

# *Rural Settlement in the High Atlas Mountains*

## *A Case Study of the Ait Mizane Valley*

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### ***Introduction***

#### **The People:**

The High Atlas Mountains of Morocco are the home of the original inhabitants of the country, the Berbers. These people are largely subsistence farmers, living in the valleys in small villages that cling to the valley sides above their intricate patterns of irrigated terraces.

#### **Subsistence farming:**

They grow a wide range of crops and keep cattle, goats and sheep, the latter on the high slopes of the mountains. They also grow walnuts as a cash crop; although this has recently been supplanted by fruit (cherries and apples) and almonds. Their lifestyle and settlement patterns are similar to mountain people in many other parts of the world like the Himalayas and the Andes. Villages can house up to 700 people who live in extended families, farming the land communally. The villages make interesting studies in terms of site situation and function. It is especially worthwhile to compare Imlil with another village and to compare these villages with similar rural settlements in the U.K.

#### **Use of Concrete in Housing and Construction:**

One of the major changes in the High Atlas villages of Imlil has been the increasing use of concrete in construction. The traditional houses of the High Atlas have made use of locally obtained building sand or mud mixed with gravel and stones to form massive walls and flat roofs supported by timber beams. This construction is very effective except during heavy rains when the sodden mud roofs are vulnerable to collapse.

Concrete roofs and floors and cement renders are very desirable for their superior strength and water resistance and ease of cleaning and decoration. However, this requires cash for buying in sacks of cement and transport to bring them to the building site. Therefore, the increased use of concrete in the houses of Imlil may indicate greater wealth of the family or members of family working outside of farming for cash and also relatively good access to the road at Imlil via mule tracks. The different styles of housing and decoration may also express the changing aspirations of the villagers due to the influence of television and increasing contact with the city.

At a conference on the future of mountain tourism in Morocco (November 1995) representatives of the departments concerned with heritage in Morocco and tourism expressed concerns that the traditional housing and therefore landscape and appearance of the valleys could be lost. If the villages change completely, then part of the attraction for tourists could be lost too...

## Aim

- To examine the distribution and characteristics of settlements in the Ait Mizane Valley.
- To understand the changes that the increasing influence of Tourism is bringing to the rural High Atlas.

## Questions

- Do altitude and relief influence the location of settlements in this area?
- Do the villages display any similarities in terms of site, form or function?
- What factors account for these similarities / differences?
- Is there any evidence of recent change in the villages?
- How has the growth of tourism affected the villages?

Use the Village Terminology Sheet (See Appendix 7) as an aid to recording your observations.

## Method

**Introductory Exercise:** Draw a sketch map to show the site and situation of Imlil and another, more typical, village such as Aremdt or Ikkis, in the next valley. This theme can be followed up in the field with sketches and descriptive analysis made from a suitable vantage point.

**Site, Form and Function.** Use the Settlement Site Survey sheet (Appendix 1) and the Situation, Form and Function Sheet (Appendix 2) to record details of Imlil and, in consultation with your group leader, another village in the valley. When you fill in the Settlement Site Survey Sheet, use the first letter of the village name, rather than ticks, so that the same form can be used for more than one village. For example, if you think the village has an extremely poor aspect (in a valley bottom surrounded by high mountains that restrict the amount of sunlight reaching the village) you would award it “-3”. If you feel a village had a reasonable aspect, you would award it “+2”. At the end, total the columns (2 marks in the “+3” column will score “6”, 4 marks in the “+2” column will score “8” and so on), add together and divide by the number of categories (9 in this case). Your answer for the village will be between +3 and -3. This method of data collection is subjective – i.e. there are no right or wrong answers, it is your opinion. Your results should differ from others in the group.

**Land use mapping.** Use the blank base map (Appendix 3) to map the current functions in Imlil. You will probably find that it needs updating but you can add a key to show the main services and shops in the village:

F	=	general food shop
B	=	butcher
T	=	tourist shop
C	=	cafe
H	=	hotel

You should also be able to find several specific rural services such as a blacksmith, carpenter etc. It will not be possible to carry out such a detailed survey in any of the other villages but ask your guide or Omar from the Kasbah what functions there are in your chosen village. Try to find out what the current population of each village is, and whether it is growing or declining.

