	0.00	0.01	2.26	3.08	0.99	0.26	0.12	0.36	0.14	0.02	0.01	0.01	0.61	19.15	118.2
13	1990	0.01	0.01	0.14	0.77	0.14	0.71	2.77	0.24	0.08	0.02	0.01	0.00	0.41	12.91	79.7
14	1991	0.01	0.17	0.02	0.15	0.04	0.05	0.05	1.02	0.02	0.03	0.01	0.00	0.13	4.13	25.5
15	1992	0.00	0.04	0.05	0.08	0.03	0.01	0.10	0.20	0.35	0.01	0.00	0.00	0.07	2.30	14.2
16	1993	0.01	0.05	1.12	0.16	0.83	0.67	0.55	0.11	0.04	0.00	0.00	0.00	0.29	9.22	56.9
17	1994	0.00	0.04	0.07	0.01	0.02	0.02	0.04	0.01	0.00	0.00	0.00	0.00	0.02	0.56	3.4
18	1995	0.01	0.01	0.03	1.77	6.75	2.33	1.40	0.39	1.97	0.13	0.02	0.01	1.24	39.06	241.1
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**Table II3.3.3: Ecoulement moyen mensuel de la rivier (3/9)**

No.	Year	Monthly average discharge (m <sup>3</sup> /s)												Mean annual flow		
		Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	m <sup>3</sup> /s	Mm <sup>3</sup> /yr	mm/yr
<b>DAM: AMEZMIZ (No.7)</b>		<b>B.A. (km<sup>2</sup>): 80</b>												<b>Reference station: Sidi Hssain</b>		
	Ave.	0.17	0.30	0.32	0.70	0.49	0.53	0.80	0.76	0.46	0.26	0.20	0.16	0.43	13.56	169.5
	Max.	0.59	1.23	0.86	2.66	1.02	0.97	2.13	1.31	1.08	0.50	0.43	0.36			
	Min.	0.00	0.01	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
1	1986	0.00	0.01	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.08	1.05
2	1987	0.00	0.04	0.05	0.33	0.52	0.86	0.73	0.35	0.42	0.25	0.43	0.33	0.36	11.27	140.8
3	1988	0.59	0.41	0.61	0.53	0.38	0.45	0.65	0.99	0.50	0.47	0.37	0.26	0.52	16.26	203.2
4	1989	0.36	1.23	0.86	1.28	0.76	0.52	1.01	0.66	0.63	0.37	0.38	0.15	0.69	21.67	270.9
5	1990	0.17	0.18	0.18	0.23	0.21	0.27	0.48	0.59	0.35	0.26	0.18	0.36	0.29	9.07	113.4
6	1991	0.06	0.18	0.16	2.66	1.02	0.97	1.10	1.31	1.08	0.50	0.30	0.22	0.80	25.22	315.2
7	1992	0.18	0.28	0.32	0.35	0.36	0.38	0.61	0.56	0.35	0.19	0.10	0.06	0.31	9.85	123.1
8	1993	0.10	0.32	0.68	0.58	0.49	0.74	0.78	0.59	0.36	0.16	0.09	0.16	0.42	13.19	164.9
9	1994	0.11	0.19	0.24	0.25	0.23	0.30	0.54	1.22	0.24	0.17	0.13	0.09	0.31	9.74	121.7
10	1995	0.10	0.14	0.13	0.78	0.98	0.82	2.13	1.28	0.70	0.27	0.00	0.01	0.61	19.25	240.7
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<b>DAM: BOULAOUANE (No.8)</b>		<b>B.A. (km<sup>2</sup>): 565</b>												<b>Reference station: Illoudjane</b>		
	Ave.	0.25	0.56	1.98	2.35	2.52	1.92	2.84	2.39	1.20	0.66	0.69	0.43	1.48	46.67	583.4
	Max.	1.88	7.18	24.79	13.70	17.97	8.09	10.38	8.08	3.94	3.75	3.77	3.71			
	Min.	0.00	0.00	0.00	0.00	0.00	0.02	0.03	0.01	0.01	0.00	0.00	0.00			
1	1976	0.05	0.06	0.07	0.12	0.16	0.09	0.08	0.12	0.08	0.04	0.00	0.00	0.07	2.26	28.2
2	1977	0.52	0.14	0.28	0.31	3.26	3.43	2.92	3.29	1.41	0.27	0.20	0.09	1.33	41.90	523.8
3	1978	0.03	0.40	0.11	0.20	5.25	3.42	1.27	1.93	1.53	1.24	0.91	1.23	1.45	45.74	571.7
4	1979	1.56	0.60	0.47	1.08	0.51	1.36	5.55	8.08	3.94	3.75	3.32	0.63	2.57	81.11	1013.9
5	1980	0.28	0.10	0.38	0.21	0.12	0.31	0.65	0.52	0.41	0.21	0.13	0.09	0.28	8.88	111.0
6	1981	0.02	0.28	0.07	0.17	0.46	0.54	0.65	1.70	1.49	0.19	0.08	0.07	0.48	15.04	188.0
7	1982	0.05	0.01	0.03	0.06	0.07	0.11	0.05	0.04	0.03	0.00	0.00	0.00	0.04	1.19	14.9
8	1983	0.00	0.11	1.03	0.50	0.33	0.20	0.23	0.16	0.20	0.11	0.05	0.02	0.24	7.71	96.4
9	1984	0.00	0.00	0.06	0.02	3.36	3.94	3.61	2.78	1.27	0.38	0.14	0.07	1.29	40.59	507.4
10	1985	0.01	0.00	0.00	0.03	0.38	0.21	2.89	1.69	0.70	0.27	0.12	0.05	0.53	16.80	210.0
11	1986	0.01	0.13	0.00	0.00	0.08	0.02	0.03	0.01	0.01	0.01	0.00	0.00	0.03	0.79	9.9
12	1987	0.02	0.40	0.49	3.14	1.31	4.04	10.38	2.90	1.65	0.78	0.29	0.16	2.13	67.04	838.0
13	1988	0.11	1.38	24.79	4.43	2.74	3.30	3.85	3.09	3.04	3.75	3.77	3.71	4.81	151.70	1896.3
14	1989	1.88	7.18	7.56	11.52	8.24	4.70	6.25	2.40	1.74	0.41	3.53	0.05	4.64	146.30	1828.8
15	1990	0.05	0.05	0.04	0.05	0.04	0.58	1.72	5.42	1.34	0.54	0.32	0.25	0.86	27.20	340.0
16	1991	0.01	0.01	0.01	7.99	2.96	3.06	3.48	3.62	2.57	0.75	0.12	0.04	2.05	64.75	809.4
17	1992	0.07	0.20	0.20	0.20	0.24	0.11	0.12	0.17	0.12	0.11	0.09	0.06	0.14	4.46	55.8
18	1993	0.00	0.04	3.85	3.25	2.93	0.70	3.88	2.87	1.37	0.23	0.21	1.67	1.76	55.48	693.5
19	1994	0.18	0.04	0.01	0.00	0.00	0.21	0.85	3.59	0.91	0.11	0.05	0.04	0.50	15.63	195.4
20	1995	0.13	0.00	0.07	13.70	17.97	8.09	8.32	3.45	0.20	0.00	0.51	0.29	4.40	138.82	1735.3
<b>DAM: TASKOURT (No.9)</b>		<b>B.A. (km<sup>2</sup>): 439</b>												<b>Reference station: Sidi Bouathmane</b>		
	Ave.	0.06	0.67	1.80	1.57	0.91	1.40	2.44	2.72	1.58	0.63	0.15	0.16	1.17	36.96	462.1
	Max.	0.21	3.19	12.63	5.67	2.48	5.19	6.75	5.68	2.64	2.26	0.44	0.96			
	Min.	0.01	0.02	0.02	0.01	0.01	0.02	0.04	0.20	0.13	0.09	0.01	0.01			
1	1985	0.02	0.02	0.02	0.04	0.17	0.14	1.32	2.14	2.02	0.26	0.02	0.02	0.52	16.34	204.3
2	1986	0.02	0.16	0.04	0.01	0.43	0.93	0.27	0.20	0.13	0.42	0.01	0.01	0.21	6.72	84.0
3	1987	0.02	1.90	2.78	5.67	1.41	5.19	6.75	3.48	2.26	1.01	0.13	0.02	2.54	80.00	1000.0
4	1988	0.02	0.95	12.63	3.41	1.99	1.90	2.39	3.97	2.43	0.85	0.32	0.19	2.57	81.13	1014.2
