

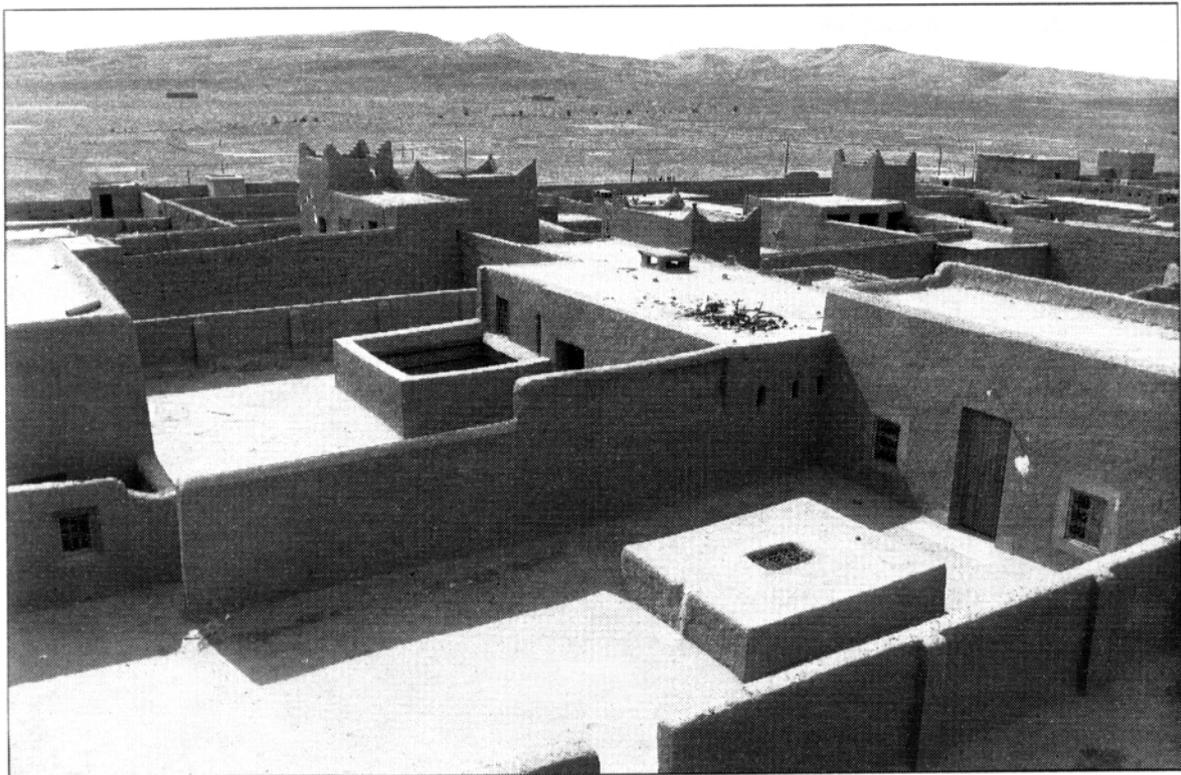


1989 Technical Review Summary  
by *Jamel Akbar*

0203.MOR

## Rehabilitation of Drâa Valley Ksour

Drâa Valley, Morocco



*Architect*

C.E.R.F.

Rabat, Morocco

Local Builders (mo'allimin)

Drâa Valley, Morocco

*Client*

World Food Programme

Rome, Italy

Ministère de l'Intérieur

Rabat, Morocco

*Completed*

1971 - 1975

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## I. Introduction

The concept of this project was to rely on self-help, taking advantage of the traditional building skills of the local population that was largely under-employed, in order to preserve the dwindling heritage of outstanding traditional mud architecture. The project did not aim to tackle all the related problems; its strategy was rather to help put a halt to the increasing exodus which was affecting the *ksour*. The project's massive scale, comprehensive approach and detailed analysis of the specific needs of each *ksar* are worthy of attention. To preserve the physical form of the *ksour* there was minimum intervention, meant to generate maximum participation, and this was thought to be a short cut to produce a quality environment. Nevertheless, there emerged many inevitable problems such as drought that were beyond the control of those involved. At first sight, the project may not appear as successful as it is. The residents' poverty conceals reality. A comparison between the *ksour* that were renovated by the project and the ones that were not, and the sharp contrast between their physical quality and their residents' condition, reveals the initiators' originality, especially if one considers that the project was commenced 21 years ago.

