

## ISSUE OF SUSTAINABILITY ON LIGHT POLLUTION FROM THE PERSPECTIVE OF MAQASID SHARIAH

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### Abstract

*In the growing tension of discussing human development, sustainability is endorsed as the answer to providing a just and balanced resolution. A notion of sustaining one field is defined as the notion to preserve and conserve the available resources for the sake of current and future consumption. However, there are many regards to sustainability, particularly one interpreted by the Brundtland commission, to be ambiguous and inoperative. An ambiguous concept of sustainability leads to mismanaged city development and urban growth that overlooks the danger of light pollution, which adversely affects human welfare. Given this phenomenon, this paper seeks to examine the dangers of light pollution under the framework Islamic Jurisprudence Principle of Maqasid Shariah. To draw parameters on how this concept could be well adopted in sustain light pollution, the elements and principles embedded in this holistic concept shall then appraised. This study adopts a qualitative method based on content and doctrinal analysis in reviewing and analyzing relevant documents, commission, and other literary work. The study shows that framing the dangers of light pollution, Maqasid Shariah covers a more comprehensive, including the perseveration of human life, intellectual, progeny and property. This study further submits and considers the extent to which the recommendations drawn from this study would enhance the understanding of light pollution threat amongst the city planner, economic player, and policymaker, thereby mitigating and reducing the light pollution crisis.*

**Keywords:** *Light pollution, Sustainability, Brundtland Commission, Maqasid Shariah, Islamic Jurisprudence.*

### INTRODUCTION

Sustainability has emerged as the core concept in integrating the issue of environmental mitigation and human development. This situation leads to a deep root network on sustainability in the study of economic management, renewable sources administration, and energy organization. The goal of

sustainability has become more focal in the modern age since 1980, signifying an increased concern of humanity towards nature and the environment in the Biosphere. As the academic discussion in sustainability has escalated, apprehension on the applicability of sustainability to new industry & development is inevitable. The Brundtland Commission 1987 defines sustainability as "a development that meets the present needs without compromising the need of future generations to meet their own need" (Brundtland Commission 1987). Dovers and many others view the Brundtland interpretation of sustainability as ambiguous and indefinite (S. R. Dovers and Handmer 1993; S. Dovers and Norton 1992). This problem contributes to growing sustainability interpretations designed without comprehensive and justified argument (Christen and Schmidt 2012). The subjective interpretation of sustainability making it adjustable to any policies (Imran, Alam, and Beaumont 2011), which periodically do not necessarily envision the notion of sustainability at all.

In addition to that, this very definition only orients on the axis of human development, which translated into economic and technological development (Carvalho 2001; Robinson 2004), while the social aspect of human nature (Fuchs 2017; Weingaertner and Moberg 2014), as such poverty and inequalities; and ecological balance (Imran, Alam, and Beaumont 2011; Buchdahl and Raper 1998) only play a subsidiary role in the definition. Despite its infirmity, the definition of sustainability by Brundtland report attracted strong advocacy and admiration from research institute, industry, economy player and policymaker. As mentioned earlier, the inconclusive interpretation of sustainability is a confused, short-lived and unplanned execution of sustainability.

While at a glance, the goal of sustainability suggests that it is parallel with optimization, but in reality, both of these goals tend to contravene each other. In achieving optimization, which revolves around customer satisfaction, wealth generation, and cost reduction (Shaharir b. M. Z. 2013), sustainability is often overlooked. Any attempt to fully optimize at a specific field, particularly economics, will disrupt the sustainability on the other field, for instance, energy conservation and ecosystem preservation (Rita Yi Man Li 2011), even in some cases, the goal of economic even devastate the social balance of human life (Fuchs 2017; Schoenaker, Hoekstra, and Smits 2015). What makes it worse is that economic optimization does not have measurable performance since optimization is always invariably subjective to the customer and industrial impetus, which contribute to the segregation on the aim of ecological and social balance to subordinate level.

Brundtland definition of sustainability also demonstrates how little it estimates the importance of ethical or spiritual value in its definition (Shaharir b. M. Z. 2013; Narayanan 2013; International Environmental Forum 2001). Perhaps this circumstance can be explained as the very nature of ethical or

spiritual value itself that does not have a measurable goal (Shaharir b. M. Z. and M. Alinor b. A. K. 2014), making it subjected to instability. However, it is worth noting that as the primary actor of sustainability is human, ethical and spiritual values can offer a life-enhancing element that can significantly benefit the notion of sustainability (Cairns 2002; Mabogunje 2004; Young 2011; Liu 2010). The spiritual value extracted from religious ideologies and literature is viewed by (Narayanan 2013) as a critical enhancement in maintaining sustainability through its ethical values and insight into how humans react towards nature and ecology.