5	1989	0.06	3.19	2.50	1.29	1.08	0.46	2.69	1.83	1.99	0.64	0.44	0.08	1.36	42.98	537.3
6	1990	0.02	0.02	0.13	0.15	0.06	0.43	1.36	0.94	0.55	0.09	0.06	0.96	0.40	12.57	157.2
7	1991	0.16	0.15	0.12	3.74	0.71	1.46	1.73	3.46	2.45	0.60	0.21	0.13	1.24	39.17	489.7
8	1992	0.21	0.29	0.30	0.92	0.57	1.32	0.83	1.56	0.60	0.30	0.02	0.01	0.57	17.99	224.9
9	1993	0.01	0.21	0.92	0.76	1.06	1.18	5.16	5.16	1.53	0.36	0.02	0.02	1.36	43.03	537.9
10	1994	0.02	0.31	0.11	0.04	0.01	0.02	0.04	1.54	0.73	0.20	0.03	0.17	0.27	8.48	106.0
11	1995	0.07	0.18	0.28	1.30	2.48	2.43	4.36	5.68	2.64	2.26	0.35	0.20	1.85	58.19	727.3
12																
13																
14																
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: Estimated from stations at Illoudjane (for No.7) and Sidi Bouathmane (for No.8)

**Table II3.3.3: Ecoulement moyen mensuel de la rivier (4/9)**

No.	Year	Monthly average discharge (m <sup>3</sup> /s)											Mean annual flow				
		Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	m <sup>3</sup> /s	Mm <sup>3</sup> /yr	mm/yr	
<b>DAM: TIMKIT (No.10)</b>		<b>B.A. (km<sup>2</sup>): 592</b>											<b>Reference station: Ait Bouijane</b>				
	Ave.	0.58	0.85	0.82	0.63	0.62	0.60	0.71	0.69	0.70	0.71	0.53	0.69	0.68	21.40	36.2	
	Max.	1.72	4.01	3.28	2.91	2.02	1.79	1.57	2.01	2.09	3.15	1.46	3.04				
	Min.	0.10	0.09	0.24	0.12	0.11	0.09	0.15	0.16	0.15	0.15	0.09	0.04				
1	1976	0.58	0.48	0.42	0.37	0.42	0.40	0.36	0.32	0.34	0.26	0.30	0.34	0.38	12.05	20.4	
2	1977	0.79	0.26	0.30	0.63	1.15	0.70	0.58	0.40	0.46	0.37	0.34	0.34	0.53	16.63	28.1	
3	1978	0.30	0.51	0.48	0.31	0.43	0.33	0.55	0.33	0.36	0.27	0.29	0.33	0.37	11.82	20.0	
4	1979	0.48	3.32	0.96	0.92	0.86	0.97	1.50	2.01	2.09	1.60	0.89	0.71	1.36	43.03	72.7	
5	1980	0.70	0.35	0.77	0.99	0.89	0.80	0.78	0.59	0.50	0.47	0.44	0.36	0.64	20.04	33.9	
6	1981	0.36	0.37	0.34	0.38	0.38	0.37	0.37	0.36	0.32	0.17	0.18	0.14	0.31	9.83	16.6	
7	1982	0.20	0.23	0.41	0.43	0.61	0.77	0.44	0.44	0.36	0.15	0.20	0.29	0.38	11.85	20.0	
8	1983	0.20	0.15	0.36	0.20	0.29	0.13	0.18	0.20	0.27	0.20	0.11	0.05	0.19	6.13	10.3	
9	1984	0.12	0.09	0.36	0.32	0.33	0.24	0.25	0.40	1.04	0.61	0.85	0.79	0.45	14.28	24.1	
10	1985	0.75	0.28	0.42	0.19	0.11	0.09	0.15	0.17	0.19	0.34	0.18	0.15	0.25	7.89	13.3	
11	1986	0.10	1.82	0.24	0.18	0.12	0.10	0.23	0.16	0.15	0.19	0.09	0.04	0.29	9.07	15.3	
12	1987	0.43	0.21	0.43	0.12	0.16	0.17	0.56	0.34	0.36	0.30	0.18	0.18	0.29	9.09	15.4	
13	1988	0.17	0.38	1.27	0.62	0.60	0.98	1.26	1.24	1.31	3.15	0.44	3.04	1.20	37.98	64.2	
14	1989	1.25	1.17	3.28	2.91	2.02	1.79	1.57	1.51	1.50	1.45	1.46	1.54	1.79	56.36	95.2	
15	1990	1.72	0.96	0.97	1.01	1.06	1.02	0.94	0.86	0.82	0.86	0.92	1.00	1.01	31.86	53.8	
16	1991	0.83	0.88	0.89	0.71	0.48	0.35	0.66	0.67	0.81	1.04	0.54	0.42	0.69	21.79	36.8	
17	1992	0.33	0.40	0.57	0.34	0.43	0.37	0.46	0.42	0.48	0.32	0.43	0.45	0.42	13.17	22.2	
18	1993	0.71	0.20	2.33	0.90	0.86	0.88	1.25	1.32	1.15	1.13	1.04	1.06	1.07	33.66	56.9	
19	1994	1.02	4.01	0.70	0.72	0.87	0.78	1.30	1.53	0.94	0.70	0.69	0.98	1.19	37.61	63.5	
20	1995	0.64	0.94	0.86	0.36	0.42	0.77	0.76	0.52	0.59	0.67	1.07	1.49	0.76	23.89	40.4	
<b>DAM: TADIGHOUST (No.11)</b>		<b>B.A. (km<sup>2</sup>): 2,239</b>											<b>Reference station: Tadighoust</b>				
	Ave.	0.92	2.80	2.66	1.46	0.60	0.77	0.79	0.80	0.98	1.13	0.43	0.64	1.17	36.79	62.1	
	Max.	4.58	21.85	24.60	17.72	5.75	4.45	3.82	7.70	10.32	10.22	2.63	3.08				
	Min.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				
1	1977	0.46	0.18	0.03	1.23	0.06	0.00	0.00	0.00	0.01	0.01	0.01	0.00	0.17	5.30	9.0	
2	1978	0.00	0.24	0.00	0.00	0.79	0.00	0.00	0.00	0.64	0.01	0.00	0.00	0.14	4.50	7.6	
3	1979	1.16	7.16	0.00	0.00	0.17	1.29	3.82	2.28	0.79	0.44	0.48	0.32	1.50	47.28	79.9	
4	1980	0.58	0.70	0.45	0.64	0.34	0.49	0.14	0.09	0.22	0.21	0.20	0.17	0.35	11.12	18.8	
5	1981	0.03	0.03	0.17	0.16	0.14	0.00	0.00	0.12	1.15	0.57	0.00	0.00	0.20	6.29	10.6	
6	1982	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.43	0.00	0.00	0.22	0.06	1.74	2.9	
7	1983	0.15	0.16	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.84	1.4	
8	1984	0.00	0.00	0.38	0.00	0.00	0.00	0.00	0.01	0.60	0.00	0.00	0.00	0.08	2.62	4.4	
9	1985	1.29	1.40	5.90	2.72	0.00	0.00	0.00	0.00	0.00	1.68	0.00	1.09	1.17	36.96	62.4	
10	1986	2.31	7.24	0.00	0.00	0.00	0.00	0.91	0.00	0.89	0.00	0.00	0.00	0.96	30.21	51.0	
11	1987	0.78	2.06	1.86	2.21	0.00	0.00	0.00	0.00	0.29	0.00	0.00	0.00	0.60	19.06	32.2	
12	1988	0.01	6.28	1.39	0.00	0.00	3.24	2.42	0.14	0.02	3.80	0.89	3.08	1.76	55.66	94.0	
13	1989	1.39	1.92	13.52	17.72	5.75	4.45	2.82	2.18	10.32	2.08	1.90	2.09	5.53	174.35	294.5	
14	1990	4.58	1.19	0.72	1.47	1.88	1.97	0.78	0.60	0.85	10.22	2.63	2.78	2.46	77.60	131.1	
15	1991	1.82	0.67	0.28	1.31	0.39	0.44	0.29	0.06	0.05	0.49	0.01	0.00	0.48	15.25	25.8	
16	1992	2.39	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.20	6.19	10.5	
