



People's perception of the loggia: A vernacular passive cooling system in Iranian architecture



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ABSTRACT

The paper has explored the users' perception regarding traditional loggias. It has used a range of different methods including a socio-cultural questionnaire survey and personal observations. It shows that the loggia is a dominant spatial element in vernacular dwellings in Yazd, Iran, which is popular but no longer incorporated into new building designs.

The findings show that there is a range of positive and negative factors attributed to traditional loggias. The positive attributes indicate that these spaces were created to serve residents' social, cultural and aesthetical requirements and to provide comfort and convenience. Concurrently, negative aspects show that these spaces are perceived to be inconvenient, uneconomic, and often impractical. The multiplicity of the negative aspects together with the fact that loggias are not adapted to contemporary lifestyles implies that negative factors, altogether, have outweighed the advantages of loggias and put a stop to their use in new housing developments today. In order to put them back into use, all their attributes should be holistically taken into consideration and adjusted accordingly. If the drawbacks are overcome, the improved loggia can be incorporated into the design of future homes to make them more pleasant and less reliant on electro-mechanical cooling.

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1. Introduction

In hot climates, most twentieth-century buildings are increasingly dependent on air-conditioning systems and electrical equipment to have thermally comfortable conditions. This has resulted in more emissions of greenhouse gases that drive climate change and global warming. Vernacular dwellings such as those of Iran, however, are said to have been able to adapt more simply to the climate according to principles evolved over many generations (Abro, 1994; Fathy, 1986). In the context of this research, a vernacular building refers to a building, built by local people using traditional technologies, from locally available materials, in accordance with environmental context, to accommodate domestic ways of life. For the purpose of this study, which has particularly taken place in the city of Yazd (central Iran), earth (sun-dried or fired mud-brick) central courtyard buildings which were built before the 1920s, embrace the above-mentioned characteristics, and are interchangeably called vernacular or traditional. These buildings have been equipped with passive cooling features such as central courtyards, underground living spaces and loggias which

could modify to some extent the impact of a hostile climate. This climate (especially in the city of Yazd) is characterized by a shortage of water, higher evaporation than precipitation (resulting in low humidity), intense solar radiation (especially during hot summer days), high diurnal and seasonal temperature ranges, dust and sandstorms, cold and dry winters, and hot and dry summers. Nevertheless, in recent decades, many of long-standing vernacular concepts essential for living in hot climates have been ignored or suppressed. These concepts, in most Third-World countries, have been replaced by methods sometimes inappropriate to local conditions and to physical, economic, social, cultural and aesthetic requirements (Moore, 1995, p. 15; Singh, Mahapatra, & Atreya, 2009; Cain, Afshar, Norton, & Daraie, 1976). Traditional architecture and spaces, especially those of the hot-dry climates of Iran, have been undervalued and unused in contemporary constructions.

The exact reasons for the decline of vernacular traditions in central Iran have not been well investigated and addressed. Few studies have investigated the vernacular architecture of Iran, but most focus on 'one aspect of the morass of variables' only (Roaf, 1988, p. 106). Beazley and Harverson (1982), Roaf (1988), Taghi (1990), Pirnia (1991), Memarian (1995), Moradi and Amirkabirian (2001), Tavassoli (2002) and Ghobadian (2003) are mainly concerned with descriptive architectural history, showing how the vernacular traditions concerned were built, used and imbued with meaning in

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the past. The goal of most of these studies has been the classification, listing and description of traditional house types and their characteristic features. Little attempt has been made to address the contemporary decline of the traditions, the difficulties in using traditional technologies in contemporary design, or the opportunities they could offer to the architecture of today.

Alongside those historical architectural studies there exists a body of work that is focused on the thermal performance of the passive cooling techniques adopted in vernacular architecture in the Middle East (e.g. Fardeheb, 1987; Meir & Roaf, 2006). In the case of Iran, this type of research has been undertaken by Bahadori and Yaghoobi (2006), who focus on the thermal performance of central courtyard houses equipped with vernacular cooling systems, as well as by Bahadori (1978), Roaf (1988) and Safarzadeh and Bahadori (2005). However, much of this work is based on computer simulations and theoretical mathematical studies rather than on empirical measurements.

These studies do not consider the reasons why the vernacular passive cooling strategies are no longer used today. Little if any published research exists on the contemporary use, meaning and performance of vernacular passive cooling systems in central Iran.

Lessons can still be learnt from vernacular architectural elements, before their demise, to meet contemporary needs and to create more appropriate and acceptable environments for present-day users. One of the main architectural elements used in traditional architecture of hot dry climates of Iran is the loggia. This paper examines the use, meaning, suitability and acceptability of the loggia as an important element of vernacular dwellings in the hot dry climates in the present-day Yazd, Iran. It identifies, classifies and prioritises advantages and disadvantages of the traditional loggia within the context of the contemporary lifestyle.

2. Loggia (talar or eyvan)

Loggia is a semi-open living space within the body of a building, closed on three sides as well as on top and connected to the courtyard by its open side (Fig. 1). It is flat, often slightly raised and located at the ground floor level. It is a feature of vernacular architecture in many parts of the world such as in Mexico and Spain (Moore, 1995, p. 14) and the Middle East with a long history in Iranian architecture (Manzoor, 1989). Terms like veranda, porch, portico or gallery are alternatively used as synonyms for loggia, or to identify a slightly different building element (Vellinga, Oliver, & Bridge, 2007, p. 91; Schoenauer, 2000, p. 171). In Persian, terms *eyvan* (also *aivan*, *ayvan*, *ivan* or *iwan*) and *talar* (and less frequently *suffe*) have been used for loggia by academics.



Fig. 1. Talar in Moulayi House in Yazd. Source: Photograph by the author.



Fig. 2. A talar in Yazd. Source: Photograph by the author.

2.1. Talar and eyvan

According to Memarian (1998), *eyvan* and *talar* are 'semi-open spaces which face onto an open space such as a courtyard'. Similarly, Roaf (1988) defines *talar* and *eyvan* as 'vaulted reception rooms with an open wall overlooking onto the courtyard'.

Talars and *eyvans* have similar functions, but they can be distinguished from each other by their forms (Figs. 2 and 3). A *talar* is a large rectangle (or sometimes square) space in plan. It is an independent space, rarely placed in front of a room, where it does occur in conjunction with another room (Memarian, 1998, p. 129; Schoenauer, 2000, p. 170). Its floor is often raised a few steps above the level of the courtyard so that an underground room (basement) can be built underneath (Manzoor, 1989, p. 120) with natural light and ventilation. *Talar* is usually entered through side doors rather than from the front (Schoenauer, 2000, p. 170). It has its long axis at a right angle to the court and, consequently, does not require column support at its open end (Schoenauer, 2000, p. 171). The *talar* is dominant space (usually) on the south side of central courtyards and one of the most common spatial elements in plans of vernacular dwellings in Yazd (Roaf, 1988, p. 269; Memarian, 1998, p. 128). The use of a *talar* extends to all social classes (Memarian, 1998, p. 129).

Eyvan is slightly different from *talar*. According to Memarian (1998), it is usually a long rectangle in plan, positioned in front of a three-door or a five-door room, which connects them to the courtyard. At the front of an *eyvan* the roof is carried on a series of



Fig. 3. An eyvan in Yazd. Source: Haji-Ghasemi (2004).

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