**Nearest Neighbour Analysis.** From the base map (Appendix 4) it is also possible to do a nearest neighbour analysis. This will determine whether the villages are clustered in certain places or spread throughout the valleys. This will provide a test of random distribution and give a statistical meaning to the terms, clustered, dispersed and random.

The index will give a value between 0 and 2.15.

0 = points are completely clustered

1 = points have a random distribution

2.15 = points have a uniform distribution, i.e. they are spread as far as possible.

The formula used to calculate the NNI (usually referred to as R) is:

$$R = 2D \sqrt{n/A}$$

Where            D = mean observed nearest neighbour distance  
                       n = total number of points in survey  
                       A = area of study.

#### Method

Define the boundary of the study area. This is usually the area of the map used, note that there is no need to convert to the scale of the map. (An A4 piece of paper has an area of approximately 624cm<sup>2</sup>).

Plot the points on the map and give each one a number.

Measure the distance from each point to its nearest neighbour. One point may be the nearest for several other points. Draw up a table as below

Point on map	Number of Nearest Neighbour	Distance between these points (cm)
1	2	11
2	1	11
3	2	7
4	5	4
5	4	4
		Σd = 37

Calculate the mean distance by dividing the sum of the distances by the number of points.

$$D = \sum d/n \quad \text{for our example this would be } 37/5 = 7.4$$

Calculate the NNI, using the formula

$$2 \times 7.4 \sqrt{5/624} = 14.8 \times 0.09 = 1.32$$

Thus, for this example the points are closer to a random distribution than any other. This can be further tested with reference to significance tables as to whether significant clustering or dispersal has occurred.

### **Data presentation**

- Draw up two tables showing clearly the characteristics of the site and situation on Imlil and your other village
- List the different types of function in the two villages.
- Complete a land-use map for Imlil. Produce pie charts to show the percentage change in the different types of service since 1989, 2004 and today (use the land-use maps of Imlil 1995 in Appendices 5 and 6 and the figures for 1989 and 2004 in Appendix 7).
- Make a note of any evidence of change that you saw in your second village, or that you found out about from talking to Omar or your guide. Include any information on population change.

### **Analysis**

Look at your tables showing the site and situation characteristics and at the results of your Nearest Neighbour Analysis.

- How has relief influenced the distribution of settlements?
- Is it clustered in certain places?
- Is there a maximum or minimum height or a maximum slope angle for the development of settlements?
- Is there a maximum distance from a water source or road head?
- Look at the different functions in your two villages. Try to account for any similarities or differences. Why do you think that Imlil might not be typical of villages in this area?
- Calculate the percentage change in the different functions in Imlil from 1989 to 2004 and to the present. Try to give reasons for these changes.

### **Discussion Point**

Tourism, improved road access and communications and a growing population are all things that will impact settlements in the Ait Mizane Valley.

What do you think the effects of these changes might be and how do you think they should be managed?

