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The Courtyard House: Can a Sustainable Future Learn from a Context Relevant Past

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Abstract

This paper looks at the courtyard house as a traditional urban dwelling of yesteryears with a view to explore its potential in informing the housing developments of the future. In order to address the question, the paper starts with a historical overview of this built form as an urban dwellings that fulfilled its functional and spatial requirements in times gone by. It then goes on to highlight the inadequacy of post-colonial housing solutions in Algeria and to look into two important aspects of this traditional housing typology; its socio-cultural relevance and environmental performance. The analysis is carried out using both secondary research in the form of three examples from the literature and the primary research carried out as field work in the form of temperature measurements inside a house, during the hot season, in Boussaada (Algeria). The discussion and concluding remarks attempt to make arguments for re-considering what could be learned from such traditional housing typology to inform future urban development that would subscribe to the values of sustainable development.

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Keywords

Courtyard House; Urban Development; Typology; Cultural Relevance; Environmental Performance; Traditional Architecture; Sustainable Development.

1. Introduction

Dwellings form the biggest share of building stocks in developing countries are likely to have lasting impact on the economy and environment, both, locally and globally. In the Middle East and North Africa (MENA), which is the focus of this paper, there is an added significance to such debate given the cultural identity “crisis” that Arab/Islamic countries are undergoing, and the far-reaching consequences of such a crisis on both the built environment and the quality of life of people living in it. Given this situation, any discussion relating to the provision, policies, design and theories of dwellings in this region are to be set within the context of an examination of the cultural heritage and development of this part of the world whose importance ‘cannot be over-emphasized at this juncture in the history of the region and the political and economic currents that are sweeping the world from China to Brazil’ (Avrami, 2013).

Through a discussion of the courtyard house as a building typology, this paper attempts to make an argument for the role of this form of traditional buildings in informing the debate on how to address the issue of dwelling provision in a way that is conducive to the socio-cultural context and compatible with the principles of sustainable

development. The discussion of the role of the courtyard house will focus on two aspects; its socio-cultural significance and its environmental performance (in terms of thermal mitigation against excessive heat gains) with a view to build an argument for its potential within a sustainable development framework. The discussion takes place through a combination of secondary and primary research. The former involves the use of a selection of examples from the literature while the latter is by means of analysis and discussion of data obtained by direct temperature measurements in the field.

2. The Urban Courtyard House: Between a Forgotten World Heritage and an Expensive Liability

Courtyard houses are one of the oldest forms of dwellings that are still around nowadays. Although they can be found in different regions of the world (Latin America, China, Europe) it is traditionally associated with the Middle East. The ancient civilisation at Kahun in Egypt and The Chaldean city of Ur bear witness to that (Oliver, 2003). While courtyard houses exist in most parts of the Arab/Islamic world, they evolved in different ways “as influenced by existing local traditions, construction materials and environmental factors” (Sibley, 2006). Whereas the courtyard houses of the Casbah in Algiers have some unique characteristics (Golvin, 1988), their past role and potential future is similar to that in the MENA region. Those characteristics include: the square courtyard (Wast ed dar) surrounded by two or three arched galleries on the four sides and long shallow rooms (Fig. 1). In larger houses, as the size of the courtyard increases the covered circulation galleries can become four, five or even six arched ones as the case of Dar Aziza (Fig. 2). To complete the list of features; the courtyard is accessed through a chicane (*Sqifa*) that acts as a buffer zone between the alleyway and the courtyard, providing privacy.

In its heyday, the urban courtyard house seems to offer a balance between the perfect geometry of the courtyard and the irregular periphery that adapts to the plot in a way that” the symmetrical and totally balanced order of the courtyard can be interpreted as the timeless centre of gravity of the house, while the periphery responds to the given circumstances and pressures of the earthly environment” (Bianca, 2000). In doing so it offered a solution that balanced the environmental constraints, the socio-cultural needs and the economic conditions addressing both material and immaterial needs of its occupants.