17	1993	0.18	0.35	24.60	0.42	1.48	1.68	1.68	2.00	1.96	1.62	1.41	0.52	3.13	98.62	166.6	
18	1994	0.52	4.08	0.81	0.49	0.35	0.42	0.83	7.70	0.50	0.64	0.32	0.30	1.41	44.49	75.2	
19	1995	0.29	21.85	2.72	0.34	0.31	1.13	1.84	0.60	0.57	0.54	0.51	0.48	2.63	82.89	140.0	
20	1996	0.46	0.43	0.41	0.39	0.37	0.35	0.33	0.30	0.27	0.24	0.22	1.83	0.47	14.81	25.0	
<b>DAM: TIOUZAGUINE (No.12)</b>		<b>B.A. (km<sup>2</sup>): 258</b>											<b>Reference station: Tazougert</b>				
	Ave.	0.07	0.27	0.54	0.17	0.12	0.04	0.04	0.12	0.11	0.06	0.01	0.01	0.13	4.08	6.9	
	Max.	0.64	1.83	7.79	1.74	1.66	0.27	0.28	0.80	0.54	0.43	0.03	0.11				
	Min.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				
1	1977	0.02	0.18	0.02	0.00	0.01	0.02	0.02	0.02	0.01	0.00	0.00	0.00	0.03	0.81	1.4	
2	1978	0.00	0.01	0.00	0.00	1.66	0.02	0.01	0.01	0.20	0.01	0.00	0.00	0.16	5.13	8.7	
3	1979	0.52	1.83	0.34	0.04	0.04	0.06	0.28	0.16	0.03	0.01	0.01	0.00	0.28	8.79	14.8	
4	1980	0.02	0.00	0.00	0.01	0.01	0.02	0.01	0.01	0.01	0.00	0.00	0.00	0.01	0.24	0.4	
5	1981	0.00	0.00	0.00	0.00	0.12	0.01	0.01	0.09	0.10	0.10	0.00	0.00	0.04	1.12	1.9	
6	1982	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.22	0.00	0.00	0.00	0.02	0.66	1.1	
7	1983	0.01	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.03	0.00	0.00	0.00	0.01	0.17	0.3	
8	1984	0.00	0.00	0.24	0.00	0.00	0.00	0.00	0.00	0.08	0.00	0.00	0.00	0.03	0.87	1.5	
9	1985	0.64	0.05	0.02	0.49	0.03	0.01	0.00	0.00	0.00	0.03	0.01	0.00	0.11	3.37	5.7	
10	1986	0.02	1.00	0.00	0.00	0.00	0.00	0.02	0.00	0.07	0.05	0.01	0.00	0.10	3.19	5.4	
11	1987	0.01	0.05	0.29	0.02	0.00	0.10	0.01	0.00	0.07	0.00	0.00	0.00	0.05	1.48	2.5	
12	1988	0.00	0.39	0.03	0.00	0.00	0.00	0.00	0.13	0.00	0.28	0.00	0.00	0.07	2.23	3.8	
13	1989	0.03	0.63	1.50	0.62	0.02	0.01	0.01	0.63	0.54	0.00	0.00	0.00	0.33	10.52	17.8	
14	1990	0.01	0.00	0.00	0.11	0.04	0.08	0.04	0.06	0.04	0.05	0.01	0.01	0.04	1.22	2.1	
15	1991	0.01	0.03	0.01	0.02	0.02	0.02	0.01	0.01	0.04	0.02	0.01	0.01	0.02	0.58	1.0	
16	1992	0.01	0.01	0.15	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.03	0.88	1.5	
17	1993	0.02	0.02	7.79	1.74	0.03	0.02	0.03	0.02	0.01	0.01	0.01	0.00	0.80	25.31	42.8	
18	1994	0.07	0.95	0.27	0.27	0.27	0.27	0.26	0.80	0.							

**Table II3.3.3: Ecoulement moyen mensuel de la rivier (5/9)**

No.	Year	Monthly average discharge (m <sup>3</sup> /s)												Mean annual flow		
		Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	m <sup>3</sup> /s	Mm <sup>3</sup> /yr	mm/yr
<b>DAM: KHENG GROU (No.13)</b>		<b>B.A. (km<sup>2</sup>): 4900</b>												<b>Reference station: Beni Yatti</b>		
	Ave.	1.69	5.43	3.12	1.09	2.30	0.42	0.36	6.01	3.00	0.90	0.23	0.32	2.08	65.48	13.4
	Max.	9.78	64.60	29.70	11.11	26.35	1.43	1.22	70.01	32.09	2.98	2.33	1.92			
	Min.	0.01	0.01	0.04	0.07	0.08	0.03	0.06	0.04	0.04	0.03	0.01	0.01			
1	1972	1.50	6.12	9.72	0.54	0.22	0.13	0.07	29.41	0.23	2.82	0.06	0.03	4.20	132.37	27.0
2	1973	0.01	0.01	0.52	0.16	0.12	0.04	0.06	9.19	0.34	0.10	0.07	0.05	0.88	27.68	5.6
3	1974	0.23	0.52	1.66	0.27	0.18	0.13	0.11	70.01	32.09	1.40	0.13	0.10	8.87	279.84	57.1
4	1975	1.02	0.23	0.51	0.67	0.31	0.53	0.56	1.79	6.44	0.87	2.33	0.10	1.29	40.65	8.3
5	1976	9.78	0.33	0.21	3.54	8.75	0.24	0.11	2.27	1.91	0.16	0.06	0.06	2.29	72.31	14.8
6	1977	1.77	10.62	2.61	0.22	0.86	0.90	0.56	0.05	0.04	0.06	0.05	0.03	1.49	47.01	9.6
7	1978	0.03	0.03	0.04	0.07	26.35	0.14	0.10	0.07	0.29	0.31	0.08	0.05	2.34	73.74	15.0
8	1979	8.04	64.60	1.08	0.50	0.31	0.23	1.22	1.05	0.23	0.16	0.07	0.04	6.56	206.73	42.2
9	1980	0.52	0.20	0.32	0.26	0.26	1.43	0.16	0.17	0.15	0.20	0.03	0.02	0.30	9.48	1.9
10	1981	0.03	0.07	0.07	0.08	4.65	0.11	0.10	3.08	2.88	2.98	0.05	1.92	1.34	42.31	8.6
11	1982	0.30	9.52	4.57	1.20	1.17	1.16	1.01	0.99	3.43	1.23	0.82	0.82	2.20	69.28	14.1
12	1983	1.26	1.02	1.27	1.22	1.23	1.15	1.18	0.96	3.95	2.68	0.02	0.01	1.33	41.91	8.6
13	1984	0.03	0.13	4.11	0.11	0.16	0.09	0.08	0.08	0.37	0.03	0.01	0.01	0.43	13.53	2.8
14	1985	7.03	0.98	2.65	11.11	0.14	0.11	0.07	0.04	0.12	0.15	0.08	0.04	1.88	59.42	12.1
15	1986	1.49	5.44	0.77	0.09	0.11	0.10	0.11	0.08	0.15	0.09	0.06	0.04	0.72	22.58	4.6
16	1987	0.08	0.23	2.21	0.12	0.08	1.23	0.93	0.34	0.12	0.08	0.05	0.02	0.45	14.14	2.9
17	1988	0.09	1.99	0.28	0.18	0.18	0.18	0.17	0.17	0.22	2.05	0.15	0.26	0.49	15.57	3.2
18	1989	0.19	2.36	29.70	1.16	0.56	0.23	0.14	0.10	0.42	0.19	0.09	0.10	2.91	91.71	18.7
19	1990	0.25	0.17	0.08	0.15	0.20	0.03	0.23	0.18	0.13	0.11	0.07	0.82	0.20	6.45	1.3
20	1991	0.09	3.99	0.12	0.18	0.18	0.18	0.17	0.15	6.53	2.34	0.32	1.86	1.36	42.89	8.8
<b>DAM: ADAROUC (No.14)</b>		<b>B.A. (km<sup>2</sup>): 630</b>												<b>Reference station: Sidi Mokhfi</b>		
	Ave.	1.05	1.16	1.39	1.65	2.29	1.80	2.51	1.98	1.56	0.99	0.90	0.95	1.52	47.93	9.8
	Max.	3.40	3.91	3.66	4.81	7.69	5.96	9.47	6.13	4.66	3.61	3.38	3.59			
	Min.	0.00	0.00	0.00	0.00	0.05	0.02	0.00	0.00	0.00	0.00	0.00	0.00			
1	1976	1.19	1.53	3.25	2.85	7.69	1.66	6.76	6.13	4.50	3.61	3.38	3.59	3.87	121.91	24.9
