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Vertical Infrastructure Development As An Effort to Preserve the Environment

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Abstract. The need for settlements is increasing in line with the increase in population. The available land is very limited, so a solution is needed to overcome this problem so that land conversion does not occur. Infrastructure development in a horizontal direction should be balanced with development in a vertical direction so that green open space can be maintained as an effort to preserve the environment. The pros and cons that occur due to vertical infrastructure development plans are the result of the lack of understanding of related local wisdom, as well as the lack of integrated public awareness to preserve the environment. Vertical sanctity is a local wisdom that can mediate the pros and cons of the emergence of feelings of *cemer/leteh* when entering the lower floors of high-rise buildings and flyovers due to feeling stepped over by people on the upper floors. The problem studied is whether there are challenges in vertical infrastructure development and what is the community's opinion on vertical infrastructure as an effort to preserve the environment. It is hoped that with this study, the research objectives can be achieved, namely wanting to know the challenges faced and how the community thinks about vertical infrastructure development. The method is carried out by structured interviews with relevant stakeholders and obtaining data through filling out questionnaires that are converted into Likert scales. The results of the study obtained are that the challenges faced can be solved through understanding existing local wisdom and vertical infrastructure development is needed to minimize land conversion and maintain environmental sustainability. The suggestion proposed is to always try to explore and preserve local wisdom because of its positive role in efforts to solve problems in the community, and the existence of vertical infrastructure can certainly be stated in written rules / legislation.

Keywords: *Cemer/leteh*, environmental preservation, vertical infrastructure.

INTRODUCTION

The rapid development of the population, followed by developments in the economic, social, cultural, and others, requires the development of adequate infrastructure. Limited land for settlements, industry, and others is a challenge for policymakers in determining infrastructure development. The increase in population is inversely proportional to the existing land supply, even the available land is not only fixed but reduced due to erosion and abrasion. If the settlement and industrial land plan has been fully used, then what happens is other land use efforts such as agricultural land, plantations, or green open land. In this case, it is often referred to as land use change events, and if these events are not immediately controlled it can disrupt environmental sustainability.

In a country or region must have regulations governing infrastructure development, which are regulated in spatial regulations. Good spatial arrangements certainly regulate efforts to preserve the environment. If the population development exceeds the settlement area plan regulated in spatial planning, then in this case policies are often taken to be able to overcome existing problems. The policy taken definitely violates existing rules, or if there have been changes to previous regulations. Whatever is done, it can be ascertained that the activity violates the original rules that have been made. Changes to the initial legality that have been agreed must be detrimental in terms of environmental sustainability, because what is regulated must be changes in existing designations. Environmental sustainability is maintained if land conversion efforts are stopped, or infrastructure development in a horizontal direction is replaced by infrastructure development in a vertical direction, or often referred to as multilevel infrastructure (multi-storey buildings). Therefore, changes to existing legality are not efforts to make changes in land designation or use change, but what is appropriate is an effort to use land as little as possible, but the needs of residential places, industry, and others can still be accommodated.

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The demand for infrastructure development is very large, there is development in regions whose economies are advancing rapidly. Bali as a world tourist destination has its own charm so that it is like sugar that attracts ants to settle in Bali. The increase in population is not only due to biological development, but also due to urbanization by residents outside Bali who complain about their fate in making a living in Bali. This fact has certainly led to demands for increased infrastructure development, both residential, industrial, office, and infrastructure infrastructure in the field of transportation. Bali already has spatial regulations governing the construction of high-rise buildings of a maximum of 15 meters, or equivalent to four-storey high-rise buildings. Construction of high-rise buildings of a maximum of 15 meters, except tower buildings for aviation and security defense purposes (Pemda Prov. Bali, 2009). It is believed that the making of this regulation is definitely based on various mature and thorough considerations, or in accordance with some local wisdom in Bali. However, the development of the times is often not appropriate in making predictions, because with this restriction, many land use changes have been carried out due to the demands of infrastructure development. In the transportation sector, the construction of flyovers has been rejected by some Balinese people, with various reasons that are basically reasonable and acceptable. There is a feeling of *cemer/leteh* for *mesulub* on the road under the flyover, as well as if it is associated with transportation trips with *pratima* (sacred objects) motorcades to pass under the flyover. Seeing the complexity of this problem, it had caused pros and cons among the Balinese people, thankfully it did not develop into a prolonged conflict. Making something good naturally requires sacrifice, therefore it is sought to find a way out not to cause feelings of defeat for those whose opinions are not fully implemented, and whose opinions are accepted do not feel overwhelmed because their opinions are used.

