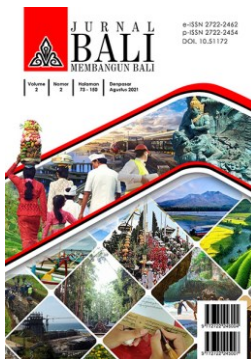




Covid-19 Pandemic and the Green Open Space Concept of Balinese Traditional Community

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Abstrak

Tujuan: Tujuan penelitian ini adalah untuk mengetahui hubungan antara konsep Ruang Terbuka Hijau (RTH) masyarakat tradisional Bali dan penyakit Covid-19.

Metodologi: Metode yang digunakan dalam penelitian ini adalah studi kepustakaan yang akan disajikan secara kualitatif.

Hasil dan pembahasan: Makna Ruang Terbuka Hijau (RTH) pada konsep *hulu-teben*, *tri mandala*, *karang embang*, *sanga mandala*, *natah*, *karang tuang*, *kahyangan tiga* dan *setra* merupakan usaha dalam meminimalisasi interaksi yang bersifat mengancam keselarasan alam.

Implikasi: Penyebaran virus yang dominan pada ruang tertutup juga dapat diminimalisasi melalui konsep penataan Ruang Terbuka Hijau (RTH) baik yang dalam skala rumah tinggal maupun publik.

Kata kunci: Ruang Terbuka Hijau (RTH), masyarakat adat Bali, pandemic Covid-19.

Article History

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Abstract

Purpose: The purpose of this research was to determine the relationship between the concept of Green Open Space (Ruang Terbuka Hijau/RTH) of traditional Balinese society and the Covid-19 disease.

Methodology: The method used in this research is a literature study which will be presented qualitatively.

Results and discussion: The meaning of the Green Open Space in the concept of *hulu-teben*, *tri mandala*, *karang embang*, *sanga mandala*, *natah*, *karang tuang*, *kahyangan tiga* and *setra* is an effort to minimize interactions that threaten the harmony of nature.

Implication: The dominant spread of the virus in closed spaces can also be minimized through the concept of structuring the Green Open Space, both on a residential and public scale.

Keywords: green open space, harmony, Balinese traditional community, Covid-19 pandemic.

INTRODUCTION

Albert Einstein said that science without religion would be lame, while religion without science would be blind. It can be understood that religion and technology should be carried out in a balanced way in life. Religion with its teachings was created to provide direction so that human life remains on the path of truth that has been universally agreed upon, while technology was created to facilitate humans in tracing the path of truth. Religion and science exist in humans who are a small part of nature. Humans who are part of nature should use religious teachings and science to maintain harmony with nature.

Harmony between humans and nature is an attitude that is always maintained by traditional Balinese people. The nature referred to here is the smallest to the largest environment with all the creatures in it. This attitude is motivated by religious teachings known as the concept of "Tri Hita Karana". The concept of "Tri Hita Karana" teaches humans to always be in harmony with 3 (three) things, namely God as creator, fellow human beings and towards nature (Parwata, 2008). If understood more deeply, the harmony is not only with the natural world but also with the supernatural world. This is because the Balinese believe that there are forces beyond human capabilities that exist in nature. This power is also believed to fight if humans have started to be out of harmony with nature. Alignment with God who is believed to be the creator is carried out with *yadnya* in the form of offering ceremonies in holy places. Harmony with humans is done by helping each other such as the presence of the term "*sekaa*" or association. Specifically, to maintain harmony with nature, traditional Balinese people do it in 2 (two) ways, namely sacred and profane. Sacred nature is carried out with various ceremonial traditions such as *tumpek bubuk*, *Nyepi*, *ngeruak land*, *mecaru* ceremony, etc. The various sacred ceremonies are addressed to the forces of nature (*niskala*) to ask for protection so that human relations with nature always run harmoniously.

