Social economy indicator on constructing forest sustainability in Bali

Indicador de economia social na construção da sustentabilidade florestal em Bali

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Abstract

The forestry issue has been discussed in the United Nations Framework Convention on Climate Change. Deforestation is caused by the industrialization oriented towards economic growth, ignoring environmental issues that can cause global warming. In Bali, sustainability has been applied for a long time. This can be proved by the existence of tumpek wariga that appreciates and respects the plants and is an embodiment of environmental sustainability as a manifestation of local wisdom. However, this is insufficient if one remembers the fact that the condition of Bali's forests has been distorted. This analysis aims to know the simultaneous and partial influences and the most dominant determinants affecting forest sustainability. Within the lifetime data and analysis of adaptive partial adjustment model double log, this analysis found the fact that simultaneously and partially Gross Regional Domestic Product (GRDP)**,** the number of citizens, the regional autonomy policy and forest sustainability condition in the previous year have significant influence on forest sustainability during the period of this analysis. The amount of citizen variable is the most dominant variable toward forest sustainability because it obtains the highest standardized coefficient data of 0,292. Based on the analysis, results and discussion, one concludes that forests have to be well maintained, conserved and utilized in balance for everyone's prosperity in today's generation and for the sake of next generations. Correct management is needed for a sustainable development especially in long-term capacity through internalization and negative externalization which is caused by economic development.

Keywords: Gross Regional Domestic Product, Number of Citizens, Regional Autonomy, Local Wisdom, Partial Adjustment Model.

Resumo

A questão florestal tem sido discutida na Convenção-Quadro das Nações Unidas sobre as Alterações Climáticas. A desflorestação é causada pela industrialização orientada para o crescimento económico, ignorando as questões ambientais que podem causar o aquecimento global. Em Bali, a sustentabilidade tem sido aplicada há muito tempo. Isto pode ser comprovado pela existência do *tumpek wariga* que aprecia e respeita as plantas e é uma encarnação da sustentabilidade ambiental como uma manifestação da sabedoria local. Contudo, isto é insuficiente se recordarmos que o estado das florestas de Bali foi desconsiderado. Esta análise visa descobrir as influências simultâneas e parciais e os determinantes mais dominantes que afetam a sustentabilidade florestal. Nos dados e análise do modelo de ajustamento parcial adaptativo de registo duplo, esta análise constatou que o Produto Interno Bruto Regional simultâneo e parcial, o número de cidadãos, a política de autonomia regional e o estatuto de sustentabilidade florestal no ano anterior têm influência significativa na sustentabilidade florestal durante o período da presente análise. A variável do cidadão é a variável mais dominante para a sustentabilidade florestal porque obtém os dados de coeficiente mais elevado padronizado de 0,292. Com base na análise, resultados e discussão, conclui-se que as florestas têm de ser mantidas, conservadas e utilizadas em equilíbrio para a prosperidade de todos na geração atual e para o bem das próximas gerações. É necessária uma gestão adequada para o desenvolvimento sustentável, especialmente a longo prazo, através da internalização e externalização negativa que é causada pelo desenvolvimento económico.

Palavras-chave: Produto Interno Bruto Regional, Número de Cidadãos, Autonomia Regional, Sabedoria Local, Modelo de Ajustamento Parcial.

1. Introduction

Natural resource is an environmental important aspect. Humans live and grow within the benefit of natural resources around them such as land, water, air, flora, fauna, microorganism, mineral and energy (Sikor et al., 2010). On the issues of global warming which causes climate change, natural resources, especially from forests, become the main focus to reduce the effect of global warming (Sunderlin et al., 2014). Thus, it indicates the importance of forests for the human life. Forests have various functions based on economic development, which forests were free sector back then.

In Bali, the topic of environment rescue had been an old heritage since long time ago. It can be shown by the existence of particular ritual which called *tumpek wariga sebilang enem sasih* that has a purpose to appreciate the existence of flora which indirectly become the source of environment conservation. Besides, through the concept of *Tri Hita Karan*, an orientation of concept on human relation with other human, environment and God become an important issue from the old day until now. In Bali tradition, there is a place called *alas angker* to regularly maintain Forest Sustainability, and there is also *pakelem* on forest or mountain. Total forest in Bali are 130.686.01 hectares which is divided on 8 districts and a city, except Gianyar district which has no forest at all. Those forests constitute 23,20% of the total area of Bali (Badan Pusat Statistik Provinsi Bali, 2013)

