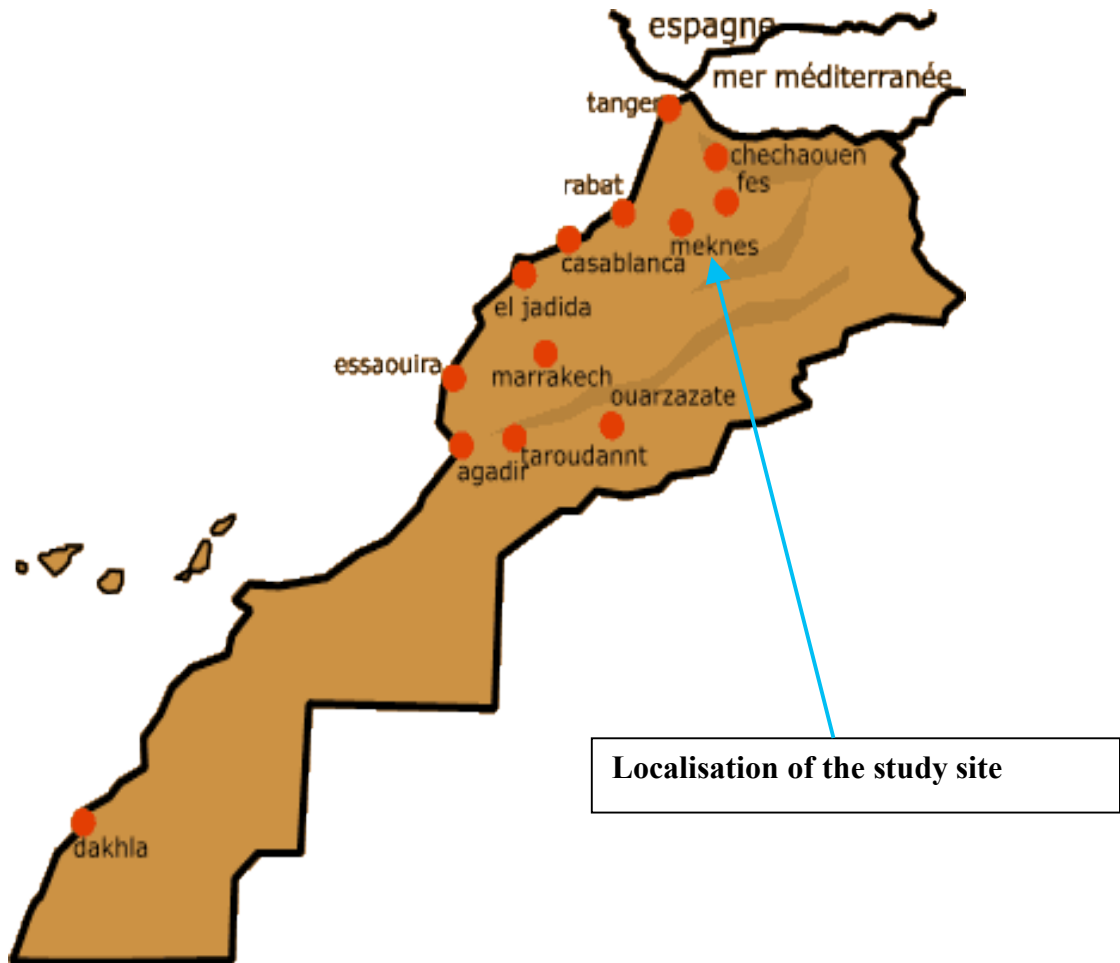


Morocco's Middle Atlas study site description

Location of the study area

The study site area is portion of an administrative unit, the rural community of *Timahdit Perimeter* constitutes the land of the *Ait Arfa du Guigou Tribe*. The study area is the *Ait Beni Yacoub*, which is a fraction of the *Ait Arfa du Guigou Tribe*. The *Ait Beni Yacoub* itself is composed of four subfractions that are: *Lamrabitine*, *Ait Kessou*, *Ait Bouadiya* and *Ait Ben Yacoub* as shown in the following map of localization.





The study site

Figure 1. Localization of the study site area

Climate

The climate is semi-arid with hot summer and cold winters.