## II. Context

### a. Historical Background

The Moroccan five-year (1968-1972) development plan combined a policy of agricultural development with an agricultural investment code including important hydraulic projects. The regions affected by the plans were to experience changes from a subsistence oriented production to an industrialised commercial agriculture. The plan concept was that, with increased revenues in these rural areas, a modernisation of the rural habitat would stimulate production and create employment, thus reducing rural exodus. A programme for constructing 60'000 new houses throughout Morocco was included in the plan. The restoration and renovation of 30'000 houses in the *ksour* valleys were included in the five year programme. Assistance was requested from the World Food Programme (WFP) for rural housing development schemes in the hope of improving the living conditions of the farmers affected by agrarian reforms and the redistribution of land in the areas earmarked for development.

The pre-saharian valleys of south-east Morocco such as the Drâa Valley are widely respected for their outstanding traditional mud architecture. Their aesthetic qualities are well known and extensively documented. By the 1960's, this invaluable heritage started to degrade for various reasons such as drought, introduction of new materials and techniques, promises of a better life in the cities and exodus. The rehabilitation of the Drâa Valley which was carried out by the Moroccan Ministry of the Interior with the assistance of the World Food Programme aimed at counteracting those factors. The food-for-work concept was used in the renovation scheme. The project was initiated by expatriate professionals and was endorsed by the local authorities.

### b. Local Architectural Character

The *ksour* (plural of *ksar*) are compact, fortified villages that are closely spaced on the edge of oasis-like river beds against an inhospitable mountainous barren background. The *ksour*, built in mud and inhabited by a sedentary farming population, display a very compact fabric with an urban appearance that is marked by towers (*borjs*). Defensive walls can be free-standing with passage ways separating the walls from the houses; unmarried men used these passages to patrol and guard the villages at night. Defensive walls can also be the outside walls of the peripheral houses.

The origins of the form of the *ksour* are open to theoretical speculations. One of the most likely explanations is that they were introduced by the Arab and Arabised Berber tribes (the Ben Hilal arrived in the 12th century and most crossed the Atlas mountains, though some remained in the valleys; the Ben Ma'qil came between the 13th and 14th century and some of them currently live in Zagora and Asrir; the Ben Hassan mostly remained in the desert). This is corroborated by the Arabic names of many of the *ksour*. This hypothesis may also explain the similarity between the Yemeni architecture and that of the *ksour*. Another functional explanation is that nomads and sedentaries have lived for centuries in intimate but sometimes antagonistic and interdependent relationships which might have given the *ksour* their present form.

There are no clear patterns to the streets of the *ksour*. However, the narrow streets are sometimes laid out according to a grid-like pattern or there are a few cul-de-sacs connected to main streets. The most interesting architectural feature is lighting within the *ksour*. Streets are often covered with long overpasses of *sabats* creating narrow dim streets and sometimes totally dark cul-de-sacs. The reason, they say, is that flies usually avoid darkness. Dates (which are very sweet), are the main source of food and because of the hot climate, the interior of the *ksour* is infested with flies. To solve this, the residents made full use of dark spaces. The *ksour's* darkness and the residents ability to control light within houses and public spaces and protect them from the bright desert light is perhaps the most innovative feature of this type of architecture. Sometimes, the light in the streets in between the *sabats* are like spot lights in a tunnel, while the light of the courtyard within the houses is like a spot light in a cave.

Access to the interior of the *ksour* used to be controlled through either one or two gates. However, since security is no longer important, more entrances were created by the residents abutting the external walls, or by the rehabilitation schemes which connected some internal streets to the outside of the *ksour* by demolishing parts of buildings. At what used to be the main entrance, a *kasabah* or a castle is usually located within the *ksar*. Most of these *kasabahs* are now vacant. A number of major activities used to take place in the *kasabah*; it was the meeting place for the men of the *ksar*, it was the place where the residents exchanged goods with outsiders and they stored their valuables on the upper floor of the *kasabah*. The mosque and the *hammam* are located near the *kasabah* and near them a covered area (*sqifah*) is usually found where important community discussions used to be held.