Tabel 1 Total Area of Forest on each district 2019

City/District	Total Area (ha)	Total Forest (ha)	Percentages of Forest compared to total area		
			District (%)	Province (%)	Forest Province (%)
Jembrana	84.180	42.156,27	50,08	7,48	32,26
Tabanan	83.933	9.969,15	11,88	1,77	7,63
Badung	41.852	1.779,87	4,25	0,32	1,36
Gianyar	36.800	-	-	-	-
Klungkung	31.500	1.048,50	3,33	0,19	0,80
Bangli	52.081	9.341,28	17,94	1,66	7,15
Karangasem	83.954	14.220,23	16,94	2,52	10,88
Buleleng	136.588	51.436,21	37,66	9,13	39,36
Denpasar	12.398	734,50	5,92	0,13	0,56
Provinsi Bali	563.286	130.686,01	-	23,20	100,00

Sumber : *Dinas Kehutanan Provinsi Bali, 2019*

Forest condition in Bali experienced a big pressure by the destruction of forest safety, it reduces the area of forests and endangers critical land with resources for Bali, which caused the macro climate conditions in Bali by increasing the heat of the weather and drying the sources of water resulting on an imbalance and destruction on nature. This destruction is caused by several factors, such as people living in the area, irresponsible human actions which cause wildfires, illegal logging and taking other resources illegally.

One of the important factors that have to be faced in order to create further development is how people should rescue their environment without sacrificing economic development and social justice (Blowers, 1993). Several people depend on the business of selling the forest's resources, so in order to stop exploiting nature, an economical improvement that lasts long-term must be put in action, thus protecting the environment and protecting human life. In order to understand the economical condition of the area is to know about the development of Domestic Product Regional Bruto and each capita value of development of an area (Sanjaya, 2018). The growth of the population is another factor to consider, this caused an increased demand on improving their basic and superior needs. These needs make humans use

natural resources, which ends in exploitation. Furthermore, it will be more impactful if there is a regional autonomy regulation, which is a double-edged sword, it will improve people's social life but it will destroy the environment conservation.

As one of development strengths, Forest Sustainability needs to be correctly maintained and improved on its qualities (Subandi, 2016). Bali inherited a program of environmental conservation a long time ago. It can be proved by the existence of *tumpek wariga* ritual every six months on the Bali calendar and the implementation of *wana kerthi*. Those rituals are still not enough to prevent environmental destruction, since Bali forest also has a distortion of safety, the area of forest is reduced, and the land is in critical condition in forest areas has increased. Furthermore, the development of social economic indicators has brought a big influence toward forest preservation. Therefore, it needs scientific knowledge related to Forest Preservation which is expected to become the basic knowledge and a policy, thus, *sawala* of economic social justification will not be crucial when it comes to issues toward the environment. This is a new concept of this analysis, which is supported by empirical data, taking in account social variables, developing the concept of *dummy variables*, and using an analysis model of *Partial Adjustment Model* (PAM). Moreover, this analysis becomes urgent because it has a purpose to analyze the influence of Domestic Product Regional Bruto, the number of citizens, regional autonomy and Forest Sustainability in previous periods simultaneously and partially, and it has a purpose to understand what kind of variable influences the Forest condition in Bali the most.

2. Research Methodology

The data used here, is secondary data which has obtained from 1993 to 2019. Argumentation used from 1993 as the first year of data, the number of earliest requirements in data testing, while 2019 is the latest year that exist based on the data. Another data sources in this analysis is primary data and another secondary data. Primary data comes from the result of *adjustment* publication and the description by other related instances, arranged interviews with government informants enlighten the organizations regional instrument such as: Statistical Main Instantiation, Development Plan and Regional Development Instantiation, Environmental Instantiation, Forestry Instantiation, Stakeholders, Bali Environmental Facilities, Bali Greenpeace Committee. Secondary data on the Gross Regional Domestic Product was obtained from the official publication of the main statistical institution of Bali, the Forestry Institution of Bali.

This research used interpretation of Forest Sustainability which counted the forest that has no destruction. This research used and application of econometric dynamic model *Distributed Lag* within the technique of *double log* on Forest Sustainability of Bali was carried out by computer application *software eviews 9.0* (Winarno, 2011). Before regression model testing, need to do the test toward data stationerity of time with stationerity test, cointegrity test, continued to basic assumption test (such as linearity test and normality test) then classical assumption test (multicolinerity test, heteroscedacity test and autocorrelation test) in order to make the model become *Best Liniear Unibiased Estimator* (Ghozali & Ratmono, 2017). Data analysis technique used here is regression analysis *Linear Partial Adjustment Model* within the method of *double log* to know the influence of independent variable toward dependent variable, the ec=xample will be explained as below:

$$LnY_i = \beta_0 + \beta_1 LnX_{1i} + \beta_2 LnX_{2i} + \beta_3 LnX_{3i} + \beta_4 X_{4it-1} e_i. \quad \text{.....} \quad (1)$$

Description :

LnY_i = Forest Sustainability from 1993 to 2019
LnX_{1i} = Domestic Product Regional Bruto
LnX_{2i} = The amount of citizen
LnX_{3i} = Regional Autonomy Policy
$LnX_{4i\ t-1}$ = Forest Sustainability in previous year
$\beta_1,\beta_2,\beta_3,\beta_4$ = Coefficient Regression
β_o = Intersep
e_i = erorr term estimation
i = Observation – i

3. Result and Discussion

3.1. Validity test *Time Series*

The data used here need to get a validation test which include stationary test and cointegration test.

