

Road Development Program of Isolated Area in Nusa Penida Islands as an Important Determinant of Tourism Development: An Application of “Tri Hita Karana” Concept to Project Evaluation

Nyoman Budiarta Raka Mandi, Ida Bagus Putu Adnyana,
Made Dodiek Wirya Ardana and I. Wayan Suweda

Department of Civil Engineering, Faculty of Engineering, Udayana University, Bali, Indonesia

Abstract: Nusa Penida Islands, off the Southeast coast of Bali, Indonesia with its fragile environment, traditional society and marginal economy are highly dependent to Bali Island as its mainland. Tourism development as an economical activity in Nusa Penida Islands is very important considering its geographical limitations. Sustainability is a major issue in Nusa Penida tourism which was identified as having negative impacts (e.g., incompatible development, loss of intangible culture, pollution, wear and tear) caused by the surge in traffic and infrastructure. This study applies “Tri Hita Karana” concept (e.g., Parahyangan, Pawongan, Palemahan) and project evaluation methods to measure the growth of tourism development through its road development program of isolated area in Nusa Penida Islands. This study is the first comprehensive study to explicitly position this preservation planning challenge within the field of cultural tourism management. Field study and data were obtained through questionnaire by taking into account area development, technical and economical aspects. The result of this study shows that the application of “Tri Hita Karana” concept brings a different perspective especially in terms of environmental and cultural conservation. The road development program of isolated area in Nusa Penida Islands was already considered as feasible to begin in 2020, supported by these program evaluation indicators with an interest rate of 18%: NPV of Rp. 181, 090 million BCR of 1.59 and IRR of 24.72%.

Key words: Tri Hita Karana concept, tourism transport infrastructure, isolated area, Nusa Penida Islands, tourism management, environmental

INTRODUCTION

During the seven years period (2010-2016), tourist’s arrival in Indonesia experienced an average increase of 9.47% each year. In 2016 there were 12.203 million people arrived in Indonesia, an increase of 15.54% compared to 2015 with 10.405 million people (Anonymous, 2017). This figure is expected to keep increasing up to 10% on average annually. The increase of tourists arrival will push up the demand on facilities related to tourism services such as restaurants, hotels, transportations, etc. which would encourage society’s income and spending.

Bali as one of the most popular tourist destination in Indonesia, the holder of Award for Asia’s Best Resort Destination, located between the islands of Java and Lombok, covering 5, 636 km² or 0.29% of Indonesia’s territory. Even though Bali is relatively small, it has the potential as a tourist destination. This statement is

supported by the increase of tourists arrival in Bali both domestic and international. Nusa Penida Islands are the few among other popular tourist destinations in Bali in 2016 there were 4.92 million people arrived in Bali which was an increase of 23.14% compared to 4.01 million people in 2015 (Anonymous, 2012) and 439, 061 international tourist who visited Nusa Penida sub-district in 2016, (Organization of Sanur custome village, 2016 in (Adnyana, 2016) an increase of 35.89 % compared to the year 2015 of 281, 468 as shown in Table 1.

The increasing economic and social activities in Nusa Penida Islands is currently not supported due to inadequate road network and road segments which are not meeting the standard required by Director General of Bina Marga under the Ministry of Public Research. Besides, today’s origin-destination movement between islands or in the island is still being served by traditional motor boats in small scale to serve the demand to several

Table 1: Number of tourists to Nusa Penida Island through sanur port

Months	2015		2016		Growth	
	Local (Person)	Foreign (Person)	Local (Person)	Foreign (Person)	Local (%)	Foreign (%)
January	13.000	18.000	23.009	27.868	43.50	35.41
February	13.200	18.186	20.646	39.729	36.07	54.22
March	16.354	15.292	21.147	28.050	22.67	45.48
April	26.560	18.990	19.359	31.374	(37.20)	39.47
May	21.628	21.969	25.069	33.896	13.73	35.19
June	20.686	23.107	23.639	33.878	12.49	31.79
July	26.158	31.623	23.599	50.752	(10.84)	37.69
August	23.128	39.175	23.208	54.797	0.34	28.51
September	20.688	28.098	23.897	40.571	13.43	30.74
October	22.734	28.210	23.344	39.823	2.61	29.16
November	30.907	18.274	21.686	29.503	(42.52)	38.06
December	25.079	20.544	23.840	28.820	(5.2)	28.72
Total	260.122	281.468	272.443	439.061	4.52	35.89

Organization of Sanur Custom Village (2016)

destinations. To anticipate the economic growth of Nusa Penida Islands there is a need to prioritize the road development as tourism transportation infrastructure.