Precipitation

Altitude and the continental character are the main factors that influence the climate of the study area. Precipitations are concentrated within two main periods; in winter: November - December and in spring: March-April. Precipitations follow an irregular trend. The number of days of snow is 45. Precipitations follow a spatial trend. They decrease from an average of 800 mm at *Jbel Hebri* (1,900 m) to reach 400 mm at *Timahdit* village. Precipitation data from surrounding weather station (*Azrou*, *Ifrane* and *Timahdit*) are reported in Table 1.

Table 1: Monthly average pluviometry in the stations of Timahdite, Azrou and Ifrane

Months	J	F	M	A	M	J	J	A	S	O	N	D	Total
Timahdite	37	35	41	31	29	18	8	16	18	39	65	66	403
Azrou	84,2	103,4	112,6	111,4	73,4	27,6	4,4	8,7	30,2	64,8	103	109,2	832,9
Ifrane	134,3	141	111,9	110,9	73,6	33,2	9,6	11,2	28,4	76,3	137,8	148,4	1016,6

Temperature

The region is characterized by cold winters where temperature could drop in January, which the coldest month, to -2.5°C as minimum average and $+9.8^{\circ}\text{C}$ as maximum average. Summers are very hot with maximum average of 31°C and 13.6°C as minimum average. In the figure 1, are reported precipitations and temperatures for *Azrou* and *Ifrane*. The two figures show that the wet season goes from October to April while the dry season is comprised between May and September.

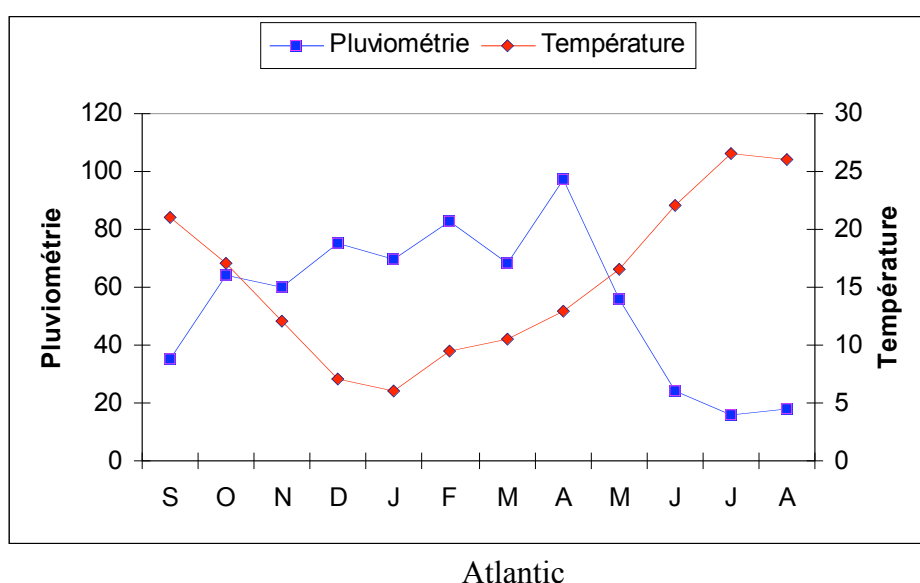


Figure 1a: Evolution of precipitation and temperature in Azrou (Larossi, 2001)