Basically, good infrastructure development is if you always try to maintain environmental sustainability, or in other words, infrastructure development must be in line with maintaining a sustainable environment. Therefore, a more detailed study of efforts to develop environmentally friendly infrastructure is urgently needed, especially those concerning local wisdom and the needs of local communities.

Based on the background description that is the subject of the topic of discussion above, the following problem formulation can be prepared:

1. What are the challenges of vertical infrastructure development?
2. What does the community think about infrastructure development in a vertical direction in an effort to maintain environmental sustainability?

To answer problems that arise based on background and research topics, in general the objectives of research are:

1. To find out the things that are challenges in efforts to develop infrastructure in a vertical direction.
2. Knowing the opinion of the community about vertical infrastructure development in an effort to preserve the environment.

LITERATURE REVIEW

Vertical Infrastructure

As infrastructure in supporting various activities, infrastructure has a very important role. The smooth running of all activities requires adequate infrastructure conditions, so that development in all fields can be carried out as planned. Infrastructure conditions such as buildings that are less safe, do not cause a sense of comfort in activities, so the guarantee is the disruption of productivity in carrying out work. In the field of transportation, if the road and bridge infrastructure is inadequate, such as the condition of many potholes, vertical and horizontal slopes are not good, then traffic becomes less smooth. The capacity of the road is less than passing vehicles can also cause congestion, all of this causes the rate of service is not good so that it affects other fields. Besides, being stuck in traffic can cause stress in driving. Work stress is a natural thing, but side stress can affect the process and work results and performent of a person (Manuaba, A., 1990).

Conventional infrastructure development is generally carried out horizontally or sideways, this reality can lead to a decrease in available land. The effort made is to take new land, which is usually easy to take is land that has been functioned because it is already land, so it mainly has road access. Rice fields and plantation land are ready-to-use land, is often sacrificed for the development of residential areas and for other industrial infrastructure. Due to the use of green open land such as rice fields, plantation land, or urban forests and village forests, it can cause threats to environmental sustainability. Efforts to maintain green open space are very important for environmental sustainability, for example implementing spatial regulations strictly and consistently. Delays in this effort, due to the insistence on demands for economic development and other sectors, are often taken policies with

little violation of existing rules. Generally, policies like this in the future can cause new problems, therefore before new problems arise, the action taken should be a decision without causing other problems. Kamaruzzaman, et al., (2018), the focus of housing provision in Malaysia is affordable housing throughout the country, as an effort to overcome the problem of rising cost of ownership due to economic crisis and limited land.

Eliminating urban forests or green open space to build residential areas and other industrial infrastructure, this can reduce the production of Oxygen (O_2), because green open space full of vegetation are producing O_2 and otherwise absorbing Carbon Dioxide (CO_2). Reduced Oxygen in space can reduce the quality of human health, especially related to the metabolism of the human body. If the lack of Oxygen lasts a long time, it can cause respiratory diseases, this can also cause the quality of work to be reduced and worker productivity also decreases. Development towards verticals or multilevel is an effort to be able to maintain green open space both urban forests, village forests, rice fields, and plantations, because more efficient land use is no longer sideways but through multi-storey buildings. Bevilacqua, et al., (2017), in their study stated that in the European Union through building efficiency can reduce CO_2 gas emissions significantly.

Dynamics of Vertical Infrastructure in Bali

Infrastructure is a basic physical need for organizing a system of structures to ensure that the economy can function properly (Sullivian and Arthur, 2003). Civil Engineering is a scientific discipline that studies infrastructure design, how to plan, build, and renovate not only buildings and other civil infrastructure, but also the development carried out must pay attention to environmental sustainability. Vertical infrastructure or multilevel infrastructure in Indonesia and internationally has experienced very rapid development, evidenced by the number of high-rise buildings, and in the field of transportation flyovers and underpasses are built a lot. While in Bali the development of vertical infrastructure is very slow due to the pros and cons of some people in Bali.

The pros and cons that occur are due to the rejection of some communities against multilevel infrastructure development including flats and flyovers. This rejection may also lead to one of the reasons for the slow development of vertical infrastructure in Bali. Research conducted by Mahajan, et al., (2013), through the Rotary Method applied at intersections with the aim of overcoming problems at intersections such as traffic jams, collisions, vehicle maneuver movements, the results of the study are needed large enough land to be applied to design in intersection areas. The application of the Rotary Method to intersections in Bali, especially intersections in urban areas, is certainly difficult to do because of the limited land for widening intersections. If the word is forced at a certain intersection location, it is also believed that there will be a transfer of land functions such as open land hijua, so that this action can harm the environment due to the clearing of greenery trees around the intersection. This event can cause problems with lack of thermal comfort due to reduced oxygen production, due to this discomfort also affects other factors such as work productivity, and health. According to Medl, et al., (2017), in urban areas a vertical greening system can be carried out by attaching plant pots to the wall, so as to reduce excessive heat due to some being absorbed by green plant leaves in pots, and this idea can affect land use.