Towers (*borjs*) mark the *ksour's* defensive walls. They are placed regularly on the outer wall or on the houses of the wealthy. Each tower could have a different decorative style. Towers are mostly an upward extension of the staircases.

The typical house is usually a 2 storey building that is constructed on 150 to 250 sq m. The houses of the well-to-do can be 3 storeys, rarely more, and the top floors are partly built-up, as roof terraces. On the roof terrace, there are a few other rooms which serve as bedrooms. Doors between roof parapets allow the residents to move from one house to another.

Long narrow rooms are arranged around the central open space that can be square or rectangular in shape and in which 4 to 8 thick square or L-shaped columns surround a central courtyard. Sometimes there are no walls between spaces around the court thus forming one large space with the columns in the centre marking the light well. The court is usually walled by a less than one metre high parapet rising above the roof terrace, and receives a modicum of light that is controlled by placing mats over the opening.

Houses often have no external elevations. One elevation on the ground level stands on the dim street while the other 3, or even 4 sides, adjoining neighbouring premises with shared party walls. The only opening onto the street usually is a wide doorway through which the livestock can also be driven. Peripheral houses may have small windows. Through the deep bent entrance hall one enters the central space. In rare cases one enters directly into the central open space. The ground floor is often reserved to accommodate the livestock while the side-room (or rooms) that

open onto the court are used as storage for straw and hay. On the upper floor, the central spaces are used as multi-purpose spaces. Dates are often stored inside overpasses allowing air to circulate through the floor of the *sabat*.

Cumbersome furniture is normally absent. The only common piece of furniture is a very low round table used for meals and usually stored by hanging on the wall. Mats are placed to create a space for sitting, eating or sleeping. Infrequently, mud platforms are used as seats or beds. Most house objects such as water jars, pots, pans and copper water basins are found in the kitchen.

c. *Climatic Conditions*

Annual rainfall declines as one descends towards the pre-Saharan region coming from Marrakesh through the Atlas mountains where it reaches an average of 100 mm or less. Some years there is hardly any rain at all, thus rain-dependent agriculture is not possible. The climate is harsh during the summer. The average maximum temperature is over 30°C during 7 months and reaches 44°C in July. The average minimum is 10°C during the 4 to 5 winter months, reaching as low as 3°C in January. However, diurnal variation - as a monthly average - is rarely less than 15°C or more than 18°C which means that traditional houses offer good environment during most parts of the year. Hot winds, charging the air with dust and sand, are quite usual (known as *Sirocco* if it comes from the south or *Cherguy* if it comes from the east, *sharg*, or *sharq*).

d. *Topography of the Project Site*

The south-eastern side of the Anti-Atlas is a desert that accommodates some fertile valleys such as the Drâa valley (*wadi dar'a*) the Gheris, the Dades and the Ziz. The melted snow creates a linear oasis river bed in which water is used for irrigation for most parts of the year. The Drâa river, which takes its name at Ouarzazate at the confluence of Oued (valley) Dades and Oued Ouarzazate reaches its mouth (*mhamid*) only in years of comparatively heavy rainfall. The 17 renovated villages (*ksour*) are located between the towns of Agdz and Zagora (94 km) where the site is fairly flat and the valley winds in a background of distant mountains.

e. *Immediate surroundings of the site*

If the relief of the Drâa valley is shallow, the *ksour* will dominate the surrounding environment as they are located on the high grounds, and their existing approach is from the main road; it has no vegetation which contrasts sharply with the traditional original entrances to the green oases. Some *ksour* lie on the edge or in the middle of the oasis. Most *ksour* in the Drâa valley can be reached easily from the main road between Ouarzazate and Zagora (162 km) which runs on the edge of the oases, i.e., the *ksour* are located between the road and the oases. The recent extensions of the *ksour* are generally located on the barren higher grounds on the opposite side of the Ouarzazate-Zagora road.

### III. Description

#### a. *The Rise of the Programme*

A group of architects (who had gained experience in traditional mud construction in Marrakesh in the years before) created a favourable climate for this project, and this is said to have been a factor in the creation of the C.E.R.F. (Centre d'Expérimentation, de Recherche et de Formation). It seems that the Minister as well as top level civil servants gave considerable freedom to the architects and other personnel of the C.E.R.F. for the formulation of the project.