The French colonial period, which for Algeria lasted 132 years (1830-1962) has introduced many changes that have left their imprints on the built environment, the cultural identity of the indigenous population and their social make-up. On the one hand, urban developments during this period were primarily for the benefit of the European settlers and consisted of apartment blocks and villa neighbourhoods following European architectural styles and conforming to their standards. At times, the historic city fabric was demolished to clear the way for such interventions. On the other hand, rural migration to the cities, whether be it forced by the colonial administration, encouraged or simply for economic reasons, has led to the proliferation of large squatter settlements (or *bidonvilles*) around the colonial cities (Sibley, 2006). The situation reached a critical level in terms of housing shortage after the Second World War due to the indigenous population growth, which jumped from 23 % in 1906 to reach 51.4 % by 1954 (Hadjri and Osmani, 2009). To face this problem, the French administration launched a program for the construction of new neighbourhoods, in Algiers, to house the indigenous population. This initiative resulted in projects such as ‘*Climat de France*’ and ‘*Djenan El Hassan*’ by French architects Pouillon for the former and Simounet for the latter, which were completed in 1957 and 1958 respectively (Figs 3-4). In an attempt to be seen to deal more efficiently with the housing crisis by the colonial administration, this initiative was replaced by the ‘*Plan de Constantine*’ launched in 1958, as an urgent operation for the construction of big scale projects especially social housing (50,000 units per year) named as ‘*Les Grands Ensembles*’. The plan was highly criticised for being more concerned with quantity than quality; the lack of reference to the site and the local character, however the circumstances at the time didn’t allow any place for debate.

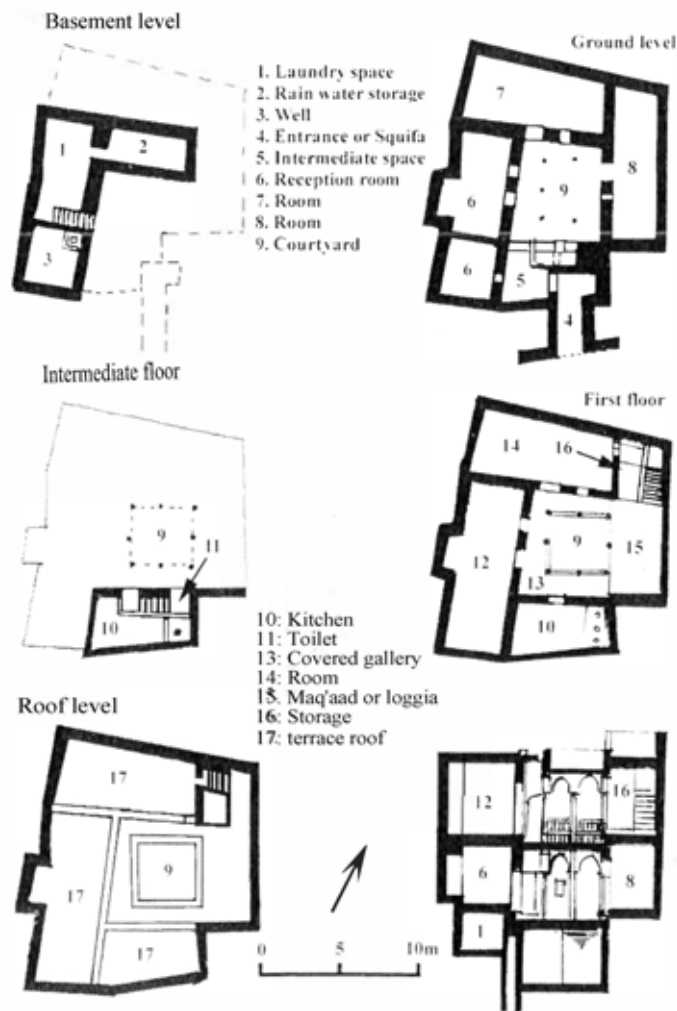


Figure 1. : A basic courtyard house in theCasbah in Algiers (Golvin, 1988)