Back ground information about farming in the Imllil area

Figure 5: Location of rural deprivation project

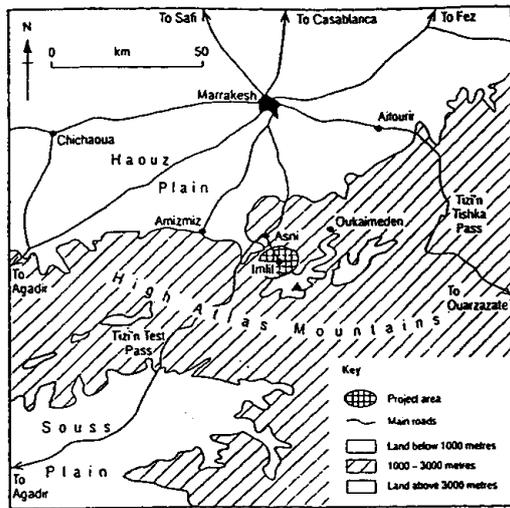


Figure 5: Imllil area – socio-economic data

Socio-economic status, education levels and tourist guides					
<b>Land use and ownership</b>					
Status	Type	Families	%	Education levels (% 4-14 in education)	Guides %
Class I	Rich	17	6	42	6
Class II	Middle rich	95	33	38	34
Class III	Middle poor	112	39	32	25
Class IV	Poor	60	21	49	13
<b>Totals</b>		<b>284</b>	<b>100</b>	<b>Av 38</b>	<b>78</b>
<b>Land use 1986/7</b>					
		Ha	%		
	Cereals	3,800	53.4		
	Fodder	140	1.9		
	Market gardening	200	2.8		
	Olives	773	10.8		
	Almonds	1,000	14.2		
	Apples	580	8.2		
	Walnuts	620	8.7		
	<b>Total</b>	<b>7,113</b>	<b>100.0</b>		
<b>Farm size</b>					
		% of farmed area	% of households		
	0-0.05 ha	23	73		
	0.05-0.10 ha	23	19		
	0.10-0.15 ha	6	3		
	>0.15 ha	48	5		
<b>Livestock</b>					
		Number	%		
	Goats	3,178	63.8		
	Sheep	1,244	25.5		
	Cows	459	10.7		
	<b>Total</b>	<b>4,881</b>	<b>100.0</b>		
<p>Note: Walnut trees dominate as a cash crop. Trees can yield as much as 5,000/tree in a good year. The trees, however, are very sensitive to frost, which makes harvesting uncertain. Trees grow between 1,200 and 2,000 metres. Prices fluctuate by over 100%.</p>					

Source: Discover, 1989

Figure 6: Population change, 1971-1989

Village/clan	1971		1989		Rate of change
	Population	%	Population	%	
Ait Souka	134	6.9	234	10.8	+3.9
Arrhen	171	8.8	180	8.3	-0.5
Arremdt	618	31.9	732	33.7	+1.8
Ashain	107	5.5	105	4.8	-0.7
Imllil	164	8.5	149	6.7	-1.8
Mzig	362	18.7	290	13.4	-5.3
Taigadirt	50	2.6	121	5.6	+3.0
Tairgaimoula	80	4.1	130	5.9	+1.8
Talawal	45	2.3	32	1.5	-0.8
Tamatoirt	146	7.5	160	7.4	-0.1
Taurirt	61	3.1	37	1.7	-1.4
<b>Totals</b>	<b>1,938</b>		<b>2,170</b>		

Source: Militar, 1984 and Discover, 1989

Figure 7: Mules and livestock