During the first phase some pilot studies and experimental projects were carried out. The *ksour* were carefully analysed, and the needed materials and costs of labour for rehabilitation and upgrading were identified for each *ksar* in consultation with the local authorities. Even the needs of individual houses, such as private water-wells, and the needs of the community such as collective stables and public buildings, were estimated. Those proposals were then discussed with the villagers concerned and accordingly a final plan was prepared for each *ksar*. The responsibility of implementation in the 17 *ksour* in the Drâa Valley was delegated to the Marrakesh regional delegation of the Direction de l'Urbanisme et de l'Habitat (1971-75).

The local population carried out the work as an assisted self-help project along with small enterprises. Skilled labourers or builders (*mu'allimin*) were paid daily MDH 7 (in 1989, US\$ 1 = MDH 8.24) and given one food ration. Unskilled workers (*khuddam*) were paid only one daily ration which was wheat or wheat flour: 400 gr, condensed milk or dried milk: 20 gr, vegetable oil: 30 gr, sugar: 20 gr, and tea: 2 gr (builders who participated in the project say that the value of one ration when sold was almost half the daily paid wage, i.e., MDH 3.5).

The project aimed to improve hygienic conditions by constructing stables out of the *ksar*: since cattle was traditionally brought into the houses. It also aimed to enhance the quality of public areas by paving streets, and private properties by rebuilding ruined houses or renovating the ones that needed some maintenance.

#### b. *General Objectives*

To rehabilitate the *ksour* in the Drâa valley in order to maintain and upgrade a valuable housing stock and a unique habitat with considerable potential for the tourist industry; to plan for future harmonious extensions of the *ksour* and to reduce under-employment and rural exodus.

The World Food Programme's objectives were: 1) the majority of the project's beneficiaries were rural low-income households, the WFP's target group, 2) the self-help approach and creating jobs for the under-employed population in accordance with the WFP guidelines, 3) simultaneously, agricultural development projects were being carried out whereby the project could be qualified as an early example of integrated development approach, 4) the historical and cultural dimensions of the *ksour* and their unique quality of architecture were a strong argument in favour of developing the tourist industry.

#### c. *Functional Requirements*

To initiate, prepare and monitor the renovation of *ksar* houses and upgrade the quality of the built environment. In this process a maximum use was to be made of local manpower and local materials. The *ksour's* architecture was to be conserved. Public spaces and communal buildings were to be maintained. Functional requirements were to be modified in order to develop the sanitary environment, eg. re-using ground floors that traditionally functioned as stables and latrines in order to improve the water supply.

d. *Building Data*

The original five-year plan of building 60'000 traditional houses and renovating 30'000 dwellings in the *ksour*, requiring a total of 150 million individual food rations, was reduced to 28'700 units and the renovation in the villages was reduced to 4'530 units. Furthermore, a total of 4'374 units, representing 69.5% of the target, have been covered in the *ksour* (17 *ksour* in Drâa Valley and 3 in Ziz).

The infrastructure works serving the 20 *ksour* included building 13 mosques, 3 Quran schools, 583 stables, 212 septic tanks, creating 15 gateways, digging 19 wells, reconstructing 455,000 sq m. of side walls, 1,500 m. of watercourses for supply and irrigation and paving 95,000 sq. m. of streets and public squares.

e. *Evolution of Design Concepts*

More details are found in other sections of the report.

*Response to Physical Constraints*

Climatically, acoustically and technically there is a continuation of the traditional technique.

*Response to User Requirements*

Where the extensions were needed for stables and new dwellings, they were planned as a continuation of the existing habitat and using the same materials, techniques and related, but simplified, architectural vocabulary.

*Formal Aspects*

Façades and decorative features are all traditional and built by local builders in all the rehabilitation works. Exterior decorations are limited to the towers and gates and to some houses of the wealthy people. Interior decorations are found on the central columns, arches and capitals. Most of the ornamentation is geometrical and composed of dots, straight and sloping lines, sawtoothed, triangles and crosses. It is often created by a relief work of bricks.