2	1977	3.40	3.71	3.44	4.38	5.24	5.96	5.72	4.77	4.66	3.57	2.32	2.11	4.09	129.12	26.4
3	1978	2.22	1.90	2.15	4.81	4.36	4.95	9.47	6.07	3.94	2.67	3.04	2.89	4.04	127.44	26.0
4	1979	2.98	3.91	3.66	2.85	3.85	2.96	5.23	4.14	3.96	1.85	2.04	2.78	3.36	105.81	21.6
5	1980	2.84	2.83	3.60	2.76	2.98	0.02	0.03	0.28	0.42	0.03	0.01	0.00	1.32	41.71	8.51
6	1981	0.00	0.00	0.00	0.49	0.93	0.33	0.30	0.78	0.13	0.02	0.01	0.00	0.25	7.89	1.61
7	1982	0.00	0.01	0.14	0.12	0.05	0.69	0.13	0.09	0.07	0.02	0.01	0.01	0.11	3.42	0.70
8	1983	0.00	0.00	0.40	1.57	0.15	0.02	0.51	0.24	0.86	0.15	0.02	0.01	0.33	10.46	2.1
9	1984	0.00	0.00	0.00	0.00	1.03	0.07	0.00	0.00	0.17	0.00	0.00	0.00	0.11	3.40	0.7
10	1985	0.01	0.00	0.00	0.00	0.45	3.53	1.73	1.29	0.00	0.00	0.00	0.00	0.56	17.71	3.6
11	1986	0.00	0.00	0.00	0.00	0.12	1.05	0.00	0.00	0.00	0.00	0.00	0.00	0.09	2.88	0.6
12	1987	0.00	0.00	0.00	0.02	0.66	0.38	0.25	0.00	0.00	0.00	0.00	0.01	0.11	3.43	0.70
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<b>DAM: SIDI OMAR (No.15)</b>		<b>B.A. (km<sup>2</sup>): 350</b>												<b>Reference station: Sidi Amar</b>		
	Ave.	0.09	0.16	0.27	1.52	3.80	2.66	0.89	0.66	0.41	0.15	0.02	0.00	0.88	27.67	5.6
	Max.	0.74	1.06	1.21	21.38	38.28	23.25	3.76	2.49	2.25	1.22	0.18	0.04			
	Min.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
1	1978	0.00	0.00	0.06	0.93	1.93	23.25	2.08	0.77	0.25	0.11	0.03	0.00	2.31	72.72	14.8
2	1979	0.15	1.06	0.39	0.20	0.86	0.29	3.76	0.52	0.23	0.03	0.00	0.00	0.63	19.93	4.1
3	1980	0.00	0.04	0.32	0.10	0.14	0.17	0.11	0.26	0.13	0.01	0.00	0.00	0.11	3.33	0.7
4	1981	0.00	0.00	0.00	0.01	0.38	1.13	0.78	1.94	2.25	0.07	0.04	0.00	0.55	17.19	3.5
5	1982	0.00	0.15	0.39	0.39	0.14	1.15	0.22	0.12	0.04	0.02	0.00	0.00	0.21	6.68	1.4
6	1983	0.00	0.00	0.16	0.48	3.62	0.13	0.29	0.12	1.19	0.06	0.00	0.00	0.51	16.11	3.3
7	1984	0.00	0.00	0.33	0.09	3.38	0.58	0.14	0.05	0.11	0.02	0.00	0.00	0.39	12.40	2.5
8	1985	0.68	0.00	0.06	0.07	1.63	5.94	1.76	0.75	0.07	0.11	0.00	0.00	0.89	28.00	5.7
9	1986	0.00	0.04	0.42	0.16	2.01	6.51	0.32	0.15	0.06	0.02	0.00	0.00	0.77	24.19	4.9
10	1987	0.00	0.00	0.48	1.44	2.56	2.15	1.66	0.28	0.13	0.03	0.00	0.00	0.72	22.80	4.7
11	1988	0.00	0.00	0.17	0.09	0.17	0.45	0.45	2.49	0.67	0.74	0.00	0.00	0.43	13.61	2.8
12	1989	0.00	0.59	0.93	2.69	2.08	0.79	0.74	0.87	0.73	0.25	0.00	0.00	0.81	25.54	5.2
13	1990	0.00	0.00	0.00	0.00	0.40	0.75	0.43	0.23	0.13	0.03	0.00	0.00	0.16	5.07	1.0
14	1991	0.00	0.05	0.09	0.12	0.08	0.08	0.27	0.64	0.09	0.03	0.04	0.04	0.13	3.97	0.8
15	1992	0.04	0.04	0.04	0.05	0.08	0.08	0.08	0.07	0.03	0.00	0.00	0.00	0.04	1.34	0.3
16	1993	0.00	0.00	0.01	0.15	0.17	0.32	0.53	0.13	0.00	0.00	0.00	0.00	0.11	3.42	0.7
17	1994	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.0
18	1995	0.05	0.00	0.03	0.59	38.28	5.10	1.94	1.60	1.32	1.22	0.08	0.00	4.21	132.88	27.1
19	1996	0.74	1.03	1.21	21.38	14.35	1.58	1.33	1.56	0.32	0.10	0.18	0.00	3.70	116.58	23.8
20																

: Estimated from stations at Dar Hamra (for 14) and Feddane Taba (for 15).

**Table II.3.3: Ecoulement moyen mensuel de la rivier (6/9)**

No.	Year	Monthly average discharge (m <sup>3</sup> /s)											Mean annual flow			
		Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	m <sup>3</sup> /s	Mm <sup>3</sup> /yr	mm/yr
<b>DAM: TIOUINE (No.16)</b>		<b>B.A. (km<sup>2</sup>): 1,540</b>											<b>Reference station: Tamdrouste</b>			
	Ave.	0.41	1.36	3.12	4.36	5.57	6.47	9.20	3.61	0.90	0.94	0.21	0.85	3.07	96.75	62.8
	Max.	2.33	8.58	27.47	33.03	32.44	40.16	37.88	26.38	3.69	12.21	1.06	7.56			
	Min.	0.00	0.00	0.02	0.03	0.02	0.17	0.10	0.07	0.04	0.00	0.00	0.00			
1	1977	0.03	0.05	0.02	0.45	32.44	7.34	2.15	0.90	0.38	0.09	0.06	0.05	3.67	115.75	75.2
2	1978	0.02	0.55	0.15	0.29	15.54	5.97	1.80	1.27	0.46	0.26	0.07	0.03	2.19	69.02	44.8
3	1979	1.61	6.06	0.89	0.57	0.78	1.53	13.17	4.63	0.85	0.27	0.12	0.08	2.56	80.80	52.5
4	1980	1.07	0.66	1.28	1.56	0.58	4.25	3.01	1.03	0.32	0.12	0.11	0.08	1.15	36.32	23.6
5	1981	0.08	0.14	0.12	0.22	0.22	0.32	0.60	0.51	0.59	0.55	0.05	0.04	0.29	9.03	5.9
6	1982	0.05	0.03	0.03	0.03	0.02	0.39	0.79	0.13	0.06	0.06	0.02	0.01	0.13	4.23	2.7
7	1983	0.04	0.39	5.25	0.37	0.22	0.21	0.10	0.07	0.04	0.00	0.00	0.00	0.55	17.38	11.3
8	1984	0.00	0.00	1.62	1.20	2.90	2.34	2.90	2.21	2.21	0.13	0.06	0.03	1.29	40.84	26.5
9	1985	0.26	0.38	0.55	0.03	0.11	0.17	0.35	0.18	0.08	0.04	0.00	0.02	0.18	5.64	3.7
10	1986	0.01	0.08	0.03	0.03	4.17	2.04	0.61	0.11	0.49	0.03	0.02	0.00	0.63	19.89	12.9
11	1987	2.33	8.58	5.65	7.12	1.88	14.15	23.00	2.81	0.60	0.41	0.16	0.05	5.52	174.13	113.1
12	1988	0.04	0.03	27.47	4.96	29.76	40.16	12.04	5.07	1.82	1.42	0.83	1.79	10.23	322.48	209.4
13	1989	0.54	2.06	2.86	33.03	3.99	2.60	13.48	4.83	1.10	0.41	0.28	0.12	5.50	173.48	112.6
14	1990	1.28	4.45	0.43	0.61	0.69	1.15	8.18	2.87	0.27	0.22	0.24	0.13	1.72	54.29	35.3
15	1991	0.10	0.13	0.23	29.06	1.66	15.40	33.17	1.90	3.69	1.61	0.78	7.56	7.96	250.89	162.9