### ***Light Pollution and Sustainability***

Light pollution is a by-product of the concentrated human population development (Faid et al., 2016) and massively profitable activity (Gallaway, Olsen, & Mitchell, 2010), sourced by artificial lighting of a city. The human-made light or artificial light produces vertical proliferation lighting on the atmosphere making the sky brighter (Shariff, Hamidi, Musa, Osman, & Faid, 2015) and disrupts the supposed night sky ambient (Faid, Shariff, & Hamidi, 2019). A disturbed night sky ambience will hamper the sustainability of human welfare, environment and energy conservation. Moreover, light pollution would have disturbed the notion of energy conservation (Faid et al., 2018). Artificial light devours a whopping 19% of total global electricity, and a study (Hölker et al., 2010) indicates that the consumption of artificial lighting surge up to 20% every year, with 6% average while the grid-based electricity produced 1.5 billion tones of carbon dioxide each year globally (K. Gaston, 2013). Without calculated energy management on this issue, this will lead to excessive electrical energy usage and amass of Green House gas density in the atmosphere.

Apart from that, light pollution would cause a deleterious mark on ecology. The polarisation of artificial light hampers the activity of the nocturnal animal, thus altering the dynamics and diversity of a balanced ecosystem. Light polarization occurs when light from artificial lighting collide with the smooth surface of dark construction, reflecting the atmosphere (Horvath, Kriska, Malik, & Robertson, 2009). This phenomenon is formerly known as polarised light pollution. The polarised lighting will disrupt the navigation of nocturnal animals, particularly hunting and mating, disrupting their natural rhythm of living. It is also reported (K. J. Gaston, Bennie, Davies, & Hopkins, 2013) that artificial lighting alters the photosynthesis cycle and dark repair phenomenon. Besides, light pollution exposure hurts human health. Also, long hours of light exposure would lead to disturbance in the natural rhythm of the human circadian cycle. Nightly exposure to artificial light suppresses melatonin production, a hormone that acts to lower the blood that encourages cancer growth (Navara & Nelson, 2007; Smolensky, 2013). Besides that, artificial

lighting during the night would cause heart disease, a sleep disorder that eventually leads to psychological problems (Chepesiuk, 2009; Falchi, Cinzano, Elvidge, Keith, & Haim, 2011).

Above all, light pollution significantly impacts a range of disciplines, encompassing human sustenance, environment equilibrium, and energy efficacy. It is harrowing to learn that 80% of the global human population lives under a light-polluted sky (Falchi et al., 2016). The mark of light pollution on humans, the environment, and energy shows that it is another complication of unsustainability. Unbalance optimization of development and economy needs to be resolved — this complication of unsustainability a regarded as an apparent consequence of indefinite and inoperable interpretation of sustainability. Thus, a new definition of sustainability is required to clarify its execution and objective, thus curbing the perils of light pollution.

### *Maqasid Syariah*

Maqasid from the linguistic perspective has various definition, although majority of the definition refer to the intention of a body (Sadatmoosavi, Ali, & Shokouh, 2015). Syariah interpreted as specified path for a specific person (Khairi et al., 2020; Sadatmoosavi et al., 2015). Thus, it can be concluded that Maqasid syariah is defined as the true intention of the specific Islamic law for Muslim (M. M. Nordin, 2016; N. Nordin, Mohammad, Ahmad, Haron, & Daud, 2017; Qoyum, 2018).

Research on Maqasid syariah is essential to understand the true intention of Islamic law which are actualizing masalah indirectly, and bringing justice for Muslim (N. Nordin et al., 2017). Al-Ghazali defined Maqasid syariah as:

"The objective of the sharia is to promote the welfare of human beings, which lies in safeguarding their faith, their life, their intellect, their posterity, and their wealth. Whatever ensures the safeguard of these five fundamentals serves the public interest and is desirable" (Qoyum, 2018).

Al-Ghazali further classified Maqasid syariah into darurriyyah or the absolute necessity requirement for Muslim; hajjiyyah, or desire or needs for Muslim not not at the level of nessecity and tahsiniyyah or the additional uncessesary needs. Darurriyyah, the absolute needs to be that require by Muslim, cover 5 main aspect, which are (Ahmed, 2013):

- a. Protection of the religion (Ad-din)
- b. Protection of life (An-Nafs)
- c. Protection of intellect (Al-A'ql)
- d. Protection of progeny (An-Nasl)
- e. Protection of property (Al-Mal)

Al-Shatibi in agreement with Al-Ghazali, commends these five aspect as a bare minimum Necessities for the subtenance of human beings (Auda, 2008). This is because that these nessecities required for bringing control the existence of the Religion, Life, Inttelect, progeny and property and these elements from being corrupted or ultimately destroyed.

## **METHODOLOGY**

In the methodology, parameters were constructed to ensure a converging focus on the objective. The parameters outlined under this research questioned, firstly, how light pollution impact human development? Secondly, how was this, in turn, relates to the framework of Maqasid Shariah? Literature searches were conducted on the topics of light pollution to get an overview of the latest developments on the effects of light pollution on the Biosphere. The literature research was conducted using various databases like ScienceDirect, Springer Link, Elsevier, Taylor and Francis Online, Emerald Insight and Scientific Journals. Conference proceedings, reports, books, guidelines, online newspapers, open-access articles, governmental and various organizations' websites and legislations were also included in the study. The latest peer-review articles on the topic were mainly used.