*Landscaping*

The paving of streets and public spaces is quite successful with a slope in the centre to drain rain water. Some residents, whose houses abut the main road created small gardens on public ground.

f. *Structure, Materials, Technology*

*Structural System*

The structural system is wall bearing. Two building methods are used: adobe brick masonry and rammed earth in wooden shattering (*tabut*). *Tabut* is used for the thick tapering walls of the lower part of houses, while adobe bricks are used for the rest (arches, columns and staircases). Foundations are shallow and often vulnerable. Floors are supported by beams made of split palm trunks on which a layer of wooden rafters rests, this in turn supports a continuous layer of branches and twigs on which a layer of pounded earth rests.

### *Materials*

The main construction material is mud mixed with chopped straw and, for some uses, manure. Roof finishes are made with a plaster of mud, straw and manure. Rocks and boulders are often used in foundations as they offer better resistance to water and humidity. Walls are rendered with a mud-cum-straw plaster that is periodically renewed. Lime and gypsum are occasionally used for plastering water gullies and ceilings.

### *Construction Technology*

The tops of the walls are protected against rain erosion by boards and reeds. Nowadays strips of corrugated metal sheets are also used. Rammed earth walls often remain without plastering and the pattern of shuttering can be seen, while the holes left by the supporting poles are marked by the stones put on top of the poles. The construction is carried out by local masons who are often experienced artisans. The equipment used by them is modest: a pickaxe, a hammer, a hoe, baskets, wooden shutterings and pounders.

### *Building Services, Site Utilities*

Most buildings have no electricity. Water comes from wells inside the houses, often located in the courtyard. However, the project dug some communal wells. In some *ksour* such as Asdrir drinking water was supplied just outside the *ksar*. There is no sewerage network (*al-wadi al-har*). Rain water flows from roofs through wall-gullies onto paved streets provided with drainage (see III.c.Landscaping).

### *g. Origin of Technology, Materials and Labour Force*

Those described under III.f. (Description of Structure, Materials and Technology) are strictly traditional and were used in all the renovation works. Exceptions are: the use of cement for street-paving and for rain-water gullies, the use of masonry at the basis of walls for their protection, for wells and street paving. Stones are brought from *ksar* Rbat Lhjar.

### *Professionals*

Architects and other professionals forming the staff of the agency (Centre d'Expérimentation, de Recherche et de Formation) that was in charge of the project in general; some professionals in charge of the implementation in the Drâa Valley (Délégation de l'Urbanisme et de l'Habitat in Marrakesh) were expatriates. All other participants were local, regional or national. All labour forces were local.

#### IV. Construction schedule and costs

##### a. History of the Project, Citing Dates

See "Historical Background", II.a and "the Rise of the Programme" (III.a).

##### b. Total Cost and Main Source of Finance

According to the former Technical Reviewer, Mr. Raoul Snelder (pp. 12-13) of his report, "The Moroccan Government budgeted a considerable amount of money as a counterpart contribution to be spent over the period of the 1968-1972 five-year plan. The WFP's Terminal Report gives a figure of MDH 103 million, covering studies, plans, materials, equipment, land, operating costs, etc. for the project as a whole. This means that the national budget was roughly twice the donor budget and it is an indication of the interest accorded to the programme by the Government. However, a report by Mr. Vérité states that at the project's end only about half that sum had been made available in actual fact. As the WFP's input was also considerably less than initially programmed this would still mean that both parties spent roughly the same amount of money for the project. The following table gives some figures concerning the initially projected inputs, and the results achieved.

Quantitative Objectives	Initial 10-1986	Revised 1-1970	Revised 4-1972	Realised 6-1975
WFP (US\$ 1'000) percentage	013'115 100%	15'735 120%	10'194 78%	05'377 41%
Gov't (US\$ 1'000) percentage	100'000 100%	?	?	54'500 54%
New rural houses percentage	60'000 100%		28'700 15%	21'326 15%
Houses renovated percentage	30'000 100%		4'530 15%	4'374 15%
New urban houses	0		1'500	?

Though detailed information is not available, the cost per renovated dwelling does seem to be reasonable; it is qualified as average by M. Hensens. Total economic impact however is more important and seems to have been favourable at least in the short term.