Village/clan	Mules		Goats		Cattle		Sheep	
	No.	%	No.	%	No.	%	No.	%
Ait Souka	15	10.1	308	10	53	12	128	10
Arrhen	13	8.7	396	12	51	11	73	6
Arremdt	51	34.2	1,177	37	123	27	609	49
Ashain	9	6.0	225	7	31	6	80	6
Imllil	11	7.4	42	1	25	5	0	0
Mzig	20	13.4	489	15	62	14	152	12
Taigadirt	9	6.0	180	6	30	7	66	5
Tairgaimoula	9	6.0	104	3	32	7	14	1
Talawal	2	1.3	10	0.2	4	1	0	0
Tamatoirt	8	5.4	175	5	38	8	92	7
Taurirt	2	1.3	75	2	10	2	30	2
<b>Totals</b>	<b>149</b>	<b>100.0</b>	<b>3,178</b>	<b>100.0</b>	<b>459</b>	<b>100.0</b>	<b>1,244</b>	<b>100.0</b>

Source: Discover, 1989

Figure 9: The Ait Mizane environment

The Ait Mizane territory makes up the 'Ass' (the third population concentration in the High Atlas). 'Ass' means stream in Berber, and these stream villages, peopled by Berbers, are located at between 1,200 and 3,000 metres. The physical environment is complex: deep, twisting V-shaped valleys create a variety of micro-environments; precipitation varies from 600-800 mm/yr (falling as snow in higher altitudes); temperatures are lower than in Haouz by 10-12°C - in winter the average is -3°C, in summer the average is 26°C. Natural vegetation includes poplar, ash, oak, red juniper and carob. True evergreen oak forest once covered much of the Reraiya but it is now restricted to an ever-decreasing zone between 1,100 and 1,500 metres. The dominant tree of the valley slopes of the Ait Mizane is juniper, and this extends upslope as far as the actual treeline at 2,400 metres. Slopes are steep throughout the Ait Mizane: in some parts the average slope angle is 21%. The River Reraiya has a regime that is typically Mediterranean: nearly half the discharge occurs between March and May; July through to September account for only a tenth of the Reraiya's annual flow. Despite this seasonal variation in flow, the Ait Mizane are well supplied with water throughout the year.

