

POLITECNICO DI TORINO  
SECOND SCHOOL OF ARCHITECTURE  
Master of Science in Architecture (Rehabilitation and Revaluation)  
***Honors theses***

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**Sustainable restoration and promotion of traditional earth buildings: the  
Maison Kouddane in Figuig oasis (Morocco)**

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The thesis has been developed through a cooperation between the CRD-PVS of the Turin Polytechnic and the NGO Africa '70, organisation which allowed me to have a period on site and place the research within the program of “Rehabilitation of the cultural heritage of the Figuig oasis in Morocco”.

The oasis of Figuig has a priceless architectural heritage represented by seven historic districts (ksour) entirely built with earth material (with the technique of adobe).



The ksar Zenaga, one of seven historic districts seen from the palm grove

Because of a recent flood, for different economic problems caused by the closure in 1994 of the border with Algeria and for the abandonment of earth buildings, replaced by new cement houses, the ksour of Figuig have today a strong state of degradation. The work, reported in detail in this thesis, is divided into two phases: the first consists of a literature search on the subject, conducted before reaching it, and the second based on the study, analysis and commentary of the work in the oasis.

While I was starting there from September 2009 to February 2010 I could study the traditional techniques of building and I was able to understand the environmental, social and architectural problems.

The study provided for an initial analysis on an urban scale of the district of Lamaiz, which is now now among the most populated.

I started with the digital transfer of the plant area, which it only existed on paper before, using the aerial imagery of the area.

Having made a number of considerations on a limited number of lots, I have been working in a more timely relief to a complex of four buildings, called *Maison Kouddane*.

I have studied all the complex, analyzing the type of building, which has traditional characters, and its state of preservation.



Survey of the main facade of the building

The work also includes a clear analysis of the degradation, carried out on building facades and on the inside of the complex, and the search for possible interventions can be implemented with the utmost respect for the tradition and the environment. I researched, in some cases, alternative solutions in accordance to climate change detected in recent years, paying greater attention to 'the protection and waterproofing of the plaster walls of rainwater, which is the main cause of erosion.

The final objective of the thesis has been the proposal for a renovation of the complex that includes a restoration aimed at preserving as much as possible spaces and building typology with minimal changes to allow a better distribution of the environments and make an optimum use of natural lighting.

The hope is to trigger a reconstruction process into the district devoting the *Maison Kouddane* in a training centre in accordance with traditional earth buildings and turning it into a landmark for the district as well as examples of sustainable reconstruction.



Section of project

Therefore the focus of the thesis is that it must be sustainable in an area with a constant changing climate, social and architectural and the respect for the tradition and preservation of this unique architecture.

I wish, through this work, to stress the universal value of the earth architecture, both as a world heritage, and a contemporary solution to a responsible future and the need to preserve, not like a “museum piece”, but trying to make it efficient and current in regard to the changing needs of population that lives in them.

Of course we can not think that the results will be immediate, but the hope is that a long way can restore the conservation of the traditional built, otherwise the *earth will return to earth*, ending its cycle and deleting a tradition perpetuated over the centuries.

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