The profane way is done by making concepts that can be used in life such as the concept of *upstream-teben*, *sanga mandala*, *telajakan*, *natah*, *teba*, coral cast, coral embang, *setra*, *kahyangan three*, etc. These profane concepts of aligning themselves with nature have an important goal, namely to present Green Open Space (Ruang Terbuka Hijau, RTH) in order to utilize natural energy without destroying it. The various ways to maintain harmony with nature, both sacred and profane, were born because of the thoughts of traditional Balinese people who do not want to oppose nature with all the elements and elements in it so that they can avoid disasters. Green Open Space (RTH) if understood in depth is a space concept that has a close relationship with efforts to maintain health through the environment. Green Open Space (RTH) will certainly be very useful in regulating air conditioning and lighting in buildings. The existence of a landscape in this case the Green Open Space (RTH) between residences will be able to circulate air so as to create good air circulation in the interior. Horizontal ventilation placements can be designed in a cross or continuous position that allows the entire space to be exposed to wind gusts. In buildings with limited land, this can be done by placing vertical ventilation, which is using the ceiling as an access for wind to escape (Mediastika, 2013).

Along with the increasing knowledge and technology possessed by humans, the attitude of aligning oneself with nature is now starting to fade. This can be seen

from the many natural disasters that occur as a result of human attitudes that do not respect nature, such as floods and landslides. However, the latest disaster at this time is the spread of the Corona virus or Corona Virus Disease (COVID-19). Based on information from Dr. dr. Erlina Burhan, M.Sc. Sp.P (K) from the department of pulmonology and respiratory medicine, Faculty of Medicine, University of Indonesia (UI), the disease caused by a coronavirus infection was first reported in Wuhan, China on December 31, 2019. On January 30, 2020, the World Health Organization (WHO) has designated this disease as a public health emergency of international concern. This COVID-19 disease was detected in Indonesia on March 2, 2020 with 2 (two) positive confirmed patients (the COVID-19 alert and alert task force PB IDI). In his article, Handayani explained that the transmission of this disease is thought to come from animals because COVID-19 is a zoonosis and is now starting to develop from humans to humans (Handayani, 2020). The explanation above is proof that nature is starting to fight humans, not only with local or narrow floods and landslides, but also through viruses that are international in nature. This incident is also proof that humans are not wise in using technology and have started to deviate from the path of truth. If you look at the causes, floods and landslides are caused by human activities who ignore the concept of Green Open Space (RTH). The neglect of Green Open Space (RTH) also has a close relationship with COVID 19 disease, that humans not only interfere with plant life, but also other living creatures, namely animals.

RESEARCH METHODS

This writing uses a literature study research method that will be presented qualitatively. The data to be sought is related to the COVID-19 disease, such as the cause of the disease, transmission, methods of prevention and its impact on nature. All matters related to COVID-19 will be linked to the meanings contained in the concepts of Green Open Space (RTH) for traditional Balinese people. The relationship between the COVID-19 disease and the concepts of Green Open Space (RTH) will later be analyzed to find the causes and ways to reduce the impact of the disease that modern society does not realize and ignore. The Green Open Space (RTH) that exists in the concepts of traditional Balinese society is not limited to the residential environment, but also the public environment. Data related to COVID-19 will be sought from library sources through internet (digital) media such as health articles, websites of health institutions and mass media such as newspapers. The Green Open Space (RTH) concepts that will be used are sanga mandala, coral cast, tri angga, kahyangan three, setra, upstream-teben, natah and coral embang. Other data that will be used as support is research related to Green Open Space (RTH) conducted in 2019.

RESULTS AND DISCUSSION

Humans as creatures with the highest gift of ability should be a protector for other creatures such as animals and plants. Not only living things, humans are also obliged to maintain and maintain all the elements or contents of the earth which is a place of life. As beings with the highest abilities, humans have the ability to face various challenges and adapt to find solutions to these challenges. The thinking ability possessed by humans will be able to continue to develop along with increasing knowledge or experience. However, the ability to think is often uncontrolled so that it has a negative impact on nature. The development of human thought and technology is the most influential factor in changing natural conditions. Most people view technology as a tool to realize their desires or ideals.