Figure 2. Four arched gallery



Figure 3. Climatde France housing development

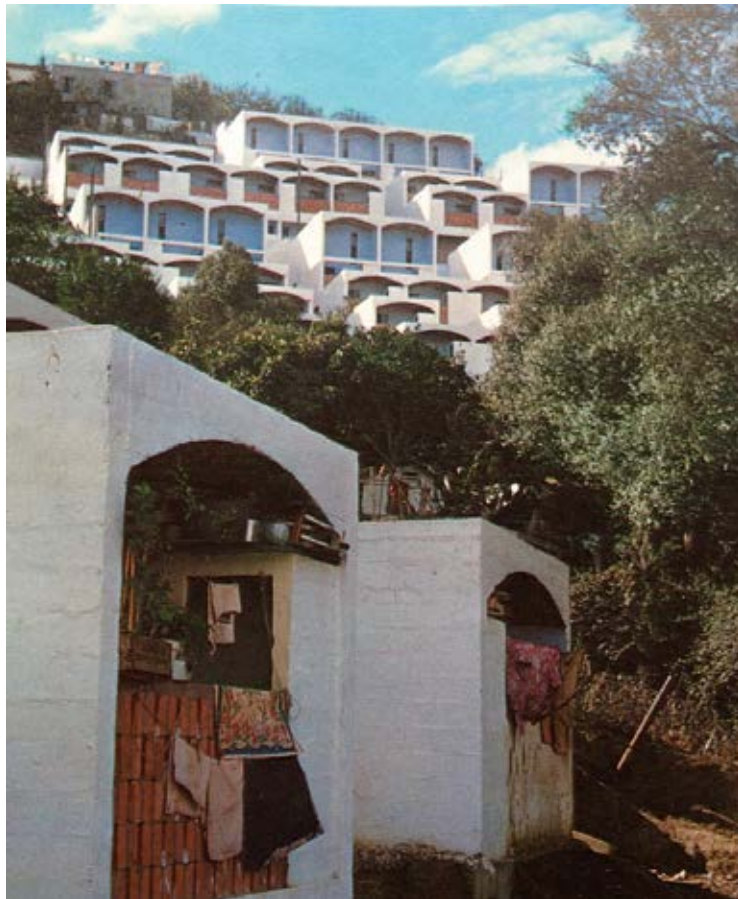


Figure 4. Djenan El Hassan housing scheme

It resulted in urban developments lacking spatial quality and with little or no reference to the traditional built heritage. Unfortunately this continued to exist in post independence Algeria (EAG-CERTUC, 2003). After more than half a century of independence, the built environment in Algeria is lacking both the architectural qualities and the cultural relevance. This situation is often identified as a contributor to what became of the traditional courtyard urban dwelling, such that of the *Casbah* in Algiers, as a forgotten heritage that is very expensive to keep and maintain. It reached a point where it needs to be “rehabilitated both physically and socially. The mere renovation of its physical condition will not improve its reputation and attract national and international visitors and investors unless the social and cultural problems are tackled and resolved in Full” (Elshestawy, 2009).

The courtyard house, regardless of its origin, has evolved into a domestic built form that is responsive to its multi-determinant context. Chief among these are climate and culture (Rapoport, 1969). In the forthcoming sections, both these determinant will be discussed by means of a number of examples from the literature and some analysis and discussion of data obtained by direct measurements in the field.

3. The Socio-Cultural Significance of the Courtyard House

This section will focus on the role that courtyard houses can play as a setting for social interactions and cultural expression as well as a tool to strengthen those bonds. Three examples from Palestine, the South of Algeria and Spain will be made use of.