##### c. Comparative Cost and Qualitative Analysis of Costs

Today, buying a 150 sq m. house in the *ksar* of Asrir would cost up to MDH 40'000 and renovating it would cost less than MDH 10'000 (in 1989, US\$ 1 = MDH 8.24). However, since the project was terminated 15 years ago, it is difficult to analyse the cost for lack of comparative data. Also, it is probable that some corruption arose. All the master builders (with the exception of one in the *ksar* of Tinezzouline which was the first renovated *ksar*) interviewed during the Technical Review mission, were complaining that they were not paid for the last year or last few months of work. They still have the document to prove their claim against the Ministry of the Interior. On the other hand, the WFP report states that the lessons to be learned from such large scale projects is that the materials to be supplied should be limited, since a great variety of materials lead to irregular arrivals and to storage and handling problems, eg. the distribution of incomplete rations

complicated administration; the necessity to make up for the difference at a later date or the delay of complete families' rations sometimes resulted in the loss of confidence of the beneficiaries.

## V. Technical Assessment

### a. Functional Assessments (use)

The fact that the *ksour* need constant maintenance and the notion that the *ksour* are no longer the answer to people's aspirations are inevitable questions. The discrepancy between the inhabitants' contemporary requirements and the degree to which the *ksour* can provide satisfaction is indeed the major problem in this type of project. Nonetheless, this discrepancy is in direct relation with the family's wealth. In a few cases the *ksar* house is deserted or left to farm-workers (known as *khammasin* and *rabba'in* or those who work for 1/5 and 1/4 the land crops; and the contract of leasing the land is known as *muzar'ah*, *mukhabarah* and *musaqat*). In other cases the *ksar* is kept as a secondary residence or a reception house for visitors while the main residence is outside the *ksour*. Yet, most *ksour* are used during the hot season on account of their coolness.

The project also suffered from some miscalculations. Although the project aimed to stable livestock outside the *ksour*, some users still bring their livestock into their houses; they claim that outside stables are not sufficient in number. The users also combined more than one stable by knocking down some walls to form a larger stable. Whereas the project provided communal water wells with pumps, some wells were not used. This means that the wells were either misplaced or the cause of conflict among users and were thus abandoned. Opening new gates and creating new streets by demolishing parts of houses changed the traditional territorial structure which was the expression of a certain social order. The traditional social order had to be modified to fit the new territorial structure. For example, higher ranking people who used to live close to the main entrance of the *ksar* on the oasis side now live on the back of the *ksar* as the new entrances on the back (opening to the main road) are more used and have become more important; in some cases they actually are the main entrances. When streets were paved, some of the houses' levels remained lower than streets' level. However, such problems are inevitable.

### b. Climatic Performance, Lighting, Ventilation and Acoustics, Orientation, etc.

Climatic performance is necessarily as good as in the traditional *ksour* since traditional local materials were used. The *ksar* houses offer an excellent environment during most parts of the year. During the TR mission (April 28th), the temperature inside the houses was very cool compared to the outside. The residents proudly argued that temperature is always the same during all seasons. Streets are always ventilated by a cool flow of air. Only a few rooms have not proper ventilation.

The major problem is lighting. Electricity is expensive. The dim light inside the houses (to avoid flies) conflicts with contemporary life-styles and is no longer needed as courtyards are covered by wire netting. There are no acoustical problems because of the heavy mud walls between houses and in between rooms.

### c. Choice of Materials; Level of Technology

All materials are from the site except cement. The technology is also indigenous and thus understood by everyone. This is one of the major advantages of the project which allowed all residents to participate and continue renovation till today. For example, the TR saw a wall gully that

needed maintenance in *ksar* Rbat Lhjar and asked about the reason for not maintaining it. The response was that the owner might not have the required capital; the TR argued that there was no need for money, a little effort would do the job; the answer was that the owner might not have a ladder! The point is that, keeping in mind the residents' poor condition, the choice of materials and levels of technology fits perfectly the objectives of the project.

d. *Ageing and Maintenance Problem*

The TR entered many buildings that had not been maintained for a long time (in one case 60 years) and they were still in good condition from the inside! The main problem of mud as a building material is its vulnerability to rain water and thus its need for frequent maintenance from the outside. Some of the renovated houses in this project (13 years ago) need little maintenance from the outside. In this respect, given the little rainfall in the region (less than 100 mm) one may argue that rather than using other building materials which will need less frequent maintenance but will cost more, one should continue using mud technique and invest in future uses, unless an affordable breakthrough in technology is found.