Technological developments are now widely used to engineer nature even beyond what is required by nature. The emergence of the COVID-19 disease cannot be separated from the relationship between humans and nature in utilizing technology. In a compass article dated February 29, 2020, the corona virus is known to have 90 percent the same genetics as pangolins. Representatives of the Wildlife Crimes Unit (WCU) of the Wildlife Conservation Society (WCS) said the suspicion that this corona virus originated from pangolins should be a concern regarding wildlife trade (accessed February 29, 2020). In another compass article dated March 26, 2020, explaining the need for evaluation of previous events that the SARS-CoV-2 type corona virus as the cause of Covid-19 first appeared in the Wuhan China wildlife market in December 2019. This virus originated from bats as animals. intermediate wild. In fact, this zoonotic potential can cause new diseases that have never existed (accessed on January 17, 2020, at 15.30 WITA). Based on the information above, it can be understood that the human ability to use technology is getting out of control so that it interferes with natural conditions, especially animals or animals. The growing population, hunting of wild animals and forest encroachment have caused living things such as animals and plants to no longer have a place to live. Plants that used to be a source of food and a home for animals are now very limited in number and even decreasing. Things like this make human contact with animals closer. In some cases, even positive actions such as animal conservation and pet-loving communities have the potential to contract diseases carried by animals (*satwa*).

Currently, the Covid-19 disease has spread throughout the world, including Indonesia. Bali as a part of Indonesia also felt a huge impact. Based on accumulated data from the Bali provincial health office, the most cases of Covid-19 were in Denpasar with 5991 cases, followed by Badung district with 4085 cases, then Tabanan

district with 2644 cases, Gianyar district with 2708 cases, Klungkung district with 1049 cases, Karangasem Regency with 1158 cases, Buleleng Regency with 1515 cases and finally Jembrana Regency with 1275 cases (Bali Provincial Health Office, accessed on January 18, 2021). Regarding the most cases in the city of Denpasar, the Bali news article also explained that the most treated patients were in the city of Denpasar, namely 647 people. Based on the latest data on January 18, 2021, when viewed from the cumulative number of positive cases of Covid-19 in Bali Province which to date is 21,682 people, the patients who are still under treatment are 10.98 percent of the total confirmed positive cases of Covid-19 (accessed January 18, 2021).

Table 1: Based on accumulated data from the Bali provincial health office
[Source: Health office and Bali provincial government]

NO	Regency/city	Number of cases
1	Denpasar	5991
2	Badung	4085
3	Tabanan	2644
4	Gianyar	2708
5	Klungkung	1049
6	Karangasem	1158
7	Buleleng	1515
8	Jembrana	1275

Denpasar City and Badung Regency are the most densely populated areas in Bali Province. This was already written for examples in Aryawiguna (2021), Puspita, et al (2021), and Putra (2021). Based on data from the Central Statistics Agency (BPS) in the Bali Province book in figures, the city of Denpasar has a population density that is very far compared to the districts of Badung, Buleleng, Tabanan and Gianyar. Denpasar City has a population density of 914.3 (thousand people) with a difference of three thousand people from Badung and Buleleng regencies and five thousand people from Tabanan and Gianyar and Karangasem regencies (Bali Province, 2018).

Kabupaten/Kota Regency/ Municipality	Jumlah Penduduk (<i>ribu jiwa</i>) Number of Population (thousand)				Pertumbuhan Penduduk per Tahun / Annual Population Growth Rate (%)	
	2010	2015	2016	2017	2010-2015	2016-2017
(1)	(2)	(3)	(4)	(5)	(6)	(6)
Kabupaten/Regency						
1. Jembrana	262.6	271.6	273.3	274.9	0.68	0.59
2. Tabanan	422.3	435.9	438.5	441.0	0.64	0.57
3. Badung	546.7	616.4	630.0	643.5	2.43	2.14
4. Gianyar	471.6	495.1	499.6	503.9	0.98	0.86
5. Klungkung	171.1	175.7	176.7	177.4	0.53	0.40
6. Bangli	216.1	222.6	223.8	225.1	0.59	0.58
7. Karangasem	397.8	408.7	410.8	412.8	0.54	0.49
8. Buleleng	626.2	646.2	650.1	653.6	0.63	0.54
Kota/Municipality						
9. Denpasar	793.0	880.6	897.3	914.3	2.12	1.89