3.1. The Courtyard in the Jerico-Nablus Study

In a study that looked at sustainable strategies for future house buildings in Palestine (Haj Hussein, 2010), the author compared the features of outdoor spaces in both traditional courtyard houses and contemporary apartment blocks with a view to analyse the socio-cultural, economical, functional and environmental dimensions of these spaces. With regard to the socio-cultural factors, the study made use of a questionnaire with 300 interviewees living in contemporary blocks and comparing their responses to an assumed hypothesis, which stipulates that both privacy and social interaction (or community) exist in the traditional setting. With regard to the issue of privacy, 50.6% of total respondents and 60% of female respondents were dissatisfied with the levels of privacy in contemporary blocks. With regard to socializing and communal activities, 45.5% of the respondents feel that the current provisions are inadequate and that they would rather have a bigger external space at the expense of the indoor living space. Furthermore, some 75% of the respondents believe that there is a need for outdoor spaces where the children can play safely under the eyes of the parents and neighbours.

Despite the lack of systematic rigour in terms of data comparison (as the inhabitants of traditional houses were not interviewed), there is evidence that points towards the socio-cultural relevance of the courtyard house as a building typology.

3.2. Taflelt Courtyard Style Community Housing in the M'Zab Valley (Algeria)

In a research paper on a community driven initiative to provide housing in Taflelt, one of the settlements in the M'Zab valley in Southern Algeria (Bouali-Messahel, 2011), the author reports on an interesting experiment of community housing based on the local traditional courtyard house typology. In this part of the country, traditional values are still prevalent in areas such as culture, social relations and the way of life. In such a traditional context, community driven initiatives are not a novelty. What is new in this case is the collaboration between the state (financial assistance) and the local community (participatory design, construction and project management). The project was conceived as a community housing project intended for low and average income households, emanating from within the local population. With an initial plan to deliver 870 dwellings, work started in 1997. By 2011, 1007 units were delivered. Both the individual units and the settlement as a whole are based on traditional designs with somehow a contemporary interpretation (Figs 5-7 and 8). This development is a success on many levels,

but most relevant to this discussion is its success in transforming a community self-build project into a tool to create social bonds and strengthen them. According to the author, the success of the project can be seen “through the participation of the population in its design, its management and sometimes even in the financing scheme of certain dwellings, by contributing to the collections intended for the neediest; which exploits the ancestral mutual aid (Twiza) and tightens up the social connections” (Bouali-Messahel, 2011). Like other experiments that adopted certain aspects of traditional styles in a contemporary context, such as those by El Minyawji brothers in Algeria during the 1970’s (Bellal, 2012), this project has shown that certain elements of the courtyard house typology can be adapted as part of a contemporary housing development that seems to be in tune with the socio-cultural needs of the dwellers.

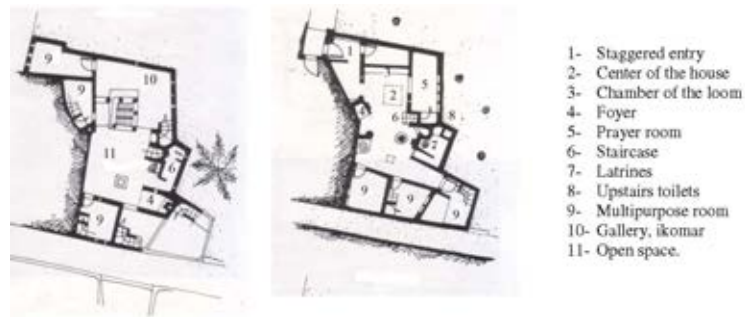


Figure 5. Traditional Mozabite house (Ravereau, Fathy & Roche, 1981)



Figure 6. The plans adopted for the Tafilelt village in the M’Zab valley (Bouali-Messahel, 2011).