Tourism affects every aspects both socio-cultural and environmental, especially in Nusa Penida Islands area which have the same sensitivities as small islands in general. Recently, there is a public perception among the Balinese society that tourism activities are considered as destructive.

Destructive to Bali culture to its environment and to its people. At this stage the aggravation of local communities are starting to be publicly expressed through various means where some might be considered as explosive. For example, the refusal of reclamation on Bena bay which until now still left conflicts and frictions within the society.

Diedrich and Garcia-Buadas (2009) study also discusses the importance of considering local reactions to tourism as an element in monitoring programs for tourism management, this study also found that local opposition to tourism was in fact became a leading indicator of decline. This situation should encourage the need to evaluate transportation's role in tourism, especially, for sensitive area that covers the utilization of zoning in determining the area for developing tourism infrastructure by integrating socio-cultural and environmental aspects. To understand and assess tourism impacts in communities with the goal to maintain sustainability and long-term success of the tourism industry.

The approach in valuing tourism investments on tourism transportation's infrastructure commonly uses corporate financial valuation (e.g., NPV, IRR, B/C ratio). These approaches are tend to be biased due to its main focus on infrastructure's operational. While it is impossible to provide a feasible financial performance in tourism transportation's infrastructure projects without any funds (Adnyana, 2016; Mandi, 2011, 2017) that is why, valuation should not only focus on the road unit but also to revenue and costs from other sectors supported

by the road itself. This study should be able to identify tourist's motivation and experience in determining their destination and then formulate into an integrated model.

“Tri Hita Karana” (THK) is a concept based on the principle of harmonious life which consists of three interrelated elements. These three elements are: *parahyangan* which refers to harmonious relationship between human and God, *pawongan* is the harmonious relationship between human to one another, *palemahan* is the harmonious relationship between human and the environment. Therefore, there is a need for evaluation, by applying THK concept on tourism transportation infrastructure project especially road construction plan in Nusa Penida Island's isolated area so as to accommodate local cultural values held by the people involved in tourism development. This concept is one of local wisdom in Bali that can serve as a basis to realize the effort of developing tourism infrastructure.

The goal of the application of THK is to identify best practices for assessing and managing the limits of acceptable change for historic island, affected by tourists traffic and infrastructure, so that, both residents and tourists can continue to benefit from them.

Based on the background, this study/research should be able to identify) how to integrate tourism, transportation and land use related to the steps in controlling accessibility and mobility to and into tourism destination which will be able to optimize the benefits to the surrounding's economy) how to plan road network optimally which can provide the most benefit to tourists and surrounding's economy and formulate it in an integrated model. This integrated model will form the basis for determining the alternative location of Nusa Penida ring road that meets the technical requirements and has an optimal economic impact while at the same time taking into account local cultural values.

Basic approach: The purpose of this study is to illustrate the concept of “Tri Hita Karana” and its implementation



Fig. 1: Road network on Nusa Penida Island

process. To keep in mind this purpose, procedure to combine THK and benefit-cost analysis is developed as it is regulated by the standard on technical feasibility, financial and other social economy impact.

Tourism infrastructure development program's content and form are mostly based on the improvement of transportation. Tourism is about travel and transportation hold an important role in tourism exploitation. Based on prior statement, the implementation of THK concept in improving infrastructure and transportation service through the construction of Nusa Penida's isolated road which is surrounded by environment that is rich in biodiversity. Therefore, the main approach in this study is the impact on ecology, degradation of tourism destination, tourist's experience and economy.