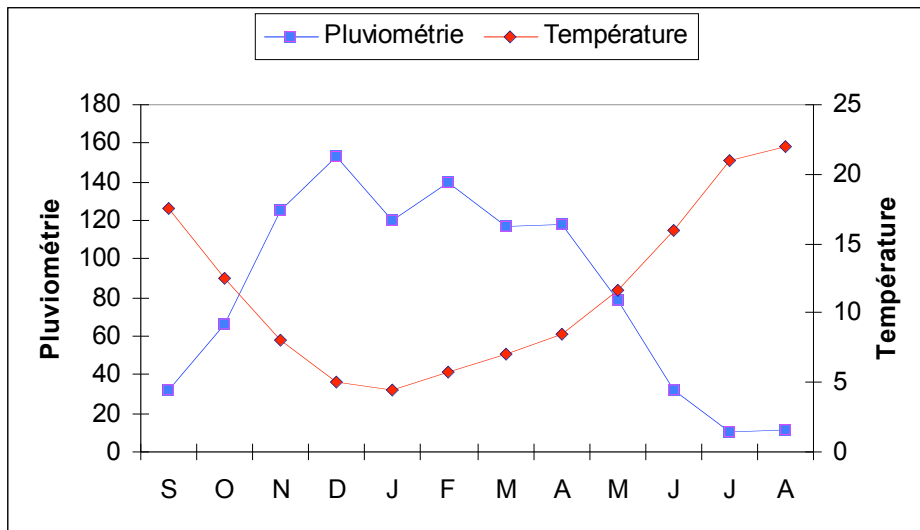


Figure 1b: Evolution of precipitation and temperature in Ifrane (Larossi, 2001)

Soils

The soils of the region have been classified into three general categories based on the amount of stones. Category 1 soils have 0 to 50% stone by volume in the 20 to 50 cm depth. Category 2 soils have 50 to 75% stone by volume in 20 to 50 cm depth. Category 3 soils have 75 to 100% stone by volume in the 20 to 50 cm depth soil. The soils of the pastures are generally of good quality, dark brown in color, and contain considerable humus. The pastures are located on basaltic band overlying calcareous or dolomitic parent material.

Water resources

The *Oued* (river) *Guigou*, which enter the study area at the Southeast corner flow North to *Timahdit* then east out of the area. This river is the major permanent stream. Its major tributaries in the area are the *Oued Bouangar*, which joins it at the southwestern corner and large springs near the *Ighzafen* (*Ighboula Lachour*) and *Ait Haddou* settlements. Ephemeral flows from springs such *Aghbalou N'Troumit* in the South and from ephemeral streams such as *Tighza* flowing east toward *Timahdit* supplement in the spring. Permanent lakes include *Aguelmem Tidouit* west of *Timahdit* and *Aguelmem Tifounasine* to the South, near the *Ighzafen* settlement. Many small springs dot the terrain in the South. In the Southeastern collective parcel, *Aghbalou Aberchane*, *Aghbalou ou Oumlil* and *Bouymisran* are among the most important. To the west are *Aghbalou N'Troumit* and *Tabjat*, on the western slope of *Chka Allah*. In the entire Northern portion, the *Azrou* plateau, there is no spring. There is to be a spring called *Ain Touna* that dried twenty five years ago.

In summary, stock water resources are abundant in the South throughout the year but extremely limited in the North, especially after ephemeral ponds dry in the spring.

Vegetation

The main vegetation types found the study site area are:

- Forests with the main types: 1) Atlantic cedar (*Cedrus libanotica atlantica*) and green oak (*Quercus ilex*) forest, 2) Atlantic cedar (*Cedrus libanotica atlantica*) and green oak (*Quercus ilex*) and juniper (*Juniperus thurifera*), 3) Atlantic cedar (*Cedrus libanotica atlantica*) and green oak (*Quercus ilex*) and juniper (*Juniperus thurifera*) with *Scorzonera pygmaea* understory, 4) Juniper (*Juniperus thurifera*).
- Grass and shrub land with the main types: 1) *Genista pseudopilosa*, 2) *Artemisia mesatlantica* and *Artemisia herba helba*; 3) *Scorzonera pygmaea*.
- Shrub grassland types: 1) *Thymus zygis* grassland, 2) *Bupleurum spinosum* grassland, 3) Mixed shrub grassland, 4) *Heliunthemum croceum* grassland, 5) Spiny shrub and annual grassland

Land use

Currently the *Ait Arfa du Guigou Perimeter* is used by four fractions (tribal subdivision): the *Ait M'Hamed*, *Ait Hcine ou Hand*, *Ait Ben Hcine* and *Ait Ben Yacoub* (Figure 2). The *Perimeter* contains 58,780 hectares of which 53.2% is collective land, 21.3% is privately owned, and 25.5% is nationally owned forest land. The collective lands of the *Perimeter* are generally shrub and grassland vegetation types and provide excellent summer pasture. However, these lands are commonly used throughout the entire year. Rapid snows melt and immediate green-up of vegetation makes possible winter grazing. This constant and excessive grazing is a major range problem leading to over utilization and depletion of forage resources. By law, all people born into the four sub fractions have legal grazing rights to the area.