Figure 7. Courtyard as a children play area



Figure 8. A development in harmony with the site

3.3. The Courtyard House of Cordoba (Spain)

A study into the social role of the courtyards in the historic quarter of Cordoba was carried out to test the idea of whether these spaces can promote social interactions between citizens, in the same way as public spaces do (Priego, Rodrigues-Morcillo & Breuste, 2012). The authors' introduction to the study highlights the importance of courtyards in this part of Cordoba when they state: 'the historical quarter of the city of Cordoba (Spain) has numerous houses with courtyard gardens (Fig. 9). Rather than being simply architectural structures, these courtyard gardens provide a space for social interaction and cultural expression, accommodating a lifestyle that is specific to this particular urban environment and in which the boundaries between the private and the public sphere are blurred' (Priego, Rodriguez-Morcillo & Breuste, 2012).

Using discussion groups as a methodology, the research team sought to gain a greater insight into the citizens' perceptions and attitudes towards the traditional courtyard gardens and shed some light on the way they are used on a daily basis and for social purposes. The study concluded that the dwellers of the Cordoba courtyard houses attach a special importance to their courtyards. Not only are these courtyards seen as a setting for social interaction, but they also provide a sense of community. The courtyard gardens encourage social relations and the conservation of cultural heritage, while they promote a sense of identity beyond that attached to the city's historic monuments. According to the authors, this research 'has shown that courtyard houses are not simply dwellings inhabited by people, but reflect a lifestyle full of close and varied social relations based on community values' (Priego, Rodriguez-Morcillo & Breuste, 2012).



Figure 9. A typical courtyard in the Cordoba historicquarter (Mousli, Semprini, 2015)

4. A typical courtyard in the Cordoba historic quarter

Having discussed the socio-cultural relevance of the courtyard house in the previous section, the second aspect of its multi-determinant context, which is the climate, is discussed through a study into the environmental performance (internal temperatures) of a typical example of traditional courtyard house in Boussaada, Algeria (35°20'N, 4°12'E, 459 m above sea level). The temperature readings are then compared to external air temperature as given by the regional office for meteorological data. In such a hot arid climate, the magnitude of heat exchange between the sun, earth and the atmosphere is greater than elsewhere. This is due to the lack of cloud cover which in turn leads to maximum levels of heat reaching the surface of earth from the sun during the day and released into the atmosphere at night. The resulting effect is a large range of daily air temperature fluctuations. This can vary from 10⁰C to 25⁰C during the summer months. In these conditions, the courtyard house owes its survival to its suitability to the climate where the principles of passive cooling using thermal mass and shading are used with much success.

4.1. The Courtyard House

This type of domestic architecture is a feature of traditional architecture around the Mediterranean region and beyond to the Middle East and India. In these arid and semi-arid climates, this form of building owes its survival to its suitability to the climate. The traditional Moorish house of North Africa is a typical example of the courtyard house where the principles of passive cooling using thermal mass, shading and reduction of external solar heat gains are used with much success.

The house being the subject of this study is a two-storey courtyard family dwelling located in the heart of the old quarter of the city (Fig. 10). The layout consists of a central courtyard surrounded by rooms arranged over two levels. The lower floor makes up the living area where all the day activities take place. It consists of a shop with its separate entrance directly accessible from the narrow alleyway, two family rooms and a kitchen. Four bedrooms and two small storage/utility rooms occupy the upper floor. The rooms are tall and narrow, which facilitates air movement inside. External windows are kept to a minimum, both in size and number. On the upper floor all the openings are onto the central courtyard. The lower floor openings (doors) are in the shade all day round.

The structural fabric of the house consists of load bearing walls supporting the floors and providing thermal mass for the building. The walls are 600 mm thick of unfired clay blocks, covered with a mixture of cement and gypsum based render.