Road development program of isolated area in Nusa Penida Island: Nusa Penida is one of the islands that are under the development of new tourist destination in Bali with its travel characteristic that are getting dominated by tourism trips as the day goes by. Characteristics of travel for people in Nusa Penida are divided into several variations of mode and travel purposes. Besides that travel characteristic also covers goods delivery for crops, farming goods and fishery.

Travels are mostly composed in the Northern and Eastern area of Nusa Penida. This is because the area is flat has dense population have various business centers, the place for center of sub-district government with its availability of main ferry port and other services resulting in relatively dense travel condition and traffic. While travels with direction to the western and southern area of Nusa Penida show the opposite condition. Hilly terrains are not well developed there are only unpaved village

roads which function as local access, mostly because the connection to sparsely populated villages and tourism area with its current potential is still not discovered. (Adnyana, 2016) also mentioned that one of the major challenges in marine transportation study for small islands in Bali is to identify the connection between transportation and production centers such as tourism area and residential area as well as the degree of dependency between the movement of the passengers and tourist destinations.

Total length of roads in Nusa Penida area is 235 km. The construction of roads along the coast in this area has not yet existed. However, several inter-village connecting roads already reached Western and Southern coast as shown in Fig. 1.

Based on the background above, road development program of isolated area in Nusa Penida Island can provide substantial economic benefits to the region, state and the nation in terms of resource development, employment, personal income, business revenue and taxes.

The application of Tri Hita Karana (THK): THK concept has already been implemented in Bali provincial regulation, since, 2012 about Bali's cultural tourism which emphasizes on the importance of THK in developing Bali's tourism (Anonymous, 2012). Therefore, ideally every tourism development activity in Bali including construction of tourism transportation infrastructure such as construction on isolated road in Nusa Penida really indicate the application of THK concept.

Asta Kosala Kosali is a regulation that regulate the layout and building in Balinese society which is one of the inseparable part of local wisdoms in Bali as a matter of

Table 2: Evaluation based on the concept of THK

Tri Hitha Karana (THK)	Tool	Actors
Parahyangan	Limits of acceptable change	Government, developers, head of traditional village, residents
Pawongan	Culture impact assessment	Government, head of traditional village, preservation professionals
Palemahan	Environmental impact statements	Developers, government, residents

fact it is the concrete form of “Tri Hita Karana” application (Anonymous, 2014). Initially “Asta Kosala Kosali” was made as a guideline in building Pura or temples in Bali. However, Balinese society’s life which are mostly Hindus grew rapidly to adapt to today’s development, “Asta Kosala Kosali” was made as the guideline to build anything in Bali including urban and regional planning.

According to Wirawan (2011) Tri Hita Karana (THK) was originated from the Sanskrit. Originated from the word Tri which means three, Hita means welfare and Karana means cause. The meaning of Tri Hita Karana is three main points that causes welfare and prosperity in human’s life. This concept is closely related to the existence of Balinese social life. It begins from the lifestyle that is related to the existence of traditional village in Bali. Not only it causes the existence of territorial alliance and fellowship based on mutual interest in society, it also is the fellowship in mutual beliefs to worship God or Sang Hyang Widhi. Thus, characteristic owned by traditional village in Bali should have a minimum of three main elements such as: territorial, society and holy places to worship God/Sang Hyang Widhi. As for the elements of THK embrace the relationship between human and God (Parahsyangan), relationship of human with each other (Pawongan), relationship between human and the environment (Palemahan) in this case the territory for traditional village is organized, so, it can provide means to perform those three elements in life which are: devotion to God, live with the purpose of giving to each other (mapunia) and to preserve sarwa prani or the environment. So that, these three relationship are harmonically sustainable. That means the construction of isolated road in Nusa Penida is the implementation of THK concept called palemahan.

Construction of Nusa Penida ring road based on the concept of THK, namely pawongan is a form of participation from the society and stakeholders done in two steps: the initial step, formulating regulations and procedures for the program; The next step is to implement it continuously to obtain feedback from the society regarding changes in planned layout, economy and culture. Due to Nusa Penida’s South-West ring road plan, a Focus Group Discussion (FGD) was already held on 2 November 2014 located at Nusa Penida’s Sub-district UPT building, attended by Klungkung’s Regent, PU Head of Department in Klungkung, Head of Nusa Penida’s sub-district and a team from Faculty of Engineering Udayana University. The participant consists of official

village head, traditional village head and Nusa Penida’s public figure. Strategies for the implemented assessment of THK concept as see in Table 2.