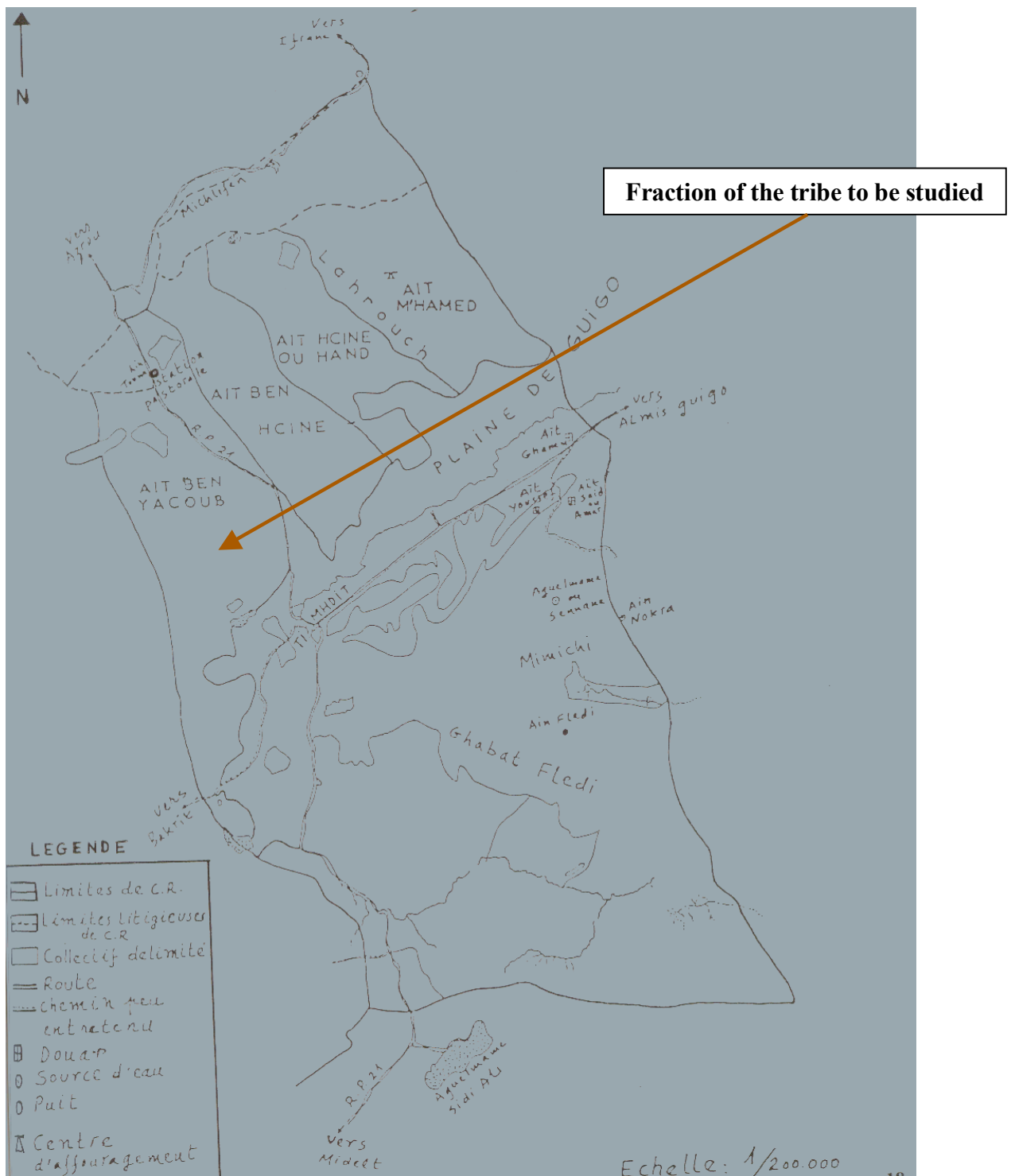


Figure 2. Localization of the fraction of the tribe to be studied

Institutions that regulate land use

The use of the land is done according to the traditional law (“droit coutumier”). Indeed, each sub fraction had a “jmaa” or council of elders, which was the form of managing most of the group affairs. Each “jmaa” selected an *Almghar N’Tuga*, a chief of grass, to make final decisions on the regulation of common grazing and decide about all other grazing matters (decisions of transhumance, agdal which is deferred grazing of an area, ...).