4.2. Temperature Recordings

The indoor dry bulb temperatures were recorded during the month of September, in one of the bedrooms at a height of 1.2 m above the floor near a window overlooking the courtyard (Figure 11). The temperatures recorded over a six-day period, are shown in the diagram in Figure 12. The diagram shows the air temperatures recorded inside the house. For comparison purposes, the mean maximum and minimum external temperatures for September are also shown. The period consisted of five full daily cycles with two half daily cycles at the beginning and the end of the recording period. The general pattern of the data shows no major fluctuations over six-day period except for start of the recording period when the internal temperature reached a maximum of 27⁰C. The three daily cycles that followed had similar patterns of internal temperatures with maximum and minimum values of 25⁰C and 22.5⁰C occurring around 18:00 hours and 06:00 hours respectively. The next 24 hours cycle saw a slightly different pattern in terms of timing of the minimum temperature which occurred later than previous days, at around 12:00 hours and reaching 24⁰C. The maximum temperature recorded still remained at 25⁰C and occurring around 18:00 hours. The last full 24 hours cycle saw a pattern of temperatures similar to the first two cycles.

During the recording period, the temperatures inside the house were kept within a narrow range as Figure 11 clearly shows despite the large fluctuations in external daily temperatures. In such inhospitable climate, the traditional courtyard house managed to keep the internal temperatures within what can be seen as comfortable limits for a hot

dry climate without the use of any mechanical ventilation or cooling.

These results compare favourably with those reported by Mousli & Semprini (2015) for their study of comfort in traditional house in Damascus.



Figure 10. The historic quarter of Boussaada (Algeria)

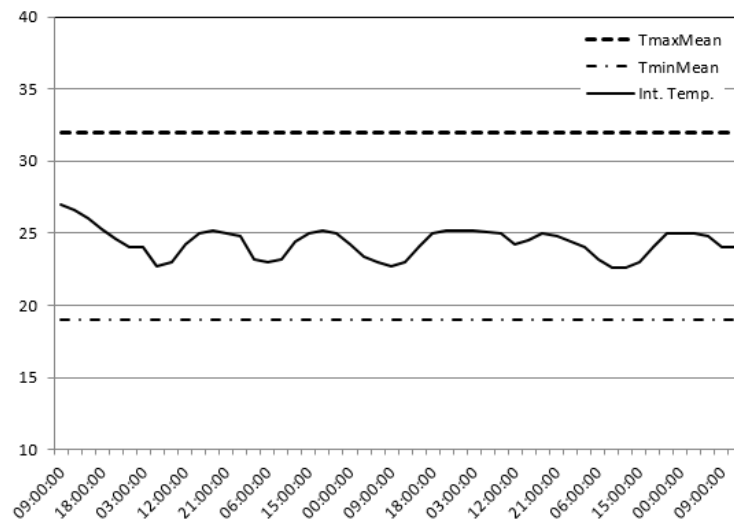


Figure 11. Air temperatures recorded inside a traditional courtyard house

5. Discussion and Conclusions

The courtyard house has evolved from its early primitive form to become ‘the basis of the urban pattern of the medinas of the Islamic world’ (Ozkan, 2010). Fez, Algiers, Tunis and other cities still have some finely restored examples of courtyard urban houses. Not only did this plan typology offer functional efficiencies for such a densely occupied urban fabric, it also offered an environmental response to the hot climate and most importantly a cultural relevance (Figs 2, 13 & 14). Those examples show that despite the upheavals of colonisation and wars of independence, at least the material side of the courtyard house has survived to varying degrees of physical damage. However the context in which those medinas exist today is far from the one that existed when they were first built. Arab Islamic architecture has undergone a series of changes and shifts during the last two centuries that coincided with the Western colonial dominance over the region and its aftermath. Those changes were not limited to the built environment only, but extended to the socio-cultural scene and the way of life itself.