## **RESULT**

### **Light Pollution from the Perspective of Maqasid Shariah**

This section highlights the relationship between effect of light pollution on sustainability and Maqasid Shariah. The discussion focuses on the five main necessity under the umbrella of darurriyyah (Azhari, 2010). The relationship of elements between light pollution on sustainbility against preservation and convervation Maqasid shariah is highlighted as follows:

#### **i. Protection of Life**

The unsustainable exposure to light pollution at night will increase the rate of death among humans. A balance cycle of night and day hours is a reuirement for Humans in their daily life. A prolonged exposure to lighting during the night imitates the sun's brightness, and this interrupt the production melatonin in the phase-shifting circadian rhythm (Navara & Nelson, 2007). This disruption can cause widespread interruptions of multiple body systems, resulting in severe medical consequences for individuals, such as cancer (Smolensky, 2013). Researchers at Cal Poly and the University of South Florida found that light pollution increases the risk that insects will spread the West Nile virus to animals and humans (Kernbach et al., 2019). Between 2003 and 2020, more than 7,200 reports of infections resulted in 320 human deaths

(Kernbach, Cassone, Unnasch, & Martin, 2020). The dangers of cancer and the increased outbreak rate of the West Nile virus indicate that light pollution potentially harms the notion of human life preservation.

ii. Protection of Intellect

Overexposure to light pollution also finds to harm the human mind. A study shows that long night exposure to artificial lighting decreases the level of body melatonin production and increases cortisol, a hormone that directly involves inducing stress and depression (Harb, Hidalgo, & Martau, 2015). The elevated level of cortisol also increases the risk of suicidal thoughts among Human. A national study on 150 00 Korean adults has found out that human exposure to artificial outdoor light at night has a higher likelihood of adopting depressive symptoms or suicidal behaviours. This finding indicates that overexposure to light pollution hampers the capability of rational thinking of the human mind, leading to the dangers of depression and suicidal thoughts.

iii. Protection of Progeny

Light pollution also impacts the endeavour of preserving lineage. As a prolonged exposure of artificial lighting hampers production of melatonin in humans, the underproduction of increase the spread of cancer cells due melatonin functionality in suppressing cancer cell growth. Research shows that human with higher artificial light exposure at night has higher probability of having prostate cancer than human that had lower exposure to light pollution (Haim & Portnov, 2013; Kim, Lee, Kim, & Kim, 2017). Besides, a decrease in melatonin was highly correlated to breast cancer (Kloog, Stevens, Haim, & Portnov, 2010). Women, especially night shift workers, are exposed to the risk of breast cancer. A study found that intensive light exposure during the night could induce breast tumour growth. Women at home are also not safe from the risk of breast cancer, as it was found that the intensity of bedroom light, remarkably short-wavelength light (~460 nm), was almost directly proportional (95%) to the risk of breast cancer (Smolensky, 2013). This fact explained why the risk of developing breast and prostate cancer was up to five times higher in industrialized nations than in underdeveloped countries (Stevens, 2006). Treatment of prostate cancer can reduce the production rate of sperm (Farhood et al., 2019), while cancerous breast will decrease the production rate and taste of breast milk (Bhurosy, Niu, & Heckman, 2020). As these two organs are involved in the reproduction and nurture of human offspring, it demonstrates the severity of light pollution on the preservation of progeny.

iv. Protection of Property

In addition to progeny, intellect, life, light pollution is also found to impact the preservation of property. The enormous emission of artificial lights on

unnecessary locations is indeed a waste of resources. Wasting energy has substantial economic and environmental impacts. In the U.S. alone, in 2018, a yearly average of 3.600 billion kilowatt-hours of energy was generated for electrical consumption, equalling the cost of USD362 million (EIA, 2018). The cost of electric production in 1991 was only USD0.7 billion (Hunter & Crawford, 1991), which was ten times smaller. The tenfold increase of unnecessary electrical usage on artificial lightning indicated a stagnant concern on light pollution despite the large numbers of researches on light pollution. The waste of money due to unnecessary artificial lighting indicate how light pollution hamper the Protection of human property.

Thus, its show that light pollution impact on sustainability directly hamper the notion of preserving the protection of life, protection of intellect, protection of progeny, protection of property. Considering its severe impact of multiple elements of human life, is demonstrated that light pollution should be a concern situated under umbrella of Maqasid Syariah.

## CONCLUSION

Light pollution is found to harm the sustainability of human development. However, as the current definition of sustainability is not comprehensive and arbitrary to interpretation, the endeavour of mitigating the issue of light pollution cannot be taken strategically and exhaustively. Thus, the dangers of light pollution are discussed under the framework of Maqasid Shariah. Light pollution is found to impact the notion of human life, progeny, intellectual and property preservation, which are the core framework of Maqasid Shariah. This study will help future city planners, industry players, and infrastructure builders develop a more Islamic-centric city.

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### Penafian

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