Congestion that occurs in Bali, especially Denpasar and Badung, has been tried to find a way out by operating the Trans Sarbagita Bus transportation program (Trans Denpasar, Badung, Gianyar, and Tabanan). But this program was considered unsuccessful due to the lack of feeder vehicles due to the Sarbagita Bus route not being able to reach remote areas. According to Surarelawan, (2018), transportation problems in Bali, especially congestion that occurs cannot be overcome by the Sarbagita Bus, because the bus is also stuck in traffic. The Trans Sarbagita Bus was stopped operating and is now replaced by the Trans Metro Dewata Bus. This change also cannot overcome the transportation problems in Bali, because the conditions experienced by the previous program are repeated, even less attractive to the public so that the bus fleet often operates empty without passengers.

The development of multilevel infrastructure in the field of transportation, in addition to overcoming congestion problems, can also provide opportunities for community creativity to use the remaining space under and around the flyover. Research conducted by Zaman, et al., (2012), on a study conducted on the area under the flyover of two bridges with different locations in Kuala Lumpur, obtained the observation that the remaining space under the flyover can be given to the surrounding community for activities. So other benefits that can be obtained by infrastructure development are not in the same plot besides breaking down congestion, it can also be a place to develop community creativity such as: opening food stalls, cafes, recreation areas, or other business places that are not permanent and not routine throughout the week.

Other studies that examine problems in the field of transportation are Geizdala and Grzebielucha (2010). Research is conducted on intersection areas with traffic modeling, which makes this field very attractive for the field of interdecipliner. The model applied is based on a cellular automaton approach and observation of vehicle movements. The result of the observation is that one can only make qualitative observations, so this model is not

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appropriate to be applied at intersections. Based on these observations, it can be argued that intersection control is still better done by regulating traffic ligth, because it is more effective, and the data can be taken quantitatively. Congestion in the intersection area in addition to the intersection capacity that has been exceeded, and the improper intersection management system, can also be caused by driver behavior that is less desiplin. Violation of traffic lights, use of limits such as markings by drivers can create congestion. Research conducted by Xiaoqiu, et al., (2011), on driver behavior, by adopting statistical methods to determine driver behavior associated with traffic conflicts at intersections. This study is very unique and requires a high focus of attention and accuracy, because it combines driver behavior with intersection characteristics. The capacity of the intersection is really a concern for the driver because during driving his behavior is expected to be in accordance with the capacity of the intersection used in the study. Understanding studies like this is very appropriate to be carried out in Bali, moreover it can be added with existing local wisdom so that infrastructure development is not an acceptable plot. The local wisdom in question is such as: holy – unholy, *hulu* – *teben*, up – down, setting the cardinal directions that follow the location of mountains and seas. Parimin, (1986), conducted a study of local wisdom stating that something that is declared unsacred is given a location in the *teben*, bottom, south, or leads to sea locations such as: the location of pet cages, grave sites, garbage dumps, and so on.