16	1992	0.02	0.07	0.25	0.83	1.15	2.89	2.76	1.17	0.30	0.32	0.10	0.14	0.82	25.90	16.8
17	1993	0.43	0.79	5.98	1.32	0.90	1.05	37.88	2.50	0.49	0.29	0.12	0.03	4.36	137.61	89.4
18	1994	0.18	2.57	9.17	1.26	0.41	0.64	3.01	26.38	1.31	0.23	0.03	0.01	3.74	117.81	76.5
19	1995	0.04	0.11	0.22	3.33	9.13	24.14	23.10	6.54	2.31	12.21	1.06	0.19	6.74	212.71	138.1
20	1996	0.14	0.10	0.14	0.99	4.91	2.74	1.89	7.07	0.63	0.18	0.12	6.57	2.12	66.87	43.4
<b>DAM: AZGHAR (No.17)</b>		<b>B.A. (km<sup>2</sup>): 295</b>											<b>Reference station: Dar Hamra</b>			
	Ave.	0.30	0.35	0.70	1.03	2.22	3.12	3.39	2.33	0.93	0.45	0.13	0.07	1.24	39.12	25.4
	Max.	1.38	1.66	2.47	4.94	12.18	9.28	11.57	5.83	3.10	1.62	0.31	0.18			
	Min.	0.01	0.04	0.11	0.05	0.05	0.05	0.21	0.35	0.16	0.04	0.02	0.01			
1	1984	0.03	0.04	1.00	0.43	1.38	0.66	0.82	0.42	1.86	0.25	0.06	0.03	0.58	18.36	11.9
2	1985	0.03	0.06	0.25	0.34	2.35	8.54	7.66	3.32	0.57	1.62	0.08	0.04	2.03	63.90	41.5
3	1986	0.08	0.24	0.52	0.16	1.66	9.28	1.34	0.35	0.16	0.12	0.18	0.07	1.12	35.42	23.0
4	1987	1.38	1.66	1.42	0.43	2.72	2.40	4.20	0.53	0.97	0.18	0.06	0.04	1.33	41.94	27.2
5	1988	0.03	0.04	0.18	0.14	0.05	0.54	1.47	5.43	0.64	0.33	0.06	0.11	0.75	23.53	15.3
6	1989	0.66	1.28	1.25	4.94	3.79	0.52	0.21	1.74	0.38	0.04	0.31	0.10	1.28	40.31	26.2
7	1990	0.45	0.05	0.62	2.68	0.31	2.63	11.57	3.76	0.80	0.28	0.23	0.15	1.96	61.95	40.2
8	1991	0.62	0.29	0.24	0.19	0.22	0.31	1.01	3.81	0.51	1.34	0.24	0.18	0.74	23.38	15.2
9	1992	0.08	0.18	0.15	0.59	0.16	0.20	1.53	1.33	1.80	0.11	0.03	0.02	0.52	16.36	10.6
10	1993	0.01	0.11	2.47	0.45	1.80	6.02	2.11	0.48	0.23	0.06	0.02	0.01	1.11	35.03	22.7
11	1994	0.19	0.13	0.24	0.05	0.05	0.05	1.79	0.96	0.20	0.11	0.03	0.03	0.32	10.16	6.6
12	1995	0.05	0.07	0.11	1.91	12.18	6.29	7.01	5.83	3.10	0.97	0.25	0.05	3.14	99.06	64.3
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<b>DAM: BOUKARKOUR(NO.18)</b>		<b>B.A. (km<sup>2</sup>): 1,120</b>											<b>Reference station: FeddaneTaba</b>			
	Ave.	0.08	0.26	1.05	1.91	2.88	3.49	1.54	0.92	0.30	0.12	0.07	0.05	1.04	32.82	21.3
	Max.	0.39	2.35	4.88	15.75	14.79	29.83	7.11	2.79	1.55	0.83	0.70	0.44			
	Min.	0.00	0.01	0.07	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00			
1	1977	0.06	0.18	0.31	0.78	3.31	12.46	0.22	0.77	0.37	0.08	0.02	0.01	1.47	46.40	30.1
2	1978	0.14	0.34	0.27	5.13	13.17	29.83	3.70	1.36	0.89	0.83	0.70	0.44	4.57	144.15	93.6
3	1979	0.34	2.35	0.62	0.51	1.57	0.60	6.80	0.67	0.48	0.20	0.06	0.01	1.20	37.74	24.5
4	1980	0.16	0.30	1.34	0.24	0.22	0.14	0.64	0.18	0.13	0.06	0.05	0.05	0.29	9.22	6.0
5	1981	0.06	0.07	0.07	0.55	1.38	1.21	0.32	2.47	0.10	0.07	0.06	0.05	0.53	16.61	10.8
6	1982	0.06	0.08	0.29	0.34	0.14	1.45	0.25	0.20	0.16	0.11	0.10	0.08	0.26	8.32	5.4
7	1983	0.06	0.07	0.78	1.00	0.10	0.07	1.08	0.65	1.55	0.08	0.03	0.03	0.46	14.60	9.5
8	1984	0.03	0.03	4.54	0.31	1.63	0.37	0.08	0.04	0.11	0.03	0.03	0.03	0.60	18.89	12.3
9	1985	0.08	0.02	1.28	0.26	0.90	4.58	0.35	0.59	0.03	0.01	0.00	0.00	0.65	20.41	13.3
10	1986	0.00	0.01	4.88	0.09	0.45	3.61	0.09	0.06	0.01	0.00	0.00	0.01	0.74	23.32	15.1
11	1987	0.04	0.27	1.12	2.77	2.73	6.22	1.14	0.12	0.10	0.08	0.03	0.01	1.19	37.46	24.3
12	1988	0.02	0.09	0.68	0.07	0.63	0.90	1.71	2.46	0.03	0.02	0.01	0.00	0.55	17.22	11.2
13	1989	0.01	0.03	2.62	4.79	2.18	0.12	0.36	0.09	0.05	0.03	0.01	0.00	0.86	27.26	17.7
14	1990	0.00	0.14	0.24	2.22	0.14	2.89	3.78	2.79	0.16	0.11	0.07	0.05	1.04	32.74	21.3
15	1991	0.39	0.71	0.16	0.39	0.14	0.32	0.30	2.38	0.38	0.30	0.03	0.03	0.46	14.45	9.4
16	1992	0.03	0.28	0.28	0.16	0.14	0.04	0.90	0.14	0.04	0.04	0.04	0.04	0.18	5.65	3.7
17	1993	0.06	0.07	0.12	0.29	0.15	0.74	1.56	1.84	0.71	0.10	0.06	0.03	0.47	14.92	9.7
18	1994	0.01	0.02	0.14	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.02	0.53	0.3
19	1995	0.01	0.02	1.21	2.56	14.79	3.65	7.11	0.31	0.46	0.15	0.04	0.01	2.54	80.10	52.0
20	1996	0.02	0.04	0.15	15.75	13.77	0.55	0.41	1.34	0.15	0.10	0.06	0.04	2.74	86.41	56.1

**Table II3.3.3: Ecoulement moyen mensuel de la rivier (7/9)**

No.	Year	Monthly average discharge (m <sup>3</sup> /s)											Mean annual flow			
		Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	m <sup>3</sup> /s	Mm <sup>3</sup> /yr	mm/yr
<b>DAM: AOULAI (No.19)</b>		<b>B.A. (km<sup>2</sup>): 490</b>											<b>Reference station: Rhafsai</b>			
	Ave.	0.07	0.91	4.00	9.93	15.28	16.42	8.92	6.13	5.52	0.80	0.22	0.09	5.63	177.67	362.6
	Max.	0.28	9.95	24.86	39.40	80.97	61.22	35.64	18.14	23.14	3.58	0.73	0.26			
	Min.	0.00	0.00	0.04	0.10	0.17	0.23	0.40	0.12	0.01	0.00	0.00	0.00			
1	1976	0.12	3.80	2.23	39.40	55.91	38.64	7.62	2.38	1.32	0.54	0.18	0.11	12.60	397.29	810.8
2	1977	0.07	0.35	0.52	7.19	11.09	24.78	15.72	12.91	18.99	2.60	0.73	0.17	7.83	246.94	504.0
3	1978	0.08	0.06	0.07	9.52	26.89	52.04	20.82	7.15	1.79	0.54	0.22	0.05	9.68	305.18	622.8
4	1979	0.28	9.95	2.59	1.11	4.85	2.06	6.87	3.19	10.26	1.01	0.18	0.11	3.57	112.57	229.7