Mission, purpose and philosophy for road construction:

Now a days, natural attractions and tourism management have become the focus of many researches. Tourism affect every environmental aspect. According to Khadaroo and Seetanah (2007) if the quality of environment decreases, this would force the tourism central planner to disinvest in order to protect and preserve environmental quality standards. Which might halt or even stop the road development program. Therefore, there is a need to study the connection between environment and ecologically sensitive areas such as small islands in Nusa Penida. Because these kind of areas often offer the most tourism potential (Sorupia, 2005). Increasing number of visitors to remote area might cause the degradation and damage to resources, this encourages the need to evaluate transportation role in tourism (Sorupia, 2005).

The mission and purpose of constructing isolated road in Nusa Penida is for the improvement of society and economy diversification, especially, through the utilization of most local resources without damaging surrounding environment.

MATERIALS AND METHODS

Evaluation based on the concept of Tri Hita Karana: The construction of Nusa Penida ring road should put more effort on preserving surrounding environment. This can be realized by implementing eco-friendly systems and periodic environment maintenance to preserve the environment’s natural beauty, also to support feedback and discussions between stakeholders and surrounding society in the context of environment and safety. Then the harmony between stakeholders and surrounding society can be realized.

The evaluation of isolated road in Nusa Penida based on the concept of “Tri Hita Karana” in this study employs qualitative approach with the emphasis on discovering, explaining and describing the knowledge descriptively, holistically and interpretatively according to matters that are related to the study’s purpose. This study require interviewees and informant who knows about construction of Nusa Penida’s isolated road whose residents are affected by the project, head of traditional

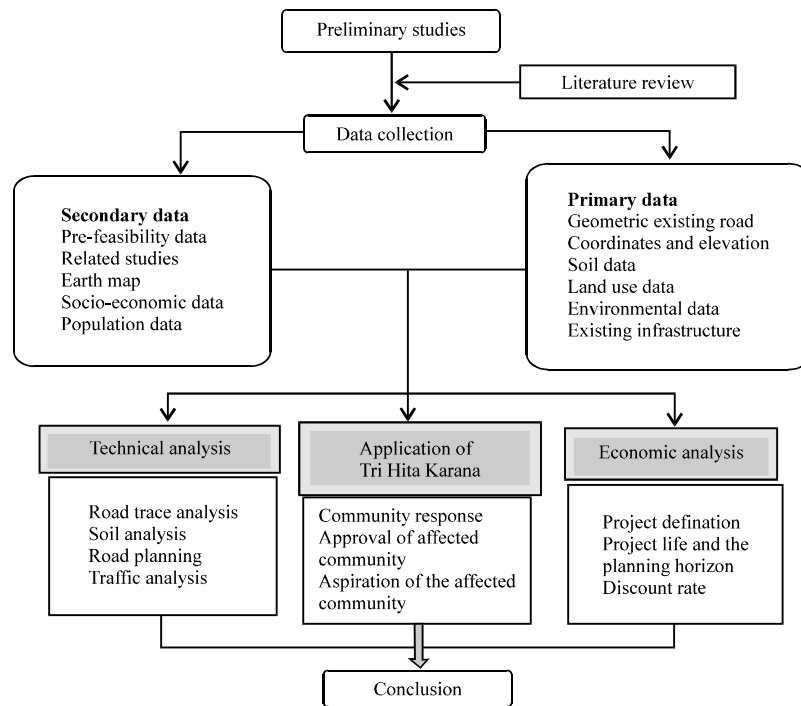


Fig. 2: Research procedure

village and head of official village, head of sub-village, sub-district office of Nusa Penida, regent and related local government apparatus. The data were obtained through observation, interview and inspection of document. While data analysis in this study was done by following qualitative data analysis procedure which are: data reduction, presentation of temporary data, data interpretation and drawing a conclusion. These data analysis procedures were done in a repetitive manner, not in a one-time analysis. The initial data that was obtained would then be reduced, presented, interpreted and after that led to a temporary conclusion. However, if the results were not considered as adequate enough to answer the research's question in this study, the procedure should be redone until satisfying result in the form of data or information is obtained.