Local Wisdom Related to Vertical Infrastructure

Formal legality is needed in handling the existence of this vertical infrastructure, because through clear regulations authority holders can run according to existing paths. As a concrete example for the use of green lane areas that should not be developed into residential areas, policy holders can strictly prohibit it and the community can openly supervise. Making legality related to vertical infrastructure or not a plot in Bali should also pay attention to existing local wisdom so that it can be accepted by the community. Local wisdom that exists, both written and unwritten, has often been applied in development arrangements such as the function of the building, its size and distance, the materials used, and the height of the building itself. Regional regulations on spatial planning in Bali are one example of setting a maximum allowable building height limit of 15 meters. The making of this regional regulation was prepared based on the consideration of several local wisdoms such as the building made should not be higher than a coconut tree. In accordance with Hindu belief in Bali that coconut trees can be used as ceremonial facilities and infrastructure in religious and cultural processions. Meanwhile, the development of vertical infrastructure such as flyovers and flats in Bali has been rejected by some people, also because of existing local wisdom. If someone crosses the *mesulub* (pass into something) on the lower floor of a high-rise building or under an overpass, then there are people who develop feelings of *cemer/leteh* (a condition that is judged or felt unclean, or dirty). Processions of *Pratima* (statue, image, painting, etc.) bearers in religious processions and Hindu customs, if passing through flyovers and underpasses, then the procession is prohibited from *mesulub* because it can cause *cuntaka* (the state of being impure so that you are not permitted to carry out religious activities such as entering holy places, carrying out rituals, and making offerings) on *pratima* as something that is very sacred by Hindus. The reason associated with this procession of *pratima* is very acceptable, because as religious people can feel something sacred. Therefore, efforts to find solutions must be pursued together. Behind all that, many do not realize that there is local wisdom that regulates the height of the existing space, that it is not limited to the height that exists as a whole can cause a feeling of *cemer/leteh*. The height limit that should not be disturbed in this case can be referred to as the vertical sanctity limitation has been written in several lontar as sacred literature in Bali. In the *Lontar* (ancient manuscript written on palm leaves) *Purwaka Veda* it is stated that vertical purity is as high as Twenty *Guli* above the crown (Budayoga-A, __), and *Lontar Surya Sewana* (Budayoga-B, __). Twenty *Guli* comes from the word *Guli* is a unit of length in traditional *Gegulak* (dimensioning system in traditional Balinese architecture) in Bali which is the length of the segments of both index fingers (length about 2,5 cm). Based on this traditional Balinese calculation, the word twenty *Guli* is equal to 2,5 multiplied by twelve, equal to 30 Cm. Thus this 30 Cm is the vertical sanctity limit measured from the top of the crown (head) upwards, or in other words as high as 30 Cm above the crown there should not be any disturbance. If the height of a multilevel building or other vertical infrastructure has a height exceeding 30 cm above the head, then there is no violation of the height limitation of vertical sanctity. Another ejection whose location is also found to contain the limitation of vertical purity is as high as one *Hasta* (Tinglis, __), means is the length of the arm from the elbow to the tip of the fingers, the average adult is 40 Cm. Another *lontar* that is also found in a different place namely *Lontar Asta Kosala-Kosali* written vertical purity calculated from the lower floor is A *Depa Ngadeg* (Geni, __). A *Depa Ngadeg* is the height of a human being in a standing position with his arms spread up, so the height of vertical purity above the crown is equal to one arm. The height of vertical purity according to what is written on this ejection is equal to 40 cm. Based on the four ejections that contain this vertical

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purity, the vertical purity height of the existing ejections is all still close to each other, so that for safety the largest can be determined, namely that the height of vertical purity is 40 cm.

The Case in Bali About Vertical Infrastructure

The development of vertical infrastructure in Bali had caused pros and cons, as a result of public rejection and acceptance. The occurrence of differences of opinion should be treated seriously, because if the pros and cons are allowed to develop it can lead to conflict. A conflict if left unchecked can be used by various interests and it is feared that this conflict can turn into a dispute between interests which can further become a wider riot. The resolution of the pros and cons should be done through deliberation and a third party is needed as a mediator who must master the problem to be able to provide a solution that can be accepted by all parties. The third party as a mediator in this matter has no personal or group interests and should be able to provide a good and correct understanding to solve the problem. The acceptance of a decision is not only the best solution or the existence of winning and losing parties but is based on the consciousness of the disputant who finally accepts on his own consciousness. Mediators like this must indeed have a much more forward-looking understanding, broader insight, and be able to present a holistic understanding for the sake of mutual interest. Such figures are usually born from academics, researchers, or those who have comprehensive insights, reliable, decisive and charismatic philosophies. The root of the problem studied is thoroughly understood, associated with the interests of each party who are pro and con, and usually associated with existing local wisdom.

The pros and cons of vertical infrastructure development in Bali are due to the feeling of *cemer/leteh* felt when *mesulub* in high-rise buildings or under overpasses and underpasses. The limits of sanctity that have been stated in various *Lontar* as sacred reference, it turns out that there are indeed limits. As local wisdom in Bali, vertical sanctity should be used as an effort to mediate the pros and cons that occur. Local wisdom about vertical sanctity should be maintained for the sake of cultural preservation because its source comes from the religious philosophy of the cosmos imbued with Hinduism. It is believed by the Hindu community that the religion of the cosmos is able to harmonize the relationship of the human psyche with the mortal world which is believed through symbols as a form of relationship between the macro and micro cosmos. According to Puja, (1978), the human body as a whole is expressed as a micro cosmos identified with the universe as the macrocosmos. The micro and macro cosmos are certainly different but are believed to be interconnected to form a unified whole. These harmonious and interconnected differences are referred to as *rwa bineda* (dualistic), which means different but have the same goal.