Figure 1. Data on the number of cases and population density of each district and city in Bali
[Source: Health office and Bali provincial government]

The population data shows that population density which has an impact on the reduction of Green Open Space (RTH) is one of the triggering factors for the spread of the Covid-19 disease. Density of occupancy or settlements has an impact on poor air circulation. Residential development carried out by developers or the government often only aims to fulfill basic human needs without paying attention to local natural conditions. This will have a negative impact on the survival of both human and ecological life (Karyono, 2014). In a smaller environment, these conditions will have an impact on each dwelling or residence. The extent of the residential environment that is not in accordance with the capacity of the occupants will ignore the existence of Green Open Space (RTH). Not only residential houses, even public buildings such as offices, shopping areas and places to eat will be forced to use artificial ventilation, especially AC (Air Conditioner). The use of artificial ventilation that cools or humidifies the room is also a trigger for the spread of Covid-19 disease. The compass article on November 7, 2020 explained that the transmission of Covid-19 disease can be through splashes or droplets that spread in the air or stick to objects, especially in closed rooms. Epidemiologist from the University of Indonesia (UI) Pandu Riono explained that there is no benchmark for how many hours the virus can survive in a closed place or space. When the droplets are still in the air in a closed and poorly ventilated room, a transmission process will occur (accessed January 18, 2021). Artificial ventilation such as fans and various types of air conditioners tend to push and spread air throughout the room. This process will cause the virus to spread, making it dangerous for the community in the room.

Understanding how the Covid-19 disease started means that knowledge and religion are no longer compatible. The development of knowledge in the form of technology is only used to meet the needs of human life without paying attention to the sustainability of nature. This action means that it is contrary to the concepts of traditional Balinese society which is always guided by nature in every activity of life. This condition will indirectly lead to a misaligned relationship between humans and God and nature. The Covid-19 disease is caused because humans have disturbed nature, especially plants and animals. The spread of the Covid-19 disease mostly occurs in environments that have densely populated areas. In addition, rooms without good air circulation and using artificial air conditioning (AC) also accelerate the transmission of the Covid-19 disease. What is the cause of the emergence and transmission of the Covid-19 disease, in principle, has been thought of through the application of traditional Balinese spatial planning concept. There are 9 (nine) concepts that have meanings related to the Covid-19 disease, namely *Hulu-teben*, *Tri Mandala*, *Sanga Mandala*, *Natah*, *Karang Tuang*, *Karang Embang*, *Karang Teba*, *Kahyangan Tiga* and *Setra*. *Hulu-teben* is a concept used in positioning or placing settlements or villages. *Hulu* is a highland, while *teben* is a lowland so that the position of the village or settlement must follow the contours of the land. The upstream-*teben* concept also considers the flow of the river with the aim that the position of the settlement does not cut or stem the river. This is intended so that settlements are protected from flooding if there is an overflow of river water. The concept of *tri mandala* in its application to settlement is used in determining sonation. *Tri Mandala* divides the settlement into three parts, starting from the highest plains (upstream), namely *prahyangan* (holy places), *pawongan* (people's houses) and *palemahan* (forests). The concept of *tri mandala* has a relationship with the concept of coral embang. Karang Embang is a term for an empty area (forest) as a transition area from one village to another. This area is also used as a cemetery surrounded by forest (Acwin, 2009). *Sanga mandala*, *natah* and coral cast are concepts used in regulating the sonation of space (area) in a residential house. The concept of *sanga mandala* is a combination of the cosmological axis (east-west) with the religious axis (north-south). *Sanga mandala* divides the residential environment into 9 (nine) sonasi from the most important areas (holy places), *madya* (buildings and gardens) and *nista* (toilets and gardens).