Mean monthly rainfall - Asni

Month	J	F	M	A	M	J	J	A	S	O	N	D	Year
Rainfall (mm)	53	53	68	71	41	8	2	7	26	44	49	64	686

Ecological decline is evident around the terraced slopes of the Imllil basin. There are many new areas of the expanded soil erosion. Further evidence of the severity of this environmental problem can be seen in the increased load of the rivers and streams flowing downslope: in the Mzig valley thick, coarse, aggraded deposits have been laid down over the last ten years. Summer thunderstorms have become ever more damaging as more people and herds inhabit these mountains.

A series of ecological events have accompanied the denudation of the basin hillslopes and the potential for erosion has increased. Slumping of loose scree down the basin slopes is an increasing problem, and some of the upper level villages face serious problems of downslope erosional materials flowing down into and through the village. The accelerated cycle of erosion threatens traditional agriculture: riverside terraces are washed away during periods of flood; scree, in great quantities, is apt to slump downhill into fields; slope movements break the *seguias*, or irrigation channels.

Source: Militar, 1984

**Appendix 1 SETTLEMENT SITE SURVEY**

Settlement Name: ..... Population (est) .....

Site Information

Relief and Position: Valley floor Valley side Hill top (circle one)

Aspect: North South East West (circle one)

Altitude: .....metres (from map)

Surrounding land: Rough Pasture Arable Bare Rock (circle one)

Access: Main Road Minor Road Track footpath (circle all that apply)

Proximity to other settlements: Use the map to calculate other settlements and distance

Settlement	Distance (km)

Housing Type

Describe the most common type of houses in the settlement. Consider the age, size, building material, any renovation and state of repair.

E.g. Old, small, mud-built houses in poor conditions, some empty, some derelict.

In the Centre:

Edge of centre:

Recent Settlement Change

Note down any evidence of expansion, service decline, tourist influence etc

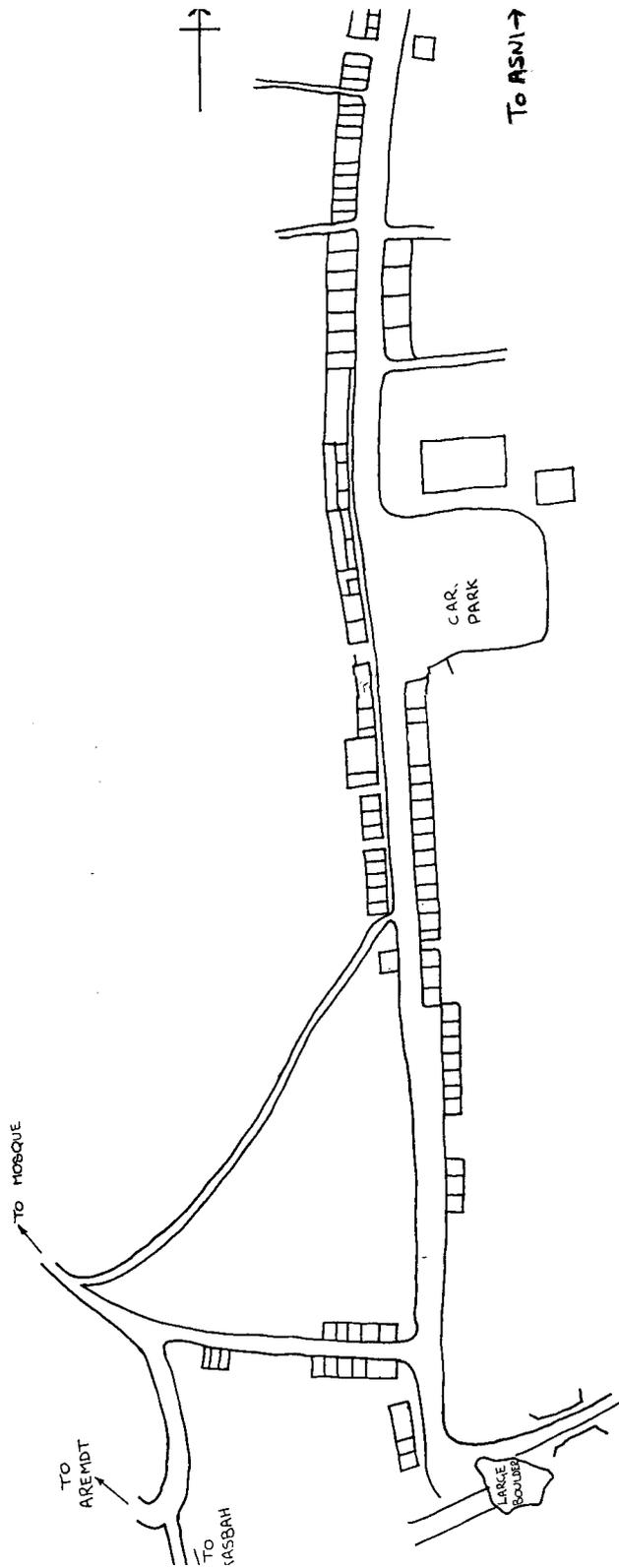
**Appendix 2: Rural Settlement in the High Atlas - Blank Data Sheet**