Humans with all their activities are micro cosmos which is also referred to as *Bhuana Alit*. The macro cosmos realm where human activities, including infrastructure, is macro cosmos which is also referred to as *Bhuana Agung* (Ardana, 1982). These two forms must always try to establish harmony in order for harmony to arise. If in this context vertical infrastructure development is the universe / macro cosmos / *Bhuana Agung*, then it should be able to cause harmony with the user, namely the community. Therefore, the pros and cons that occur in the development of vertical infrastructure are sought to find harmony, such as striving for a high design, vertical sanctity must be in accordance with minimum requirements.

Efforts to Preserve the Environment

Land will be needed in infrastructure development, therefore in its preparation must be regulated in definite regulations, so that there is no change in designation or land use change at risk of damaging environmental sustainability. Infrastructure development in the vertical direction requires less land compared to development in the horizontal direction. With little land needed, vertical infrastructure development is an effort or commitment to preserve the environment. Vertical infrastructure or multi-storey buildings are buildings that have two floors with different elevations. According to Sullivan and Arthur, (2003), infrastructure not on the same plot is included in the Civil Engineering infrastructure group whose physical arrangement of the structural system is well guaranteed. In this case, it is in accordance with the understanding of Civil Engineering organizing that the infrastructure created is to ensure the safety of the structure, including regulating the guarantee of environmental sustainability. Infrastructure development planned by Civil Engineering personnel should also review guarantees to maintain a sustainable environment.

The slow development of vertical infrastructure in Bali is caused by several local wisdom such as: the existence of vertical purity, *tri angga*, *upstream-teben*, and others. The legality of limiting the height of the building to a maximum of 15 meters, or limited to only four floors high, in accordance with the Regional Regulation of Bali

Province Number: 16 of 2009 (Pemda Prov. Bali, 2009). After further study, it turns out that efforts to accept vertical development are also in local wisdom itself, i.e. that vertical sanctity has its limits. Next, it requires the willingness of the community to explore more about the existence of local wisdom that can answer existing problems, especially those concerning infrastructure. Vertical infrastructure development is the right idea to be implemented in an effort to preserve the environment. The problem does not stop there, after the construction of vertical infrastructure, especially high-rise buildings, it can cause disruption to thermal comfort. Problems like this can be overcome by making vertical greening, namely planting attached to the wall. The heat raised can be absorbed by green foliage, then the ambient temperature can be controlled (Medl, et al., 2017). Other issues related to settlements and infrastructure often become polemics in the community, and can even develop into pros and cons. The role of the government in trying to find solutions to these problems is very expected. Kamaruzzaman, et al., (2018), the role of the government is very necessary to be able to provide good and decent housing infrastructure, and the price can be reached by the community. Environmental sustainability is guaranteed if there is public awareness in building infrastructure, and the role of the government in regulating it through strict legality.

RESEARCH METHODS

This research was conducted on vertical infrastructure in Bali, precisely in Badung Regency, because it has two underpasses and many high-rise buildings. The construction of underpasses in Badung Regency has a unique and prolonged history related to permits, because there are pros and cons in some communities. Based on Balinese local wisdom, it can finally be seen that vertical infrastructure development is reasonable to be carried out. Structured interviews were conducted with relevant stakeholders such as: *sulinggih, pemangku*, and Balinese traditional leaders, who are considered to understand local wisdom when it comes to vertical infrastructure. The results of the interview are analyzed qualitatively to be able to prepare a questionnaire containing several questions or statements. Questionnaires are distributed to people who understand about local wisdom related to vertical infrastructure. The main requirement of the questionnaire fillers is respondents who have entered the bottom floor of a high-rise building and have also gone through an underpass.

The initial research data was obtained from direct observation of the research object and the interview process with related stakeholders who understood the research topic. This data is referred to as preliminary data which is then used as a basis for preparing questionnaires. The next research data is the result of filling out a questionnaire which is then analyzed, then after obtaining the results of the study, a discussion is carried out and several conclusions are compiled. The research procedure can be presented as follows:

a. Approach stakeholders who understand local wisdom and vertical infrastructure.
b. Establish research variables, create research instruments including the preparation of questionnaires.
c. Make sure the questionnaire fillers know even if they know a little about local wisdom, and make sure they have met in vertical infrastructure.
d. Complete the required skunder data and ensure that the amount of primary data is sufficient for further analysis.
e. Perform data analysis and then compile conclusions.