This management and land used started to change under the *French Protectorate*. Actually, the use and its management are placed under the guardianship of the “Conseil de Tutelle”, a national council created by the Ministry of the Interior.

The population

An overview of the tribe which the land is concerned by the study

The *Beni Mguild Berbers* live in the central-northern part of the Middle Atlas. They used to graze their land with a vertical migration pattern. In the summer the sheep used to be pastured on the highlands, in the winter on the lowlands. Their main activity is sheep herding. Because of these seasonal movements they lived in tents. In addition to tents they also had houses, made of stones, loam and wood in which agricultural equipment and grain were stored. According to historical documents families left the house in spring to live in the tent in the summer pastures. Only a guard or a member of the family remained in the house. Nowadays the *Beni Mguilds* are settled and it is the shepherd who lives in a tent on summer pastures.

The *Beni Mguild* society could be characterized as a segmentary society. Every lineage had a council of elder (*jmaa*). The *jmaa* took all decisions such as appointment of a Koran teacher and the moment of departure to the summer and the winter pastures. The council made sure that in winter pastures grass should grow sufficiently enough before it was grazed. Such councils still exist in the High Atlas of Morocco. The *Beni Mguild* is composed of three tribes:

1. The *Irkaoulen* with fractions of the tribe

- *Ait Faska*
- *Ait Arfa du Tigrigra*
- *Ait Hamou ou Bouhou*
- *Ait Yahia ou Alla*
- *Ait Khallou*
- *Ait Kassou ou Hadou*
- *Ait Alla du Tigrigra*

2. The *Ait Arfa du Guigou* with 4 fractions of the tribe

- *Ait ben Hcine*
- *Ait Hcine ou Hand*
- *Ait Ben Yacoub*
- *Ait M’Hammed*

3. The *Ait Abdi* with fractions of the tribes

- *Ait M'hamed ou Lahcen*
- *Ait Meroual*
- *Ait Mouli*
- *Ait Lias*
- *Ait Ouahi*

Many inhabitants of the *Beni Mguild* area originally came from elsewhere. Some immigrants, originating from the south, had arrived here in the second half of last century in order to take advantage of trading opportunities. Because the shepherds were remunerated against part of the increase of the herd they had access to the communal rangelands.

The increase of the population sided with an increase of land used for agriculture. According to Beudet (1969), the land under crops increased from 19.250 ha in 1930 to 32.900 ha in 1955, an increase of 71%. Because the grazing pressure on the pastures led to increasing tensions among the pastoralists, the *Beni Mguilds* started to deny the recently arrived immigrants access to the communal pastures. To overcome these tensions, arrangements were made between *Beni Mguild* pastoralists made and newcomers (adding strange herd to indigenous herd). Conflicts between the original population and newcomers and increased suspicion between locals as regards secret arrangements would have started in the forties.

As results of what has been said, in the early eighties grazing pressure averaged three sheep per hectare pastureland while, according to calculations, only one sheep and a lamb should be allowed in every hectare. Allocation of lowland to agriculture reduced areas for grazing and resulted in breakdown of the vertical transhumance. This fact increased grazing pressure on what was left of land for grazing. The breakdown in the vertical transhumance obliged several pastoralists to no longer move their herd between summer and winter pastures but had their herd grazing the same area continuously. This phenomenon encouraged pastoralists to settle in the summer grazing lands.

Evolution of the population of the area during the last 30 years

Population will be presented for the whole province to situate the importance of the *Timahdit* one which is our target for this study.

Presentation of the population and the density at the province level

The population of *Ifrane* region increased from 81,155 persons in 1971 to 127,677 persons in 1994, an increase of 57%. In 2005, the estimated population reached of which 50% is rural. From an administrative point of view, *Ifrane* province is divided eight rural communities. These communities are *Ben Smim*, *Tigrigra*; *Ain Leuh*, *Sidi El Mokhfi*, and *Oued Ifrane*, *Timahdite*, *Dayet Aoua* and *Tizguite*. Populations of the different locations of the *Ifrane* province are reported in Table 2.