Technical analysis: Initial information on road trace plan was obtained from field data search and topography data from Development Planning Agency in Bali Province. Positions of polygon plots (coordinate and elevation) was reviewed in the field. Then, longwise and cross section road trace plan, so, it can be identified if there is a problem related to sloping, cut and fill occurred. After that road trace plan compatibility is evaluated following the standard geometric road collector speed plan of 60 km/h.

After road trace plan is set, it is followed by obtaining soil data (e.g., DCP, sondir and boring) according to the needs required by this road plan

(isolated area road plan). From the data obtained, then soil condition would be analyzed which covers soil bearing capacity and soil layer's structure.

The chosen alternative for road trace plan, then technical road planning is made which covers: geometric plan, pavement, bridges, water tunnel, drainage channels, as well as complementary needed buildings.

Traffic analysis covers the existing condition and projected travel needs in the future. Analyzing the existing condition by embracing the analysis of collector road performance in isolated area of Nusa Penida. The projected travel needs would cover the projected traffic burden on the planned year, beginning of year plan 2020 and ending of year plan 2045.

Benefit-cost methodology: The purpose of benefit-cost evaluation, total project investment covers every construction and repair costs which are needed both by public sector and society to obtain the benefit identified from the application of THK.

Investment indicators are calculated with the assumption of high traffic growth (\$7.76/year) and year plan of 25 years. The project's benefit-cost will be evaluated every 5 years. If the year plan exceed evaluation period, the residual value would be determined by using straight line depreciation method and tabulated as benefit. In general, stages of activity in this road development in Nusa Penida's isolated area is shown in Fig. 2.