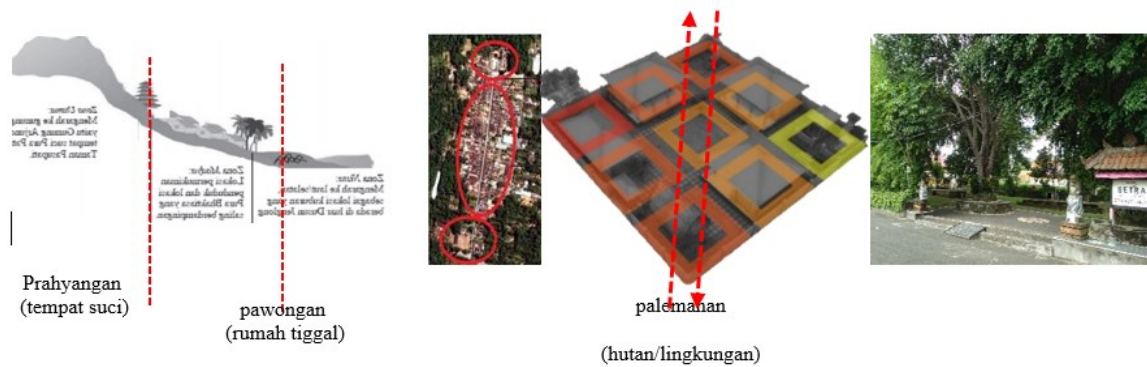


Figure 2. The concept of upstream-teben, tri mandala, sanga mandala and setra
 [Source: simdos.unud.ac.id, seminar.iplbi.or.id, reproduction and author documentation]

The arrangement of the residential environment for the traditional Balinese community is an adaptation of the arrangement of houses during the Majapahit kingdom era (trowulan site). *Natah* as sonation in the middle is the orientation of each building mass. *Natah* is believed to be the center of the entire residential area which is manifested in the form of empty space or Green Open Space (RTH). Besides *natah*, cast coral is also part of the *Sanga Mandala* concept. *Karang Tuang* is an open area in the form of Green Open Space (RTH) with a diagonal position from the southeast to the northwest. This position is based on the movement of the wind which will be distributed to the *natah* area and to the entire mass of the building. The diagonal direction of the empty space in the traditional Balinese residential environment is in accordance with the movement of the wind in the tropics, especially Bali, namely from the southeast to the northwest and vice versa. The concept of cast coral and *natah* is a structuring pattern that directs the wind circulation of each building mass. The existence of Green Open Space (RTH) in the environment and supported by space openings in the building will provide good air circulation or cross air circulation (Frick, 2007).

Another open space concept that is still related to residential houses is coral *teba*. *Teba* is a traditional Balinese term for the forest area behind the dividing wall of the residential yard area or the transition area between the house and the rice fields. *Teba* coral is usually used for tall and fruitful tree species such as coconut, mango, and other fruit trees. *Teba* coral is also used as a place to keep animals in large numbers. Related to environmental conservation, traditional Balinese people also use coral *teba* as a place to dispose of and process waste naturally. This concept is in line with the movement of processing waste from the place of origin which is being programmed by the Balinese government so that no waste accumulates in a certain place (TPA). Universally, *teba* coral becomes a forest owned by each family (locally) so that its

accumulation will support the forest nationally and even globally. The application of the concept of open space by traditional Balinese people is not only in places that are profane, but also places that are sacred such as shrines (temples) and graves (setra).

The concept of a holy place related to open space is *Kahyangan Tiga*. *Kahyangan Tiga* is the name for the three sacred places in a village, namely *Pura Puseh*, *Pura Desa*, and *Pura Dalem*. The concept of heaven three if understood from the point of view of spatial planning resembles a house. The arrangement in a holy place (temple) is done by placing the mass of the building in a certain position so that there is a lot of open space between the building masses. These open spaces are usually in the form of a garden or a stretch of grass that is used as a place of prayer. One of the sacred places (temples) of heaven three, namely the *Pura Dalem*, has a grave area termed setra. Setra is a public facility used by Balinese people as a place for burning and burial of corpses. The form of setra is an open space surrounded by large trees. Related to the setra as in the form of open space, the government of Badung Regency has determined the setra as one of the Green Open Spaces (RTH) as outlined in Article 44 paragraph 1 of the Bali Province Regional Regulation Number 16 of 2009 (Bali Province Regional Regulation Number 16 of 2009). The government's move can be said to be very appropriate because the setra environment is one of the conservation areas for large trees (*kepuh*, *pule*, *banyan*, etc.) which indirectly becomes an ecosystem for flora and fauna.