Table 2. Evolution of the population for the different communities from 1982 to 1994

Localities		Year 1982			Year 1994		
		Urban	Rural	Total	Urban	Rural	Total
Municipalities	Azrou	31 425	-	31 425	40 808	-	40 808
	Ifrane	7 701	-	7 701	11 209	-	11 209
	Total	39 126	-	39 126	52 017	-	52 017
Communes for the du cercle of Azrou	Ain Leuh	4 191	23 762	27 953	5 055	5 446	10 501
	Oued Ifrane				-	9 882	9 882
	Sidi El Mokhfi	-	-	-	2 196	11 830	14 026
	Ben Smim				-	6 314	6 314
	Tigrigra	-	13 870	13 870	-	10 838	10 838
	Timahdite	1 157	5 631	6 788	1 795	6 790	8 585
	Total	5 348	43 263	48 611	9 046	51 100	60 146
Communes for the cercle of Ifrane	Dayet Aoua	-	4 976	4 976	-	6 868	6 868
	Tizguite	-	7 445	7 445	-	8 646	8 646
	Total	-	12 421	12 421	-	15 514	15 514
Total Province		44 474	55 687	100 158	61 063	66 614	127 677
Total for rural communities		5 348	55 687	61 032	9 046	66 614	75 660

Source: RGPH 1994

Density of the populations of the different rural communities varies 8 to 56 inhabitants per km² (Table 3).

Table 3. Density of the population for the Province of Ifrane

Localities		Area size (ha)	Density of the population (hab/km2)		
			1971	1982	1994
Municipalités	Azrou	873	2 378	3 600	4 674
	Ifrane	4 418	136	174	254
	Total	5 291	506	739	983
Communes of the cercle of Azrou	Ain Leuh	40 000	59	70	26
	Ben Smim	22 982			27
	Oued Ifrane	49 938	8	8	20
	Sidi El Mokhfi	59 438			24
	Tigrigra	42 500			26
	Timahdite	63 375	10	11	14
	Total	278 233	16	17	22
	Communes of the cercle of Ifrane	Dayet Aoua	33 688	14	15
Tizguite		40 066	15	19	22
Total		73 754	15	17	21
Total Province		357 278	23	28	36
Total Province sans municipalités		351 987	15	17	21

Structure of the population per sex and age

According to population figures of 1994, for all 8 rural communities that form the *Province of Ifrane*, there is 49,8% of males and 50,2% of females. Table 4 present the distribution of this population for the different segments of age. Indeed, the population of this mountainous region is relatively young. The proportion of the class of the population less than 15 years is 39%. The proportion of the one more than 60 years is 8.45%.

Table 4. Structure of the population per sex and per age

Sex	Total %	0 to 5 years	6 to 14 years	15 to 59 years	>60 years
Male	49,83%	7,63%	12,12%	25,72%	4,36%
Female	50,17%	7,54%	11,87%	26,67%	4,09%
Total	100	15,16	23,98	52,4	8,45

Presentation of the population for *Timahdit* zone

Populations of the four fraction of the *Ait Arfa du Guigou* are presented in Table 5. Numbers of populations showed rapid increase from 1982 to 1994 and tend to stabilize since then. Households and their size are reported in Table 5. The same trend already mentioned for the population should mention for the evolution of households. Size of households remains in the interval of 5 to 6.5 persons per family leaving in the same house.

Table 5. Presentation of the population of the Timahdit area

	Year 1982	Year 1994	Year 2002
	Population		
Ait M'Hamed	1573	1 762	1 985
Ait Hcine ou Hand	1120	1 508	1 664
Ait ben Hcine	1148	1 332	1 481
Ait ben Yaqoub	1690	2 188	2 076
Total	5 531	6 790	7 206
	House holds		
Ait M'Hamed	273	317	316
Ait Hcine ou Hand	215	231	265
Ait ben Hcine	188	206	241
Ait ben Yaqoub	269	343	346
Total	945	1 097	1168
	Size of house holds		
Ait M'Hamed	5,8	5,6	6,3
Ait Hcine ou Hand	5,2	6,5	6,3
Ait ben Hcine	6,1	6,5	6,1
Ait ben Yaqoub	6,3	6,4	6,0
Total	5,9	6,2	6,2