5	1980	0.12	0.39	6.81	1.10	0.58	0.35	0.75	6.61	9.85	0.64	0.15	0.04	2.28	72.03	147.0
6	1981	0.03	0.06	0.04	11.38	21.62	7.63	7.05	18.14	3.02	0.54	0.19	0.08	5.81	183.32	374.1
7	1982	0.03	0.32	3.35	2.72	1.07	15.97	3.10	2.20	1.68	0.48	0.31	0.17	2.52	79.43	162.1
8	1983	0.04	0.03	9.30	36.38	3.40	0.57	11.93	5.50	20.08	3.58	0.42	0.18	7.71	243.12	496.2
9	1984	0.12	0.13	3.39	3.55	9.90	20.87	4.59	2.72	3.09	0.37	0.09	0.04	3.96	124.87	254.8
10	1985	0.01	0.02	3.78	4.74	19.81	61.22	17.84	12.95	2.88	0.67	0.16	0.12	10.00	315.30	643.5
11	1986	0.11	0.57	1.14	0.38	22.18	36.00	4.50	1.48	0.33	0.14	0.37	0.26	5.43	171.10	349.2
12	1987	0.11	0.14	1.37	12.09	14.26	2.08	0.90	2.96	1.22	0.32	0.10	0.04	2.99	94.33	192.5
13	1988	0.01	0.07	2.14	1.48	0.55	8.74	4.36	12.62	2.82	0.68	0.05	0.02	2.73	86.23	176.0
14	1989	0.01	0.04	24.86	36.72	17.67	4.55	1.70	5.61	2.23	0.49	0.13	0.02	7.86	247.98	506.1
15	1990	0.04	0.22	1.28	11.35	1.70	9.59	35.64	4.57	1.13	0.27	0.07	0.02	5.50	173.47	354.0
16	1991	0.02	0.03	0.06	0.10	0.17	0.69	0.50	12.85	0.58	0.60	0.18	0.02	1.30	40.94	83.5
17	1992	0.00	1.05	0.40	1.31	0.56	0.39	1.71	1.96	5.43	0.87	0.09	0.06	1.16	36.64	74.8
18	1993	0.20	0.80	14.29	1.46	12.12	10.50	10.36	1.45	0.49	0.22	0.04	0.00	4.28	134.98	275.5
19	1994	0.00	0.12	1.68	0.32	0.27	0.17	0.23	0.40	0.12	0.01	0.00	0.00	0.27	8.63	17.6
20	1995	0.00	0.00	0.68	16.34	80.97	31.52	22.26	4.96	23.14	1.35	0.68	0.21	15.19	478.99	977.5
<b>DAM: SIDI ABBOU (No.20)</b>		<b>B.A. (km<sup>2</sup>): 363</b>											<b>Reference station: Boukarkour/Tissa</b>			
	Ave.	0.02	0.12	0.59	1.24	3.39	3.41	2.22	1.73	0.53	0.11	0.03	0.01	1.10	34.80	71.0
	Max.	0.08	0.30	1.85	5.33	17.10	14.86	13.22	5.63	2.26	0.27	0.08	0.02			
	Min.	0.00	0.01	0.01	0.03	0.03	0.02	0.19	0.04	0.01	0.01	0.00	0.00			
1	1986	0.01	0.26	0.13	0.13	7.81	14.86	1.77	0.59	0.14	0.05	0.02	0.02	2.07	65.15	133.0
2	1987	0.02	0.04	0.61	0.87	3.34	1.08	0.99	0.74	0.22	0.04	0.02	0.01	0.66	20.97	42.8
3	1988	0.01	0.08	0.46	0.22	0.18	1.37	0.80	4.01	0.78	0.24	0.07	0.02	0.68	21.33	43.5
4	1989	0.08	0.30	1.85	5.33	3.56	1.02	0.40	2.70	0.65	0.12	0.04	0.01	1.34	42.34	86.4
5	1990	0.02	0.06	0.99	3.29	0.42	4.71	13.22	2.04	0.45	0.15	0.03	0.00	2.11	66.46	135.6
6	1991	0.01	0.02	0.01	0.07	0.03	0.14	0.19	5.63	0.17	0.18	0.03	0.02	0.53	16.84	34.4
7	1992	0.03	0.03	0.05	0.05	0.04	0.04	0.23	0.15	0.52	0.02	0.00	0.00	0.10	3.09	6.3
8	1993	0.00	0.01	0.94	0.33	1.42	1.94	2.13	0.25	0.10	0.03	0.00	0.00	0.59	18.58	37.9
9	1994	0.01	0.19	0.44	0.03	0.03	0.02	0.30	0.04	0.01	0.01	0.00	0.00	0.09	2.84	5.8
10	1995	0.01	0.16	0.42	2.09	17.10	8.96	2.12	1.18	2.26	0.27	0.08	0.02	2.87	90.38	184.5
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<b>DAM: SIDI EL MOKHFI (No.21)</b>		<b>B.A. (km<sup>2</sup>): 378</b>											<b>Reference station: Galez</b>			
	Ave.	0.13	0.45	6.24	10.28	13.26	16.00	8.82	6.59	6.09	1.35	0.36	0.16	5.75	181.42	370.2
	Max.	0.97	1.37	24.77	44.36	50.19	73.10	33.23	18.75	25.05	5.91	1.07	0.92			
	Min.	0.00	0.00	0.18	0.01	0.01	0.03	0.17	0.28	0.03	0.01	0.00	0.00			
1	1983	0.01	0.03	24.77	44.36	4.11	1.59	13.59	5.73	23.20	5.91	0.90	0.15	10.45	329.51	672.5
2	1984	0.08	0.16	5.39	4.86	16.58	30.84	8.19	5.13	5.90	0.81	0.12	0.03	6.35	200.14	408.4
3	1985	0.10	0.07	7.56	5.45	35.64	73.10	14.89	13.03	2.84	1.18	0.34	0.11	12.44	392.46	800.9
4	1986	0.05	0.74	1.01	0.44	26.87	36.45	4.92	2.86	0.71	0.22	0.27	0.00	6.02	189.82	387.4
5	1987	0.01	0.15	1.53	13.46	15.59	3.86	2.06	6.55	2.80	1.12	0.64	0.40	4.03	127.24	259.7
6	1988	0.31	0.61	3.57	2.58	1.49	13.70	7.93	18.75	6.76	2.94	1.07	0.92	4.97	156.62	319.6
7	1989	0.97	1.07	21.51	34.33	11.77	4.42	1.66	7.92	4.20	1.17	0.52	0.13	7.49	236.24	482.1
8	1990	0.18	0.45	1.96	9.86	2.27	9.45	33.23	4.70	1.36	0.52	0.01	0.01	5.34	168.32	343.5
9	1991	0.01	1.37	0.48	1.03	0.01	0.21	0.88	12.01	0.36	0.45	0.13	0.15	1.41	44.61	91.0
10	1992	0.01	0.77	0.87	1.57	1.33	1.15	1.01	2.22	5.53	0.52	0.02	0.00	1.26	39.58	80.8
11	1993	0.00	0.48	11.72	0.83	6.50	8.34	7.76	1.51	0.47	0.01	0.00	0.00	3.09	97.49	199.0
12	1994	0.00	0.00	0.52	0.01	0.10	0.03	0.17	0.28	0.03	0.01	0.00	0.00	0.09	2.99	6.1
13	1995	0.00	0.00	0.18	14.86	50.19	24.88	18.36	4.94	25.05	2.72	0.64	0.24	11.84	373.39	762.0
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**Table II3.3.3: Ecoulement moyen mensuel de la rivier (8/9)**

No.	Year	Monthly average discharge (m <sup>3</sup> /s)											Mean annual flow			
		Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	m <sup>3</sup> /s	Mm <sup>3</sup> /yr	mm/yr
<b>DAM: N'OUANTZ (No.22)</b>		<b>B.A. (km<sup>2</sup>): 204</b>											<b>Reference station: Tizi N'isly</b>			
	Ave.	0.28	0.27	0.36	0.27	0.48	1.10	1.29	1.19	0.66	0.43	0.25	0.26	0.57	17.84	87.4
	Max.	0.57	0.57	2.11	0.72	1.76	4.29	4.85	2.66	1.68	1.26	1.04	0.80			
	Min.	0.12	0.03	0.01	0.05	0.06	0.07	0.15	0.12	0.12	0.06	0.04	0.02			