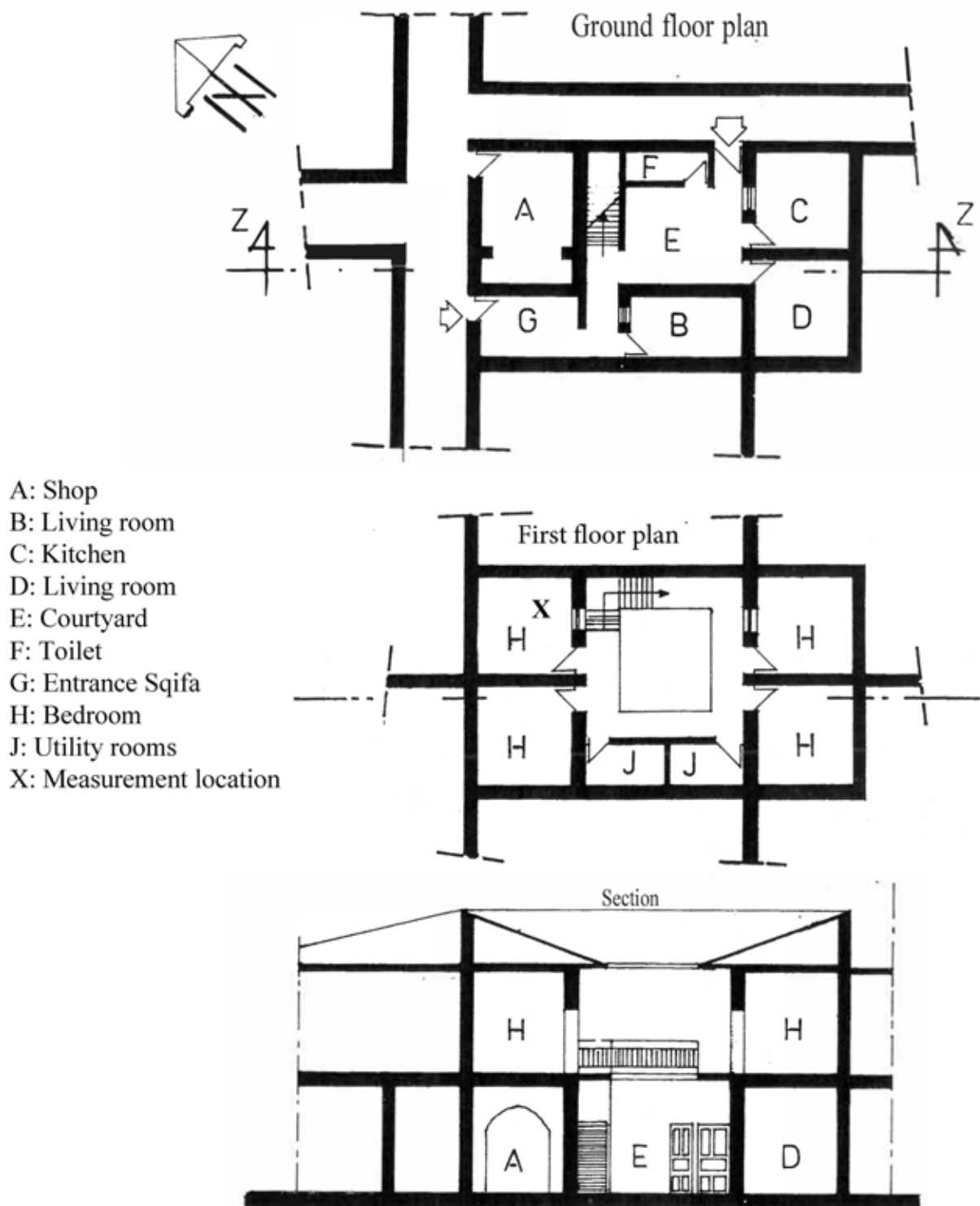


Figure 12. Plans and section of the Boussaada house. Source: The Author (2016)