The identification of local wisdom such as vertical purity is carried out qualitatively to be able to compile a theoretical framework as a guide for the preparation of statements and questions on the questionnaire. Conversion into the Likert Scale is carried out on the collection of data from filling out questionnaires, then analyzed with a descriptive approach.

RESULTS AND DISCUSSION

The impact of errors in planning infrastructure development areas in the future is very large. Therefore, serious attention should have been paid from the beginning. Due to the rapid development of the population, it shook the determination of the planned area. The imbalance of population with the planned rate of settlement designation often overpowers existing designations. This also happens in the transportation sector, that the number of vehicles that continues to increase is not offset by the addition of road infrastructure, therefore congestion arises at certain road locations. The demand for additional settlement infrastructure will always increase, while the supply of land always remains even under certain conditions can decrease, due to erosion and abrasion in coastal areas. Maintaining the preservation of local wisdom in the community, striving to always develop and always be maintained, because to solve certain problems is very necessary. The complexity of the problems faced in certain conditions can indeed be solved through an understanding of existing local wisdom, because local wisdom is something that has been ingrained in the community and contains social, cultural, and religious values. In religious

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life, social values, customs, and culture have become an inseparable unity as a philosophy of community life, especially in Bali.

To obtain research data, questionnaires were distributed to the community related to the importance of vertical infrastructure development to overcome existing problems. Questions and statements in the questionnaire are directed in such a way that respondents are easy to understand and can answer immediately without needing to be explained at length. Likewise, the answers given are easier to analyze and the conclusions obtained are easily understood by the community. The following questions and statements included in the questionnaire are:

a. It is understood that vertical infrastructure development does exist, and once went into the lower floors.
b. Can building vertical infrastructure minimize land conversion that causes disruption to environmental sustainability?
c. Residents understand that there is local wisdom associated with vertical infrastructure development plans about setting the height.
d. Does there be a feeling of *cemer/leteh* when residents enter the lower floors of vertical infrastructure?
e. What do you think about vertical infrastructure development, is it appropriate to do and continue?
f. Is it necessary to make regulations governing vertical infrastructure development?

Respondents in this study were people who had entered the lower floors of high-rise buildings and had crossed the underpass and stated that they understood the existence of local wisdom related to vertical infrastructure. An explanation of this at the beginning before filling out the questionnaire has been given and if it meets the further requirements, it is welcome to fill out the questionnaire. Respondents as questionnaire fillers seen from their level of education are very qualified so that they can be declared relevant as respondents in this study. In accordance with the results of filling out the questionnaire, the education data of 100 respondents are: educated based on the qualifications of respondents filling out the questionnaire, it can be said that the data provided is quite qualified, because the questionnaire fillers consist of 82% undergraduates, and the remaining only 18% from those with high school education. The following in Figure 1, presented research respondents based on their level of education.

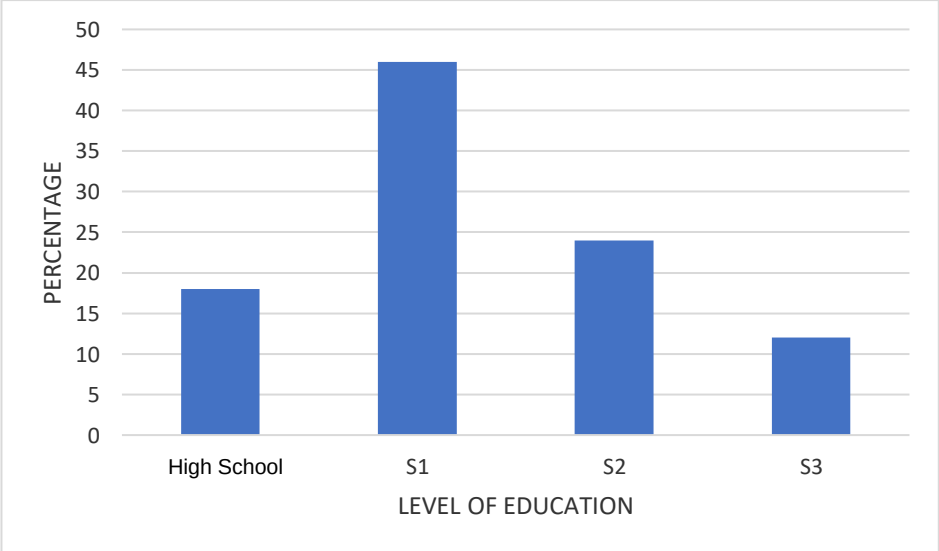

FIGURE 1. Research Respondents by Education level

Based on filling out the questionnaire, data regarding local wisdom were obtained which were associated with the height of the vertical infrastructure on the topic of study. Opinions on the need for vertical infrastructure development and whether or not rules should be made regarding vertical infrastructure development are obtained as research data. The data obtained from the results of the questionnaire are converted from Likert Scale scores, where the answer groups are given scores ranging from numbers one to five. The groups of answers on the questionnaire were successive: strongly agree, agree, neutral, disagree less, and strongly disagree. Furthermore, descriptive statistical analysis is carried out, starting with calculating the average value (mean), then calculating the standard deviation.