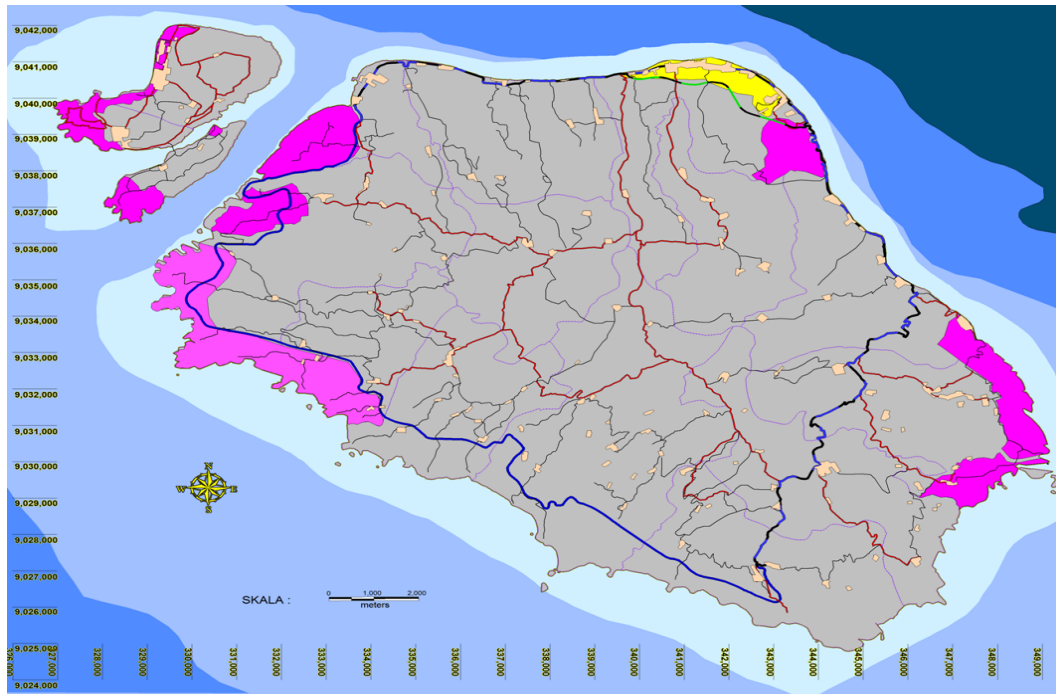


Fig. 3: Ring road or isolated road in Nusa Penid

RESULTS AND DISCUSSION

Problems on transportation and Nusa Penida's ring road construction needs: Common traffic problem in Nusa Penida, regarding linkage and relationship inter and intra-region, especially, between villages is the existence of a road network discrepancy between Northern and Eastern of Nusa Penida with Western and Southern of Nusa Penida. This is clearly visible from status, road function, road length, pavement condition also geometric and traffic burden distribution. This discrepancy is clarified from road service aspect where road network system in Northern and Eastern of Nusa Penida is relatively congested with its traffic problems which are more crucial. There were already congested and queuing traffic in Northern and Eastern areas. This problem arises as a result of the magnitude of the trip attraction and trip production which are caused by the existence of seven ports in this part of area. While Western and Southern of Nusa Penida with its rare road network and relatively long distance have empty traffic.

According to, the study on Nusa Penida area and the existing distribution network, it is visible that the need to realize road infrastructure is urgent in equitable development in Klungkung Region, especially, the latest sub-district. Infrastructure development have to be supported by other alternative solution in an integrated manner such as development in public transportation and traffic management. Nusa Penida's ring road is a collector

road network that is urgently in need to be improved based on the direction of Bali urban planning and Klungkung urban planning to connect and serve regional transportation equally.

The alternatives: The alternative plan on the new road trace in Southern and Western of Nusa Penida Island. The road corridor have a distance of approximately 1 km from coastline, this new road corridor coverage is intended to optimize the improvement on tourism potential in Southern and Western part of Nusa Penida. Road corridor coverage covers Nusa Penida's isolated areas that are located in five villages which are: sakti, Bunga Mekar, Batu Madeg, Batu Kandik and Sekar Taji. The research location is as shown on Fig. 3.

The total trace of Nusa Penida's ring road is the combination of new trace in the Western and Southern coast also the improvement of existing road class in the Northern and Eastern of Nusa Penida. Moreover, trace/route of Nusa Penida ring road is planned through road plan to avoid dense residential areas. From the calculation and measurement that had been done, the length of trace/route for Nusa Penida's ring road is 60, 150 km, consists of 29, 650 km of new trace and 30, 500 km of the existing trace on repair.

Developing the Tri Hita Karana concept: Referring to Klungkung's urban planning in accordance to Bali's Urban Planning which applies the analysis following the

principle of THK as the basis of urban planning policies, where harmonious relationship between the three elements in the universe is implemented to area planning:

Parahyangan: Harmonious relationship between human and God, it can be attributed with Nusa Penida’s potential as spiritual tourism (Tirta Yatra) because there are many temples (Pura) that generally are visited as Tirta Yatra destination by Hindus people especially those who lives in Bali. This is why the construction of ring road in Nusa Penida must take into consideration the mobilization of Tirta Yatra activities or other religious activities that exists within Nusa Penida society, it should not disrupt or degrade social facilities’ quality, especially, those related to ritual activities.

Pawongan: Harmonious relationship between human being with one another, implemented by accommodating society’s movement from residential area to one another through the construction of ring road in order to increase the effectiveness of social activities in Nusa Penida. Besides, tourism effective area which is called Kawasan Efektif Parawisata (KEP) in Indonesia was already planned which will become economy center for the society, so, the ring road construction must pay attention to the relationship between effective areas of tourism to one another.

Palemahan: Harmonious relationship between human and nature means for every ring road planning stages and in order to bring more benefit, it need to pay attention and increase environment quality. The construction of Nusa Penida’s ring road need to minimize the damage done to environment and pay attention to conservation area in particular.

Economy analysis: Lin *et al.* (2007) discusses the importance of considering the economic rationale of public investments such as road construction while also taking into account the preservation of natural and cultural heritage types in order to support sustainable models for tourism development. The study applied different approaches in estimating the economic benefits of tourism. The study mentioned two approaches: economic analysis based on multipliers cost-benefit analysis which are also employed in this study. This study aims to realize this design into physical form, it need a certain amount of costs. The required amount of construction costs need to be estimated according to pre-design construction from the road trace. Other than construction costs, it also need to estimate land costs and costs arises from negative impact of the chosen road trace, for example, compensation on buildings that were affected by the project, the handling of socio-cultural, also environment that were affected negatively. The estimated investment costs is Rp. 482,172,117,108.