e. *Design Features*

All interventions in this project were minimal trying to respect the traditional existing physical form. Thus, new additions are inevitably harmonious with existing forms in terms of massing, volumes, articulation of spaces and integration to the site. On the other hand, the new buildings of the project, such as the stables built outside the project-sites, fit quite well into the surroundings. However, the need for more dwellings leading to their construction bordering the *ksour* completely erased an impressive feature of the *ksour*; this is the outcome of the compromise between conservation and expansion.

## VI. Users

a. *Description of Those Who Use or Benefit from the Project*

Hensens puts the number of *ksour*-dwellers in the The Drâa Valley in 1971 at 124'000 living in 350 *ksour* of various sizes; the number of people who benefited from the project (Asrir) is 1'500-1'800. The majority of current users are farmers in the low to very low income category. The economy was delicately balanced in the past and was based on farming. The oasis dwellers grow barley, sorghum, wheat, vegetables, olive trees and some other fruit, and most importantly date palms. Dates are very important for the economy. A family in *ksar* Asrir could own from 100 to 200 palm trees. One tree would give up to 100 kg/year of dates. Dates of the highest quality are usually sold for MDH 10/kg (in 1988), the medium quality dates (worth MDH 7/kg) are stored and consumed by the inhabitants and the lowest is given as food to the animals. The leaves and the wood of palm trees are used as building materials to make flat dishes, deep baskets and as firewood. Livestock consists of cows, donkeys, sheep, goats and chicken.

Although the oasis in this region is known to be the richest in water in North Africa, the prolonged droughts, the new ecological conditions created by the dam near Ouarzazate, a palm tree disease combined with the population growth and the increased number of settling desert nomads have affected the local economy. Migration of the wealthy to cities, who leave their farms to be exploited by farmers (*rabba'* or *khammas*) on rent contracts is another phenomenon. Tenants do not care for property as much as owners do and the out-migration of craftsmen whose skills are better paid elsewhere are other major factors that affected the economy negatively. Thus, it can be said that the region is not sufficiently equipped to support the growing population.

Compared to cities, the majority of the population living in the *ksour* live at sub-standard level. The poorest living in a city can, at least, re-use an old piece of furniture; but in the *ksour*, even this privilege is not possible. Practically all houses have no other furniture than dishes and mats. The new influences on the Drâa Valley societies and the strain on the traditional delicately balanced economy have affected the socio-cultural situation resulting in migration. The money sent back to the families by workers who have migrated may become a factor leading to abandoning the *ksar* (the population of the Drâa Valley region, they say, has the highest migration rate in Morocco).

Since the mid 70's government's expenditure has increased in the region. The reason for this is political because of the desire of re-establishing Morocco's authority over the former Spanish Sahara. Major towns like Ouarzazate and Zagora lived a considerable change during the 1970's, however, this had little impact on the *ksour* populations. For example, a large new hotel, Hotel Club Reda Zagora with over 300 beds was recently built in the town of Zagora; none of the local labour force, they say, was used in constructing this hotel!

b. *Response to Project*

Users are definitely optimistic. The sharp contrast in terms of quality between the renovated *ksour* and the ones that are not, tells the whole story. Those who live in the renovated ones are interested in maintaining their properties. Those living in the ones that are not renovated are reluctant to invest in their properties because of the deteriorated public spaces.

## VII. Persons Involved

Most of those who initiated the project have left Morocco since the project was prepared 21 years ago, and terminated 14 years ago. However, it is Jean Hensens with the assistance of Moroccan technicians who studied and proposed the Drâa Valley project. Mr. Hensens was one of those who formed the nucleus of the C.E.R.F. which was directed by Mr. Masson. Mr. de Leenheer was the delegate of the Direction de l'Urbanisme et de l'Habitat when the project was implemented.

Many staff members of the Ministry of the Interior were also involved. However, the important persons are the builders themselves (*mo'allimin*) as well as the residents and their representatives who participated actively in all stages.

*Jamel Akbar*

Dammam, 9 March 1989