1	1977	0.40	0.31	0.55	0.40	0.49	1.43	1.22	2.02	1.43	0.69	0.31	0.36	0.79	25.01	122.6
2	1978	0.18	0.21	0.17	0.21	0.63	4.29	4.85	2.66	1.23	0.76	0.39	0.25	1.30	40.90	200.5
3	1979	0.48	0.56	0.22	0.20	0.23	0.40	1.24	1.25	0.69	0.27	0.19	0.16	0.49	15.48	75.9
4	1980	0.46	0.32	0.78	0.25	0.22	0.34	0.34	0.60	0.25	0.22	0.14	0.13	0.34	10.58	51.8
5	1981	0.16	0.14	0.12	0.13	0.18	0.27	0.29	0.67	1.17	0.74	0.17	0.17	0.35	11.08	54.3
6	1982	0.15	0.14	0.17	0.15	0.13	0.23	0.28	0.17	0.12	0.06	0.05	0.03	0.14	4.42	21.6
7	1983	0.16	0.07	0.17	0.09	0.08	0.07	0.15	0.12	0.26	0.17	0.04	0.02	0.12	3.71	18.2
8	1984	0.15	0.03	0.12	0.05	0.78	0.90	0.50	0.44	0.29	0.18	0.14	0.06	0.30	9.45	46.3
9	1985	0.13	0.13	0.25	0.14	0.21	1.14	1.24	1.36	0.63	0.37	0.16	0.36	0.50	15.92	78.1
10	1986	0.12	0.26	0.16	0.13	0.41	1.81	1.10	0.35	0.19	0.48	0.17	0.10	0.43	13.62	66.8
11	1987	0.22	0.39	0.40	0.50	0.91	2.74	1.87	0.44	0.29	0.41	0.25	0.23	0.71	22.32	109.4
12	1988	0.26	0.44	0.50	0.27	0.21	0.30	0.47	2.64	0.82	0.60	0.51	0.80	0.65	20.55	100.7
13	1989	0.27	0.57	0.53	0.40	0.60	0.47	0.31	0.31	0.47	0.16	0.22	0.21	0.38	11.83	58.0
14	1990	0.51	0.14	0.13	0.34	0.16	0.32	2.01	2.14	0.48	0.15	0.14	0.49	0.59	18.47	90.5
15	1991	0.53	0.21	0.14	0.16	0.12	0.11	0.18	1.33	0.84	0.41	0.27	0.38	0.39	12.33	60.4
16	1992	0.25	0.30	0.35	0.17	0.17	0.15	1.37	0.62	0.33	0.18	0.13	0.13	0.35	10.95	53.7
17	1993	0.12	0.11	2.11	0.72	0.78	2.65	2.79	1.50	0.54	0.36	0.15	0.33	1.00	31.48	154.3
18	1994	0.12	0.30	0.13	0.08	0.06	0.07	0.30	0.74	0.29	0.22	0.10	0.21	0.22	6.90	33.8
19	1995	0.26	0.50	0.01	0.32	1.37	2.86	4.36	2.49	1.68	1.26	1.04	0.41	1.37	43.27	212.1
20	1996	0.57	0.27	0.19	0.69	1.76	1.45	0.98	2.05	1.28	0.83	0.52	0.31	0.90	28.51	139.8
<b>DAM: IGUI N'OUAQA (No.23)</b>		<b>B.A. (km<sup>2</sup>): 161</b>											<b>Reference station: Amsoul</b>			
	Ave.	0.03	0.11	0.49	0.33	0.77	0.52	0.53	0.26	0.07	0.03	0.01	0.04	0.26	8.33	40.8
	Max.	0.19	0.47	4.07	1.72	4.95	1.78	2.22	0.98	0.32	0.23	0.10	0.48			
	Min.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
1	1978	0.01	0.47	0.00	0.12	4.95	1.51	0.37	0.09	0.02	0.01	0.01	0.00	0.63	19.83	97.2
2	1979	0.00	0.39	0.00	0.00	0.04	0.28	1.56	0.37	0.09	0.01	0.00	0.00	0.23	7.26	35.6
3	1980	0.10	0.01	0.31	0.01	0.00	0.15	0.01	0.00	0.00	0.07	0.00	0.00	0.05	1.70	8.3
4	1981	0.00	0.03	0.00	0.00	0.38	0.04	0.30	0.67	0.32	0.02	0.00	0.03	0.15	4.77	23.4
5	1982	0.01	0.00	0.15	0.00	0.00	0.01	0.00	0.00	0.07	0.00	0.00	0.00	0.02	0.64	3.1
6	1983	0.00	0.02	4.07	0.23	0.02	0.01	0.08	0.06	0.01	0.01	0.00	0.00	0.37	11.73	57.5
7	1984	0.00	0.00	0.60	0.02	2.51	0.68	0.16	0.22	0.07	0.00	0.03	0.01	0.36	11.30	55.4
8	1986	0.01	0.02	0.00	0.00	0.10	0.69	0.01	0.00	0.00	0.00	0.00	0.00	0.07	2.07	10.1
9	1987	0.13	0.22	0.07	1.60	0.71	1.36	1.48	0.11	0.09	0.02	0.04	0.03	0.49	15.32	75.1
10	1988	0.04	0.22	2.55	0.25	0.34	0.26	0.24	0.64	0.12	0.01	0.10	0.00	0.39	12.39	60.7
11	1989	0.00	0.15	0.49	0.64	0.25	0.04	0.70	0.17	0.07	0.00	0.00	0.00	0.21	6.70	32.8
12	1990	0.00	0.01	0.02	0.09	0.01	0.49	1.42	0.57	0.04	0.01	0.00	0.01	0.22	6.99	34.3
13	1991	0.00	0.01	0.00	0.05	0.00	0.00	0.00	0.03	0.01	0.01	0.01	0.06	0.01	0.47	2.3
14	1992	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.09	0.4
15	1993	0.00	0.16	0.48	0.03	0.14	0.22	0.63	0.06	0.01	0.00	0.00	0.48	0.18	5.82	28.5
16	1994	0.00	0.12	0.00	0.00	0.00	0.08	0.39	0.39	0.00	0.00	0.00	0.00	0.08	2.61	12.8
17	1995	0.00	0.06	0.02	1.72	2.45	1.59	2.22	0.49	0.22	0.23	0.02	0.01	0.75	23.70	116.2
18	1996	0.02	0.04	0.53	1.35	2.46	0.68	0.39	0.98	0.24	0.07	0.01	0.04	0.57	17.91	87.8
19	1997	0.19	0.10	0.01	0.11	0.23	1.78	0.19	0.12	0.01	0.00	0.02	0.01	0.22	6.92	33.9
20																
<b>DAM: AMONT ABDEL.(No.24)</b>		<b>B.A. (km<sup>2</sup>): 938</b>											<b>Reference station: Aguenza</b>			
	Ave.	0.04	0.53	3.89	3.34	2.95	2.77	4.71	2.62	1.17	0.47	0.18	0.15	1.90	59.84	293.4
	Max.	0.43	2.81	24.65	17.41	17.88	14.81	26.54	9.79	4.33	2.10	0.93	1.49			
	Min.	0.00	0.00	0.00	0.00	0.00	0.03	0.02	0.00	0.05	0.00	0.00	0.00			
1	1980	0.14	0.01	1.47	0.30	0.03	2.35	1.03	1.05	0.64	0.27	0.00	0.00	0.59	18.69	91.6
2	1981	0.00	0.02	0.00	0.01	1.54	0.39	0.91	1.86	1.18	0.38	0.00	0.04	0.53	16.65	81.6
3	1982	0.00	0.00	0.19	0.00	0.00	0.03	0.02	0.00	0.12	0.00	0.00	0.00	0.03	0.94	4.6
4	1983	0.00	0.14	15.43	1.02	0.44	0.13	1.24	0.58	0.10	0.02	0.00	0.00	1.58	49.73	243.8
5	1984	0.00	0.00	1.65	0.14	5.73	3.00	1.50	1.38	0.80	0.17	0.00	0.05	1.19	37.54	184.0
6	1985	0.00	0.30	0.01	0.05	0.06	0.63	2.87	0.83	0.73	0.13	0.06	0.05	0.48	15.10	74.0
7	1986	0.00	0.02	0.00	0.00	0.33	2.61	0.31	0.01	0.11	0.00	0.00	0.00	0.27	8.39	41.1
8	1987	0.43	1.41	9.79	17.41	4.67	14.81	21.49	3.61	2.49	1.23	0.57	0.09	6.46	203.79	999.0
9	1988	0.05	2.47	24.65	1.95	0.83	1.14	0.97	2.46	1.57	0.73	0.93	0.05	3.12	98.52	483.0
10	1989	0.00	2.81	3.55	5.91	1.48	0.98	5.68	3.81	1.33	0.51	0.02	0.00	2.18	68.86	337.5
11	1990	0.00	0.00	0.00	0.24	0.09	3.47	8.21	2.49	0.30	0.14	0.56	0.12	1.29	40.72	199.6