Table 3: Improved multiplier effect due to international

Multiplier coefficient	Total (Rp.)
Tourism effect to GDP	229,526,233,560
Tourism effect to regional income	22,399,230,600
Tourism effect to employment	63,508,406,760
Total	315,433,870,920

Analysis based on year 2014

Table 4: Summary of economy analysis

Description	Values
Valuation indicators for operation yuear 2020-2045	
Interest 12%	
NPV (Million. Rp.)	645,823
BCR	2.59
IRR	24.72%
Interest 15%	
NPV (Million. Rp.)	353,302
BCR	2.01
IRR	24.72
Interest 18%	
NPV (Million. Rp.)	181,090
BCR	1.59
IRR	24.72%
Sensitivity in the assumption of interest 18%	
Increased cost 15%	
decreased benefit 15%	
NPV (Million. Rp.)	61,606
BCR	1.17
IRR	20.18%

The benefit of construction on improving Nusa Penida’s ring road is composed of direct and indirect benefit. The direct benefit is costs saved on road users and increased income for those who are involved in tourism business. While the indirect benefit is multiplier effect in the form of an increase in GDP, regional income and more job opportunity.

Because of this project, the quality of road service is improved in the form of comfort and safety. Increased in road service quality is projected to be able to increase international tourist’s visit to tourist destination in Nusa Penida, especially, Nusa Gede. This condition is projected to attract as much as 25% or 36, 600 international tourists continuing their tour to Nusa Penida. Around 36, 600 international tourists visiting Nusa Penida Islands would assume a two days tour and spending on average \$200/day (international tourist average spending). Then, the additional spending by international tourists in Nusa Penida would reach Rp. 210,816,288,000 (\$US 1 = Rp. 9,000). International Tourist’s additional spending for every Rupiah (Rp.). Brings multiplier effect on the increase of GDP, regional income and employment as much as Rp. 315,433,870,920 caused by international tourist’s spending as explained on Table 3.

Investment indicators is calculated with the assumption of high traffic growth (7.76%/year) and the year plan is 25 years. Construction costs was determined based on the estimated costs already discussed on previous chapter. Summary of the ring road’s economy analysis can be seen in Table 4.

CONCLUSION

The application of THK concept has provided a different point of view, especially, in terms of environmental and cultural conservation that put sustainability and harmony as priority to bring benefit for nature's preservation and human as the resident of this universe without ruling out God as the creator. Therefore, THK is the best possible alternative that can be implemented into "Road Development Program of Isolated Area in Nusa Penida Islands as An Important Determinant of Tourism Development".

Trace/route West-South is the chosen one located in five villages (Desa Sakti, Bunga Mekar, Batumadeg, Batukandik and Sekartaji) as long as 29,650 m. The feasibility analysis shows that the construction of Nusa Penida ring road is feasible in terms of technical, environment, area development and economy aspects. Nationally, Nusa Penida is one of the 88 strategic national tourism areas which is called Kawasan Strategis Pariwisata Nasional (KSPN) in Indonesia where 11 of them are located in Bali Province, so, the area development aspect to support tourism become the determining aspect for road feasibility of isolated area in Nusa Penida.

According to economy feasibility indicator obtained, the plan on Nusa Penida ring road construction is feasible economically to be opened in year 2020. This is supported from economy indicator of: NPV, BCR and IRR with interest rate 18% as follows: NPV = Rp. 181,090 million, BCR = 1.59 and IRR = 24.72%.

Nusa Penida's ring road construction feasibility level, is quite sensitive against investment risks especially if costs incurred increase to 15% and benefits gained dropped to 15% with interest rate 18%. This is shown from the change of economy indicator in NPV, BCR and IRR as follows: NPV = Rp. 61,606 million, BCR = 1.17 and IRR = 20.18%.

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