

Research Assessment #1

Date: 10/8/2021

Subject: Sustainable Urbanism & Optimal Density Pt. 1

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Lehmann, S. (2016). Sustainable urbanism: Towards a framework for quality and optimal density? *Future Cities and Environment*, 2, 8. <https://doi.org/10.1186/s40984-016-0021-3>

Assessment:

For this week's assessment, I began the basic research of my original work. Since my original work is looking at creating a sustainable community within a limited space I wanted to look at a study that focused on breaking down urban and population density and what the optimal densities would be for citizens to live and operate comfortably within a community. To do this I found a review published in *Future Cities and Environment* and written by Steffen Lehmann. Steffen Lehmann is a famous German architect who is known for his work in sustainable and urban design and in this review, he breaks down the different ways to look at density, different real-world examples of what works and what does not, as well as the other more minor factors that density can heavily influence.

The first part of the article talks about why it is important that we reevaluate the way we design our cities and communities and the primary reasons that Lehmann cites are exorbitant use of limited resources and human-caused greenhouse gas emissions. Throughout this article, I saw a lot of mentions of topics and ideas that I had started to cover in my environmental sciences and college literature classes at UNT. Two of the concepts that I recognized were the idea of the urban heat island effect and the albedo effect. The urban heat island effect is what occurs when urbanized cities experience

noticeably higher temperatures than undeveloped rural areas. This is primarily caused by the way an area absorbs/reflects light, heat, and radiation from the sun and cities tend to be unable to absorb as much as rural areas. This is related directly to the concept of albedo because that is the measurement of how much light or radiation a surface is able to reflect. Albedo is mainly affected by the color and texture of a surface and the angle at which the sun hits the surface. Having a high albedo means the surface is able to reflect the majority of the incoming light and radiation and having a low albedo means it barely reflects anything. Albedo measurements are a significant concept that is brought into city design because they can directly affect whether an urban heat island will develop. In recent years it's been seen that implementing things like green roofing, solar panels, white/ lighter pavement, and water recycling systems will either increase the albedo of the surfaces of buildings, which makes it tougher for the urban heat island effect to take place.

The second idea that the author touches on is the importance of exploring options like compact cities and denser living situations. In his research, Lehmann, says that he has found that cities that have a higher population density and a smaller total area tend to have less fuel emission rates than less dense and widely spread cities. This is because it allows for easier and quicker transportation from citizens' homes to local amenities and workplaces. He stressed that for the most efficient design of a compact city there needs to be a comprehensive and effective transit system that is accessible to nearly every citizen so that it encourages minimal use of personal vehicles and it can keep emission rates to a minimum. Another idea he said that would be very important to consider is ventilation and airflow within an urban environment. Lehmann

said that in extremely densely populated areas one of the biggest issues is the presence of unclean air that can cause health issues to its citizens because of inefficient filtration systems. He even talks about the city of Kowloon specifically, which is one of the past cities I am looking into for my original work research. He says that the city had some of the requirements to be successful and sustainable but it was mismanaged and led to ruin. He cited the poor health of its citizens as a direct result of its truly awful air ventilation systems.

He goes into deeper details on the city of Kowloon and its shortcomings later in the article which I will cover in later assessments over this document.