The whole concept of open space inherited by traditional Balinese people is a guideline in maintaining harmony with nature. The concept of *Hulu-teben*, *Tri Mandala*, *Sanga Mandala*, *Natah*, *Karang Tuang*, *Karang Embang*, *Karang Teba*, *Kahyangan Tiga* and *Setra* is a spatial planning concept to maintain Green Open Space (RTH) both as public and private facilities. These concepts were created with the aim of providing space for plants and animals to survive and reproduce. Humans, animals and plants are creatures created by God, it's just that they are given different abilities. Humans have a complete ability or called *tri premana*, which is able to move, say and think, while animals are *Dwi Premana* (movement and sound) and plants are *Eka Pramana* (movement or growth). Humans as living beings with the most complete capabilities should maintain the survival of other creatures (Saputra et al., 2017).

Floods, landslides, global warming and most recently the Covid-19 disease are a form of resistance from nature (animals and plants) that have been treated arbitrarily by humans. Although animals are only able to move and make sounds, their bodies are equipped with toxins (viruses) that will react if they are in a state of urgency or threat. Natural engineering due to increasing knowledge and technological developments should be aimed at the harmony of the relationship with nature, not destroying it.

Thoughts on the concepts of spatial planning by the Balinese traditional community also have a relationship in the context of efforts to maintain health through natural ventilation and lighting. If understood more deeply, open space plays an important role in preventing the spread of the Covid-19 virus. *Hulu-teben*, *Tri Mandala* and *Karang embang* are spatial planning concepts on a large scale (settlement). The existence of settlements and forests will provide privacy for life between humans, animals and plants. In addition to preserving the environment, humans and animals will feel safe so that interactions with animals that are nuisance or threats can be avoided. *Sanga Mandala*, *natah*, *karang tuang* and *karang teba* are the concepts of Green Open Space (RTH) in a residential environment.

Based on information related to the Covid-19 disease, the spread of the virus is more likely to occur in closed rooms or environments with non-standard ventilation and lighting. The existence of open space in the residential environment and supported by residential architecture that tends to be open will be able to provide good air circulation. This will certainly minimize the spread of the Covid-19 disease, especially in the residential environment and inside buildings. The arrangement of the environment and the mass of buildings in traditional Balinese architecture directs the community to socialize outdoors. In conditions like this, the Covid-19 virus will disappear faster and even die because of adequate air circulation and lighting.

CONCLUSION

The Covid-19 disease started because of the interaction between humans and animals, especially bats. *Hulu-teben*, *Tri Mandala*, *Karang embang*, *Khyangan Tiga* and *setra* are green open spaces (RTH) concepts to maintain a harmonious relationship with nature. The concept provides space and a place for humans, animals and plants to live and reproduce safely. *Sanga mandala*, *natah*, *cast coral* and *teba coral* are Green Open Space (RTH) concepts in a residential environment that can help reduce the spread of Covid-19. Green Open Space (RTH) in residential homes will provide air circulation and adequate lighting to the room.

Tri Hita Karana is a concept that teaches humans to always be in harmony with nature. Humans as beings with the highest abilities should protect other, weaker creatures, not threaten or damage them. The good traditional people in Bali are people who are wise in managing nature. The thinking of traditional society is togetherness and mutual respect among God's creatures without any desire to fulfill individual egos or ideals. These characteristics are the basis of the presence of the concepts of Green Open Space (RTH). Traditional society has the view that if humans respect nature then nature will also, if humans are sick, nature will provide healing. The thoughts and

concepts of traditional Balinese society must continue to be used as a discourse not only to deal with the Covid-19 disease which is expected to be temporary, but to preserve nature and local wisdom so that there are no new similar diseases.

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