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From 105 questionnaire sheets distributed, 102 sheets were collected again. Of the 102 collected, there was 1 blank questionnaire sheet and 1 sheet whose answers were incomplete (not all questions were answered). The next 100 questionnaire sheets are analyzed as stated in Table 1.

TABLE 1. Questionnaire Analysis Results

NO	ANSWER / QUESTION	STRONGLY DISAGREE	DISAGREE	NEUTRAL	AGREE	TOTALLY AGREE
1	a)	-	-	22	46	32
2	b)	-	-	18	42	40
3	c)	1	1	24	38	36
4	d)	1	2	19	46	34
5	e)	-	-	12	55	33
6	f)	-	-	10	54	36
AVERAGE		0,3	0,5	17,4	46,8	35,0

After conducting the analysis as shown in Table 1, it can be shown that on average 35% of respondents expressed strong approval of vertical infrastructure development. A total of 46.8 percent answered in favor, 17.4 percent neutral, only 0.5 percent disagreed, and 0.3 percent said strongly disagree. Based on the table, it can also be illustrated that 81.8% of respondents stated that vertical infrastructure development is necessary. The most important thing from the data is that there is a relationship between local wisdom and high design of vertical infrastructure, therefore this local wisdom really needs to be preserved because it can be the basis for making attitudes and decisions that are quite complicated in the community. Furthermore, the data showed that 17.4% answered neutrally, because in principle the meaning contained in vertical infrastructure has not really been understood. Local wisdom that has a very important role in answering the problems in the vertical infrastructure development plan has also not received serious understanding. Their experience of passing or entering vertical infrastructure is only perceived as something ordinary and has not taken great and noble meaning when associated with efforts to minimize land use change, as well as efforts to reduce the environment. Meanwhile, from the next data, as many as 0.5% expressed disapproval, and 0.3 answered strongly disagree. Statements like this do happen to some people who do not want to *go* into the lower floors of high-rise buildings or enter the underpass. Exceptions like this in a small number of people in Bali experience it, because if forced the *mesulub* concerned can experience headaches. Based on the interview with the person concerned that if there is a violation of this *mesulub* incident, it must be redeemed by observing certain ceremonies and must rest for a few days. Therefore, because there are quite severe challenges, it is better for him not to enter *mesulub* downstairs on vertical infrastructure. A complete picture of the average results data of the questionnaire distribution is presented in Figure 2.

In order to better understand the need to regulate the height of vertical sanctity as local wisdom that plays a role in vertical infrastructure, Figure 3, displays the need to pay attention to the vertical distance from the crown to the lowest part of the part or construction of the upper floors of a multi-storey building.