	Type	Features	Notes and Sources
Site		Aspect - Relief - Altitude - Geology - Water - Soil - Shelter - Space - Building Material -	
Situation			
Form			
Function			
Growth			

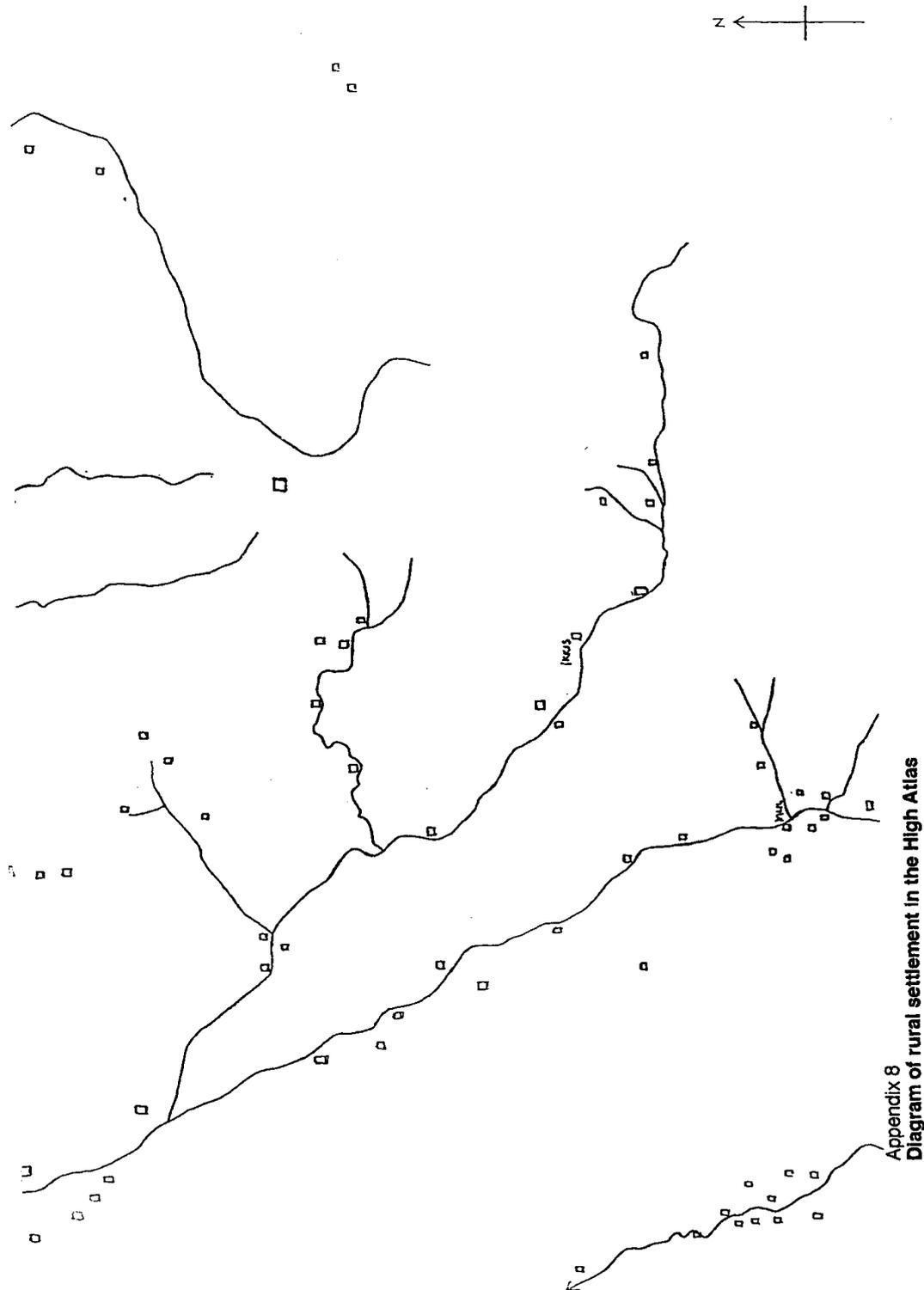
Appendix 2b Village Terminology Sheet

	DEFINITION	WHAT TO LOOK FOR	SOURCES
SITE	The land the village is built on	<b>Aspect</b> - which way the settlement faces <b>Relief</b> - Whether land is sloping or flat <b>Altitude</b> - How high above sea level <b>Geology</b> - Solid land, well drained, rock type <b>Water</b> - Free of flooding - good water supply <b>Soil</b> - Fertile for farming <b>Shelter</b> - From wind <b>Space</b> - Room for expansion  <b>Building Material</b> - Local supply of building materials	1:25,000 map and field observations  1:25,000 map  Geological map  1:25,000 map and field observations Soil sample +pH Field survey Field survey and 1:25,000 map  Field survey
SITUATION	The position of the village with reference to the surrounding area	The position with reference to roads, railways and nearby settlements, especially main towns.	1:50,000 map road signs etc
FORM	The shape of the village	Is it linear, nucleated or dispersed	1:25,000 map base map and field survey
FUNCTION	What the village does	Employment surveys of the inhabitants including population survey to discover age - structure, building-use survey of housing and services	Questionnaires, base map in the field
GROWTH	How the village has changed over time	New buildings both housing and services. Disused premises and empty houses.	Field map of buildings/derelict buildings

