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Role of the urban vegetal in improving the thermal comfort of a public place of a contemporary Saharan city.

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Abstract

The open public spaces, especially the public places, are for the population meeting, communication, conviviality. So that these spaces play their role they must be ruled by a comfortable physical environment. The optimal use of these spaces deserves detailed knowledge of all the elements that can improve the climatic conditions of use of these spaces. The purpose of this article is to study and analyze the role played by vegetation (urban vegetal) in urban external spaces since it is a fundamental component in this latter of which it minimizes and intercepts the solar rays, a very important factor of thermal comfort outside it reduces air temperatures generates shade; absorbs radiated fluxes and in general, it participates in the positive modification of physical environments (heat, humidity, light ...). Knowing that the people of the Saharan cities (hot climate and arid zone) seek to shelter solar rays by all means especially during the summer. To the latter, most of people are affected by thermal stress, given the lack of freshness and shade.This leads them to abandon the public place, and to join the built spaces, while using air conditioning, which engendered more energy consumption (electricity). The "in situ" investigation has affected the climate dimension ambient temperature, humidity, sunshine, solar radiation. And the insertion of urban vegetation (by simulation) as a mask against solar rays. The results confirm the primordial role of urban vegetal in the creation of shade, which has improved the thermal comfort of public places. Then the quality of urban life. Now it is limited, in this article, to expose a single example of the research. It is a public place (Ben Badis) in the city of Biskra / Algeria (dry climate and arid zone). The technique followed in this work is a combination of measures of the necessary climatic factors "in situ" and simulation using software.

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Keywords: urban vegetal, shade, thermal comfort, solar radiation, RayMan, Saharan city, public place.

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1. Introduction

Contemporary Saharan cities (Algeria) have been transformed into cities in the Sahara, which have not been able to retain their urban and architectural features [1]. The first reading of the plans of the nuclei of these cities reveals the ingenuity of their populations in the creation of these Saharan human settlements (Ksour), which are dispersed in a hostile environment [2]. Where we touch the interaction between contexts, socio-cultural, historical and environmental. It was the adaptation to their physical environment, where the climate context was respected. In spite of the austerity of the climate of this region, the population of these cities managed to balance the climatic conditions with their needs. Provide public spaces (urban outdoor spaces) that can be used throughout the year. All this was through a combination of urban and architectural devices.

These elements have allowed for a filtering of climatic factors (wind, air temperature and above all solar radiation). Nowadays, the climatic factor is neglected, by the adoption of urban planning instruments incompatible with their contexts, models designed for the cities of northern Algeria this has caused them to lose their identities and their geo-climatic specificities. This has led to a lack of use of the public spaces of these cities and especially the public places.

According to the analysis [3] the neglection abandonment of these spaces is due to the lack of thermal comfort, which obliges people to leave these spaces or frequented occasionally. This paper is an attempt to improve thermal comfort within existing, very open public spaces (public places). To play well their roles, and to improve, subsequently, the urban living environment of the population of contemporary Saharan cities (Algeria).

2. Problems

In Saharan cities with arid climate, the concern of the population is to avoid the sun's rays and seek the shade and freshness what pushes people to abandon public spaces (urban outdoor spaces), especially the very open ones, of which they are assailed all day by a hot and burning sun towards built-up areas while using air conditioning.

This confirms that thermal comfort in urban areas is one of the factors influencing people's activities, and then the use of outdoor spaces [4]. The use of public spaces plays a very important role in promoting the quality of urban life. Encouraging people to use public spaces happens through the control of climatic conditions. Studies show that the use of public spaces and the behavior of people are according to these [5].

Henceforth, a study was conducted by NIKOLOPOULOU M and al, in public places in England; were able to verify that the use of the places was according to the climatic conditions and especially to the conditions of comfort that they offer to the individuals [6].

In addition the positive effect of thermal comfort encourages people to frequent and meet in public spaces (public places) with a decrease in electricity consumption [7].

Indeed climatic conditions may increase, limit, direct or modify the use of urban outdoor spaces; then the impact on the framework of urban life. As already mentioned above; the population of the Saharan cities always escape from the solar rays; towards shaded places since they are cooler. In a study in CHATZIDIMITRIOU A and al. 2006, revealed that shaded paved surfaces are 40% cooler than the same surfaces exposed to sunlight and their surface temperatures 21% lower than the temperature of the air [8].

Finally the radiation is considered one of the main climatic elements, which are: air temperature, humidity, wind, precipitation and solar radiation [9]. It can be received either by direct radiation from the sun or by radiation scattered by the sky or by radiation reflected from a terrestrial surface [7].

3. Objectives

- Find the right and feasible strategy to introduce vegetation into public space as an element improving thermal comfort in outdoor spaces by the attenuation of the solar radiation and the decrease of the sky view factor.
- Determination of the type of urban vegetal that meets the objectives of the research and adapts it to the Saharan region (hot climate and arid zone).
- Seek optimal design of vegetation.
- Verification of thermal comfort by indices of thermal comfort and other parameters.