As a way for the National independence movements to stamp their 'raison d'être' on the newly independent states they introduced large development programmes which were meant to stand for modernity, nationalism, and socialism. These were largely based on western models that were imported into what is essentially an alien context, both environmentally and culturally. European style housing blocks became the norm for urban development, and even the rural world was not spared. What made the situation worse was a lack of understanding of the "new" technology by the locals. Badly constructed ugly looking concrete blocks became the norm. Even the new 'development revolution' that started in the gulf region over 2 decades ago, did not do much to bring with it something that is culturally and environmentally relevant, despite the much improved build quality introduced by the steel and glass skyscrapers builders. Few experiments are worthy of mention, where attempts were made to design and build in a way that combined tradition and modernity. Such experiments include the work of Hassan Fathy, particularly the New Gourna village (Steele, 1997) and the works of El Minyaw brothers in El Oued in the South of Algeria (Bellal, 2012). Fathy's work has shown him to be a pioneer in 'sustainable design', back in the 1940's, even before the term was invented. His use of local materials and traditional elements of architectural composition, while putting emphasis on energy efficient low cost design made him a household name among environmentally conscious designers. From an administrative and economic perspective, his project for the New Gourna village failed to resettle the local community from the old Gourna, as the locals were determined to go back to tomb robbing there, as that was their means of making a living. This failure is nothing to do with his design but rather with the way the decision makers dealt with the issue. Despite this, architecturally his design for a community settlement is a success.

The examples presented in this paper have shown that each one of them offers something that addresses either the sociocultural values or the environmental constraints of the context in which a version of the courtyard house exists. With regard to the major determinants of its context (culture and climate), the various examples presented here have shown that the courtyard house is more than just a place of dwelling or a space organiser, but it is also a setting for strengthening social bonds and encouraging cultural interactions. Furthermore, in the Tafilelt example, it became a tool for social and economic development. The internal temperature measurements data from Boussaada have confirmed what's already known about the environmental responsiveness of this type of traditional building to its context.

The question that remains is whether or not the courtyard house, as a traditional form of dwelling, has the potential to be part of a contemporary sustainable urban housing. The answer is neither as easy as it may seem, nor is it straightforward. Of course in its heydays, this built form has performed well on all levels, socially, culturally, environmentally and economically. However, times have moved on and so have the ways people live. The questions should not be approached from a polarised position between tradition and modernity. Instead, a more suited approach would be for designers to acknowledge what traditional building forms, such as the courtyard house, have to offer and how to deploy it in a contemporary context. We already know that trying to duplicate traditional architecture, as part of a contemporary development, will not work. Nevertheless, the various components of the courtyard house as a typology (form, space planning, openings, materiality etc.) need to be considered with a view to establish if any of those components can be used as part of a contemporary urban housing development. What the examples examined in this paper show is that the courtyard house as a form does actually offer advantages over imported models. At a time when the search for sustainable solutions to global development is primarily driven by the use of Western high tech systems, it is worth considering going back to basics and looking at what one can learn from traditional design and development knowledge that can be implemented in a way that is compatible with the preoccupations of present societies without compromising the needs of future generations. The need to learn from the past is as important as the triple point of sustainable development. In fact for Arab/Islamic countries one could argue that true sustainable development would not take place without considering it alongside the question of cultural identity, or the crisis this is going through. There is a perception among the younger generation in the Arab/Islamic world—and most developing countries- that building in a traditional way is backward. One cannot deny that lifestyles change and with them architecture can and must change and the reproduction of tradition will not solve the problem. For these reasons, the need to understand heritage, learn the lessons from it with a

view to adopt certain principles and adapt them within a contemporary context is most critical. Relying on literal translation of global concepts developed in the rich West will not lead to sustainable development in these parts of the world. The definition of sustainable development as meeting the needs of today without sacrificing the needs of future generations is a case in point. The resources required by a first world family are about 20 times those for a third world family.



Figure 13. Dar Ben Abdallah, Tunis (Riadmisbah, n.d.)



Figure 14. Riad Misbah, Fez (Steele & Fathy, 1997)

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