Appendix 3 Land use of Imlil Centre Base Map

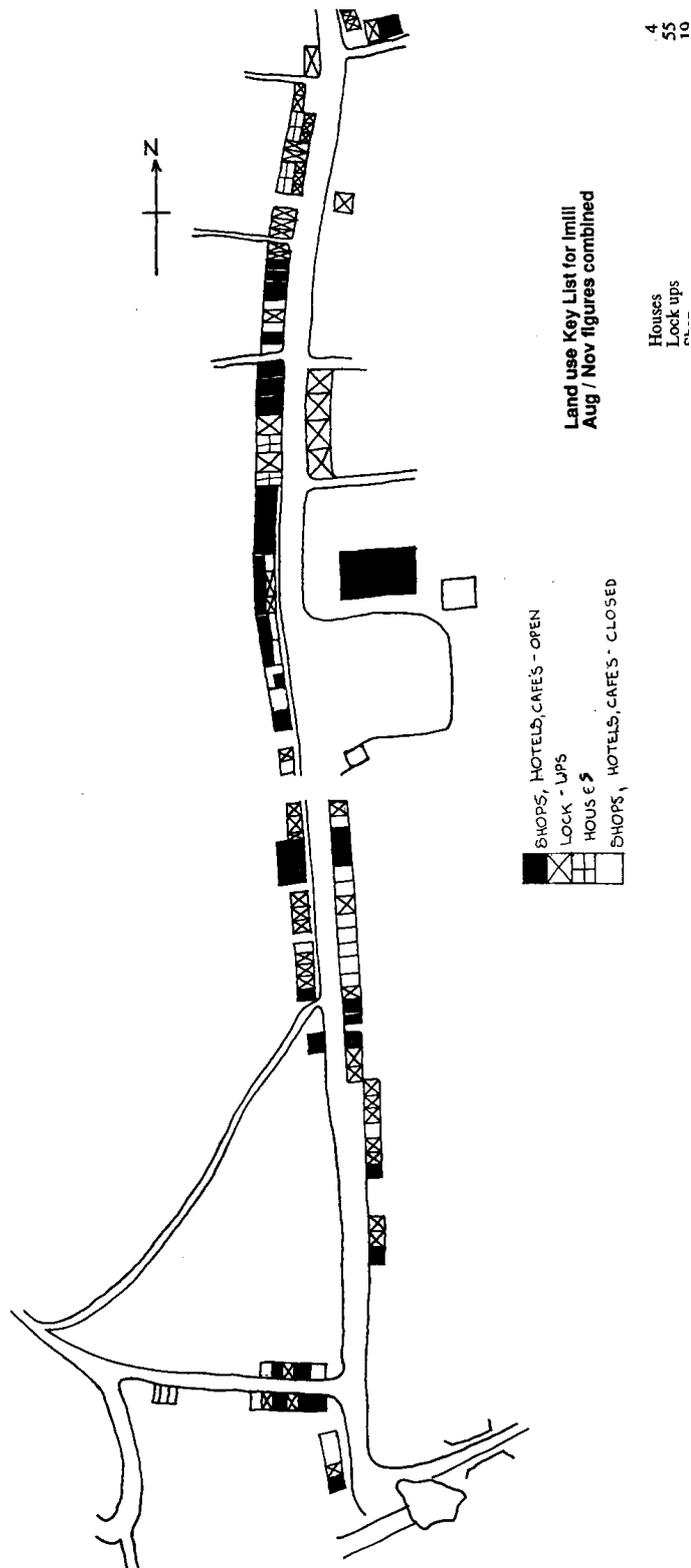


Appendix 4 Diagram of Rural Settlement in the High Atlas



Appendix 8  
Diagram of rural settlement in the High Atlas

Appendix 5 Land use of Imlil Centre Map



## Appendix 6 Factsheet Imlil - A Typical Rural settlement?

### Situation:

Imlil is situated at the head of the Rehraya River on the northern slopes of the Toubkal Massif of the High Atlas Mountains of Morocco. It is at 1700 metres above sea level in a widening of the valley where three tributaries join the Rehraya. It is in many ways untypical of Berber villages in that it is situated in a valley "basin" rather than on the steep valley sides and much of it lies below, rather than above, the level of irrigation.

### Access:

It is approached by 13km (17km on the road sign) of surfaced road from the market town of Asni which itself is situated in the High Atlas foothills on the main Tizi n'Test road from Marrakech to Taroudant. Imlil is about 60km from Marrakech.

### Built form:

Because of the basin siting, the houses are not built on top of each other in the traditional way but form a long street following the course of the river.

### Employment and Commerce:

The employment structure is also rather unusual because it is the trekking centre for this part of the mountains and many of the men earn their living as guides rather than as subsistence farmers. This also means that Imlil has more shops than is usual in a village and a greater variety of shops and services. It is, in effect, a central place.

### Shops and Services

#### **1995**

16 shops (8 general stores/food, 3 tourist shops, 5 cafes)

1 primary school

1 trekking hostel (CAF refuge)

1 mosque

#### **2004**

41 shops (39 general/food, 6 tourist)

6 restaurants

1 primary school

4 trekking hostels

1 mosque

10 gites

1 internet café

1 pharmacy

1 health centre

1 hairdresser

1 ambulance

2 incinerators 1 hammam

How has the provision of services changed?

What is there today?