12	1991	0.00	0.08	0.01	8.68	1.49	1.15	1.36	2.59	2.35	1.12	0.42	0.17	1.63	51.41	252.0
13	1992	0.00	0.00	0.00	0.02	0.14	0.19	0.16	0.02	0.10	0.00	0.07	0.00	0.06	1.83	9.0
14	1993	0.00	1.28	4.13	1.46	1.08	1.46	4.48	2.41	1.28	0.27	0.00	0.08	1.49	47.03	230.5
15	1994	0.00	0.19	0.00	0.00	0.00	0.09	0.65	1.97	0.05	0.00	0.00	0.13	0.26	8.06	39.5
16	1995	0.00	0.13	0.15	13.17	17.88	11.74	26.54	9.78	2.36	2.10	0.42	0.19	7.04	222.10	1088.7
17	1996	0.08	0.13	5.18	6.51	14.43	2.99	2.70	9.79	4.33	0.97	0.00	1.49	4.06	128.00	627.4
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**Table II3.3.3: Ecoulement moyen mensuel de la rivier (9/9)**

No.	Year	Monthly average discharge (m <sup>3</sup> /s)												Mean annual flow		
		Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	m <sup>3</sup> /s	Mm <sup>3</sup> /yr	mm/yr
		<b>DAM: SIDI ABDELLAH(No.25)</b>				<b>B.A. (km2): 233</b>				<b>Reference station: Amsoul</b>						
	Ave.	0.04	0.15	0.71	0.47	1.11	0.75	0.77	0.38	0.11	0.04	0.02	0.05	0.38	12.05	51.7
	Max.	0.27	0.68	5.89	2.48	7.16	2.57	3.21	1.42	0.46	0.34	0.14	0.70			
	Min.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
1	1978	0.01	0.68	0.00	0.17	7.16	2.19	0.53	0.13	0.03	0.01	0.01	0.00	0.91	28.69	123.2
2	1979	0.00	0.56	0.01	0.00	0.06	0.41	2.26	0.53	0.13	0.01	0.00	0.00	0.33	10.51	45.1
3	1980	0.14	0.01	0.45	0.02	0.00	0.22	0.02	0.00	0.00	0.11	0.00	0.00	0.08	2.47	10.6
4	1981	0.00	0.05	0.00	0.00	0.55	0.06	0.44	0.97	0.46	0.03	0.00	0.05	0.22	6.90	29.6
5	1982	0.01	0.01	0.21	0.00	0.00	0.02	0.00	0.00	0.10	0.00	0.00	0.00	0.03	0.93	4.0
6	1983	0.00	0.03	5.89	0.33	0.03	0.02	0.12	0.08	0.01	0.01	0.01	0.00	0.54	16.98	72.9
7	1984	0.00	0.00	0.87	0.04	3.64	0.98	0.24	0.32	0.10	0.00	0.04	0.01	0.52	16.35	70.2
8	1986	0.02	0.03	0.00	0.00	0.15	1.00	0.01	0.00	0.00	0.00	0.00	0.00	0.09	2.99	12.9
9	1987	0.19	0.31	0.10	2.31	1.02	1.97	2.14	0.17	0.13	0.03	0.06	0.05	0.70	22.17	95.2
10	1988	0.06	0.31	3.69	0.36	0.49	0.37	0.34	0.92	0.17	0.01	0.14	0.00	0.57	17.93	76.9
11	1989	0.00	0.22	0.71	0.92	0.37	0.06	1.02	0.25	0.09	0.01	0.00	0.00	0.31	9.70	41.6
12	1990	0.00	0.01	0.03	0.13	0.02	0.72	2.06	0.82	0.05	0.02	0.00	0.01	0.32	10.11	43.4
13	1991	0.00	0.01	0.00	0.07	0.00	0.00	0.00	0.05	0.01	0.01	0.01	0.09	0.02	0.68	2.9
14	1992	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.01	0.03	0.00	0.00	0.00	0.00	0.13	0.6
15	1993	0.00	0.23	0.69	0.05	0.20	0.32	0.91	0.09	0.01	0.00	0.00	0.70	0.27	8.43	36.2
16	1994	0.01	0.18	0.00	0.00	0.00	0.12	0.57	0.56	0.00	0.00	0.00	0.00	0.12	3.78	16.2
17	1995	0.01	0.08	0.02	2.48	3.54	2.31	3.21	0.71	0.31	0.34	0.03	0.02	1.09	34.31	147.2
18	1996	0.04	0.05	0.76	1.95	3.56	0.99	0.56	1.42	0.35	0.09	0.01	0.05	0.82	25.93	111.3
19	1997	0.27	0.14	0.01	0.16	0.34	2.57	0.28	0.17	0.01	0.01	0.03	0.01	0.32	10.01	43.0

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**Table II3.3.4: Verification des apports estimes**

Name of dam	Basin area (km <sup>2</sup> )	Original <sup>1)</sup>		Estimated <sup>2)</sup>		Ratio Q2/Q1	Comments
		Ann. inflow(Q1) (Mm <sup>3</sup> /yr)	(mm/yr)	Ann. inflow(Q2) (Mm <sup>3</sup> /yr)	(mm/yr)		
<b>REGION-I: MOROCCO NORTH BASINS</b>							
No.01: Neckor	710	58	82	11.7	16	0.20	Sediment control dam, Q2 seems too low
<b>REGION-II: SEBOU RIVER BASIN</b>							
No.06: Tazarane	30	16.7	557	11.9	397	0.71	
No.19: Aoulai	490	247	504	177.7	363	0.72	
No.21: Sidi El Mokhfi	378	229	606	181.4	480	0.79	
No.02: Tizimellal	170	57.71	339	38.4	226	0.67	Sediment control dam
No.20: Sidi Abbou	363	82.6	228	34.8	96	0.42	Q2 seems too low.
No.17: Azghar	295	53	180	39.1	133	0.74	
No.14: Adarouch	630	95	151	64.4	102	0.68	
<b>REGION-III: BOU REGREG RIVER BASIN AND ATLANTIC COASTAL AREA OF CASABLANCA</b>							
No.15: Sidi Omar	350	17	49	27.8	79	1.64	
No.04: Ain Kwachiya	162	7	43	6.6	41	0.94	
No.05: Upper N'fifikh	300	12.9	43	8.8	29	0.68	
No.18: Boukarkour	1,120	30	27	32.9	29	1.10	
<b>REGION-IV: OUMER RIBA RIVER BASIN</b>							
No.22: N'ouantz	204	16	78	17.8	87	1.11	
No.03: Ait Baddou	194	93.7	483	27.9	144	0.30	Sediment control dam, Q1 seems too high
<b>REGION-V: TENSIFT RIVER AND ESSAOUIRA COASTAL BASINS</b>							
No.07: Amez Miz	80	10	125	15.5	194	1.55	
No.09: Taskourt	439	49	112	60.2	137	1.23	
No.08: Boulaouane	565	57	101	41.8	74	0.73	
<b>REGION-VI: SOUSS, MASSA RIVER BASINS</b>							
No.24: Amont Abdel.	938	-	-	-	-	-	Study on-going
No.25: Sidi Abdellah	233	20	86	12.0	52	0.60	
No.23: Igui N'ouaqa	161	7	43	8.3	52	1.19	
<b>REGION-VII: GUIR, ZIZ, RHERIS AND DRAA RIVER BASINS</b>							
No.12: Tiouzaguine	258	4.73	18	4.1	16	0.87	
No.13: Kheng Grou	4,900	91.5	19	65.5	13	0.72	
No.11: Tadighoust	2,239	35.7	16	36.8	16	1.03	
No.10: Timkit	592	7.5	13	21.4	36	2.85	Big difference between Q1 and Q2
No.16: Tiouine	1,540	102	66	90.9	59	0.89	
<b>(Remarks)</b>	1) Original: Values proposed originally by DGH 2) Estimated: Values estimated by Study Team						