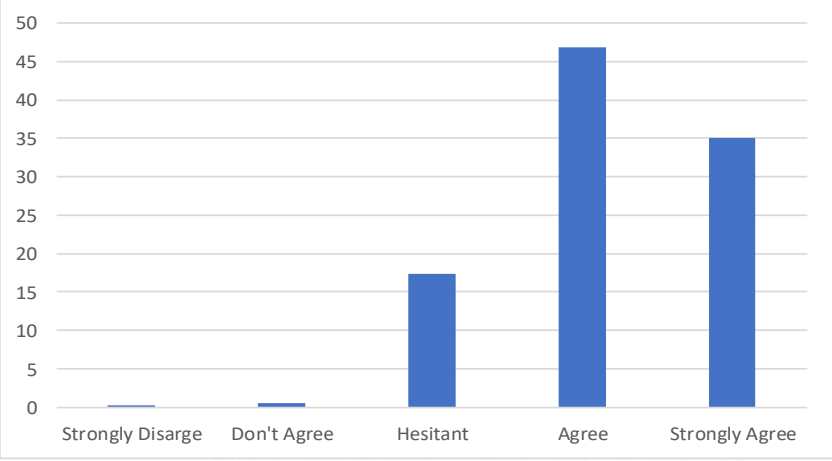

FIGURE 2. Average Results of Questionnaire Data

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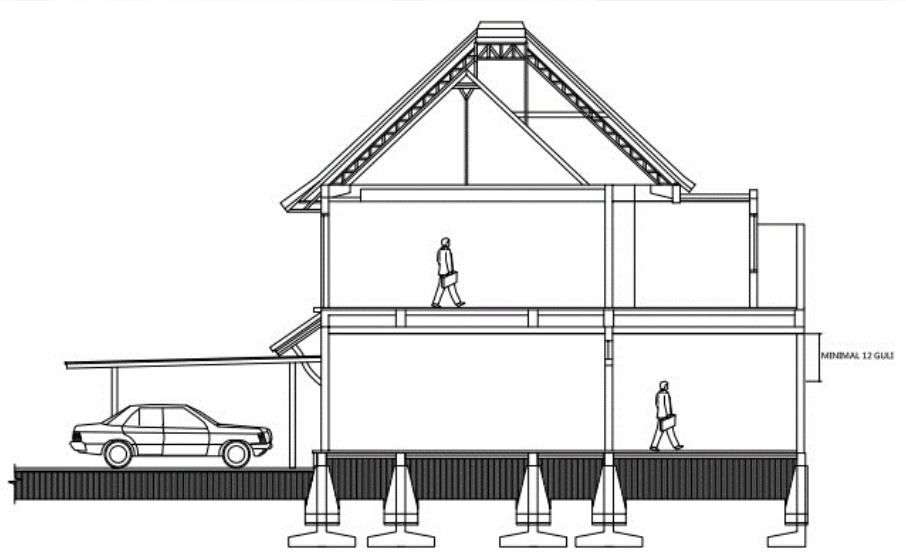

FIGURE 3. Vertical sacredness distance over the crown

Building vertical infrastructure is an answer to the problem of procuring residential areas due to the increasing population. As a result of continued use, there is a demand to increase the area of residential land, because more development is carried out in a horizontal direction, while vertical infrastructure development has been rejected by some communities so that pros and cons arise. This is where the presence of local wisdom is needed as a mediator in overcoming the pros and cons that occur. Initially, local wisdom regulated about vertical purity as high as *Dua Dasa Guli, A Depa, A Hasta, A Depa Ngadeg*, is used for layout arrangement, the height of the upakara required for the ceremonial purposes of Hinduism. The ancestors of the Balinese people have predicted that this arrangement is also needed for the arrangement of existing infrastructure for wider interests, this is evidenced by the regulation of vertical sanctity in *Lontar Asta Kosala-Kosali*. The design of the space height of each floor of a multi-storey building should be guided by a minimum height of vertical purity (Wibawa, 2020; Wibawa dan Maharani, 2022). To better understand this local wisdom, it is necessary to dig deeper into this ancestral heritage, and furthermore intense socialization is needed such as by conducting Focus Group Discution (FGD). It is hoped that by understanding about this local wisdom, it can minimize the occurrence of pro and cons, so that land conversion is also reduced, and environmental sustainability is guaranteed.

Although FGD has been carried out and understanding of local wisdom has been socialized, in accordance with the results of questionnaires and interviews with relevant stakeholders that it is felt that it is very necessary to ensure the existence of this vertical sanctity contained in an official regulation. Over time, usually something that has been discussed is often forgotten, therefore it is necessary to make regulations that regulate its legality such as regional regulations, both at the provincial and district levels. If vertical infrastructure development is regulated in an official legality, then infrastructure development in a horizontal direction can be reduced, this means that green open land can be maintained. The survival of green open areas means environmental sustainability. Green open land containing green plants is needed by the human body, because green plants are able to absorb CO_2 and can produce O_2. The need for oxygen in the human body is absolutely necessary, because if there is a lack of oxygen can cause disruption of metabolism and reduce the performance of one's appearance. So vertical infrastructure development is appropriate as an effort to preserve the environment.

CONCLUSIONS

In accordance with the results of research that has been analyzed and discussed, the following conclusions can be compiled:

a. The main challenge in vertical infrastructure development is the occurrence of community pros and cons. Some people refuse because of the feeling of *cemer/leteh* if *they go* downstairs. The community does not understand the importance of vertical infrastructure to preserve the environment and local wisdom that regulates vertical sacredness.

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b. The community mostly accepts vertical infrastructure development, because it is believed to reduce land use change, maintain green open areas, and maintain a sustainable environment.

Based on the conclusions that have been formulated, the advice that can be given is to continue to try to reduce development in the horizontal direction and start doing more infrastructure development in the vertical direction. The obstacles that arise can be solved by understanding and applying local wisdom as a fair heritage, and the seriousness of the government and related stakeholders to realize it in a written regulation that is implemented consequently.

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