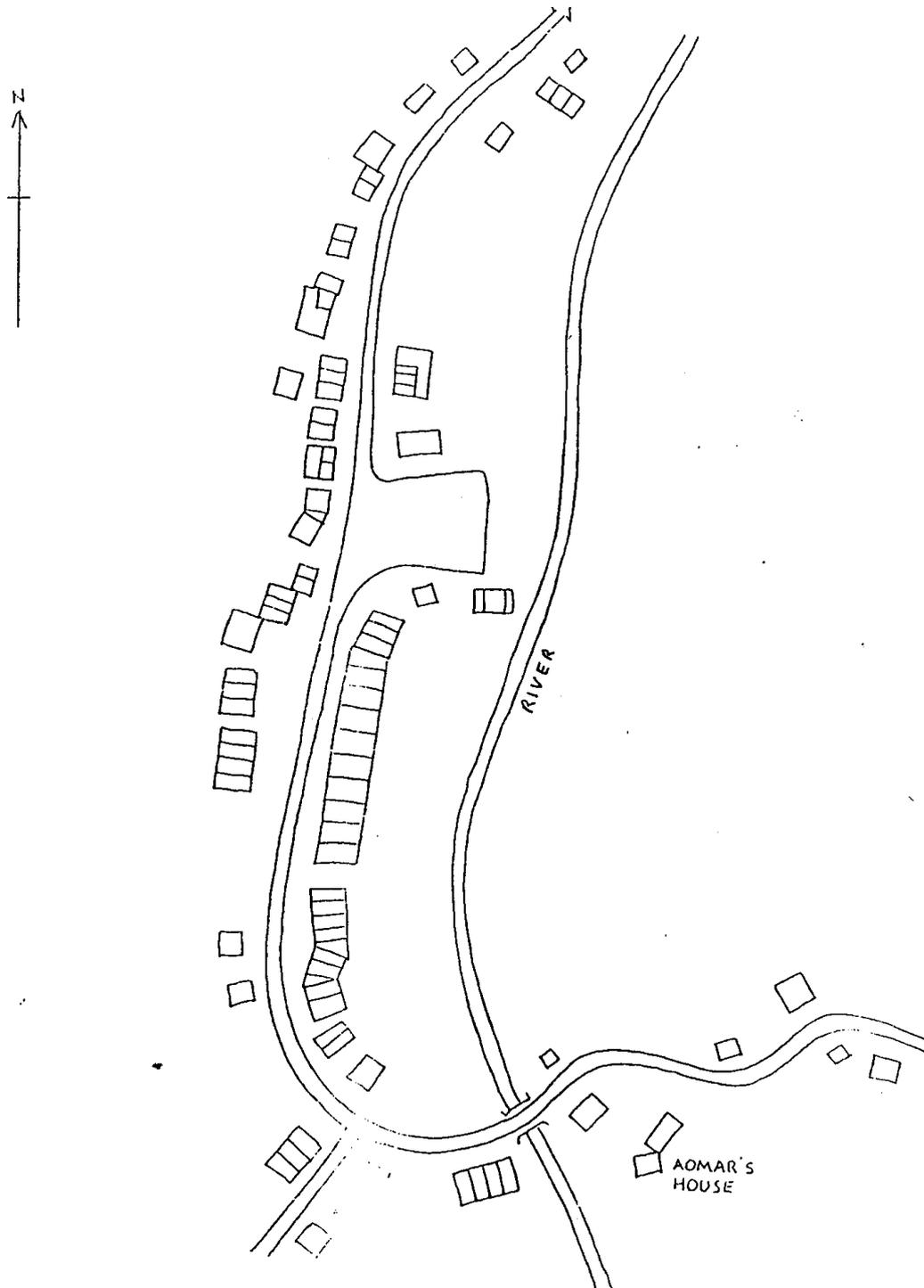
***Other villages in the Imlil basin:***

There are 12 other villages (or *douar*) in the basin and in the tributary valleys to the east, south and west. All these settlements lie below 2000m and almost none of them have any shops or services.

Last survey of population (1971): 2004 in the valley, 164 in Imlil

**Appendix 7 Base Map Sketch of Imlil – 1989 (for comparison)**

(Note the position of Omar's previous house and the previous bridge nearby that was destroyed in the August 1995 flooding.)



Appendix 8 Villages, peaks and passes around Toubkal