Stationer test

Stationer test is used to know the characteristic of data in observation, where the data is expected to have a low variance that is not really far from it means number.

Tabel 2 Stationer test result

Variable	ADF Score	McKinnon Critical Score			Information
		1%	5%	10%	
Forest Sustainability	-3.565	-3.724	-2.986	-2.632	Stasioner in ordo (1)
DPRB	-4.916	-3.724	-2.986	-2.632	Stasioner in ordo (1)
People amount	-4.726	-3.724	-2.986	-2.632	Stasioner in ordo (1)
Autonomy Policy	-5.000	-3.724	-2.986	-2.632	Stasioner in ordo (1)
Forest Sustainability	-3.494	-3.737	-2.986	-2.632	Stasioner in ordo (1)

Sumber : Analysis Result, 2020

Based on stationer data test in table 2, it can be concluded that all the data currently in stationer condition. It can be seen by the ADF (Augmented Dickey Fuller) score which smaller than critical score of McKinnon on signification 5 percent.

1)Cointegration Test

Cointegration test is important on developing a model that creates an econometric dynamic. Thus, the interpretation towards the model will not be mistaken, especially for long-term analysis. The cointegration test result will be explained on table 3 that indicated how the variable of foreign investment have cointegration with the entire independent variable. It can be seen by the value of *Likelihood ratio* that bigger than critical value within the level of 5 percent.

Tabel 3 Cointegration Test Result by Johansen test between Forest Sustainability variable and each independent variable

Independent Variable	*Eigenvalue*	*Likelihood Ratio**	Critical Value 5%	Information
DPRB	0.478	16.589	15.49	Interval lag 1 to 2
The amount of citizen	0.286	19.930	15.49	Interval lag 1 to 2
Autonomy Policy	0.187	17.990	15.49	Interval lag 1 to 2
Ln Yt_{-1}	0.700	28.903	15.49	Interval lag 1 to 2

Source : analysis result,2020
Information : * *Likelihood Ratio = Trace Statistic*

3.2. Classic Assumption Test

1) Normality Test

Normality test has a function to test the significance between independent variable and dependent variable through that will only be valid if its distributed reducial counted as normal (Wijarjono, 2015). This analysis using the model of Jarque-Bera (J-B) compared J-B with its probability. Based on the data processing, it is known that Jarque-Bera value is 1205 with probability level of 0,547 which means probability value is more than the actual level used (5 percent). This means that the data has been normally distributed.

2) Linearity Test

Linearity test used to observe whether the variable of this analysis has linear correlation or not significant. Linearity test of this analysis used Ramsey test, which consists in comparing the significant value with actual level used (5 percent). It is indicated that the probability score of 0,246 is bigger than the actual level which is 0,005 which means estimated specification model is linear within trust level of 95 percent.

3) Multicollinearity Test

Multicollinearity test in this analysis done within Klien test model which compare lower cases (correlation between each independent variable) if R^2 y Xi, Xj ....Xn > r^2 Xi, Xj....Xn thus, there are no multicollinearity happening in this analysis. based on the test output, it is explained that double coefficient linier determination value (R^2 = 0.989) is bigger than coefficient determination result of all regression auxiliary for domestic product regional bruto (0,905), the number of citizens (0,967), the regional autonomy policy (0,814) and the Forest Sustainability in previous year (0,981), it can be concluded that there is no multicollinearity problem inside the model.

4) Heteroscedasticity Test

Heteroscedasticity test has the purpose to observe if there is any unbalance variance inside the model, from one observation to another observation. In this analysis, Heteroscedasticity was done by using the model of Harvey test that compared the probability value and its actual level used. Probability value has to be bigger than probability significance of 5 percent to make the model indicated as has no Heteroscedasticity. This model obtained 0,354 for variable domestic product regional bruto, 0,201 for variable of the amount of citizen, 0,953 for variable regional autonomy policy and 0,081 for variable Forest Sustainability in previous period. It can be concluded there are no heteroscedasticity problem of this model.

5) Autocorrelation Test

This analysis used Langrage multiplier test to analyse if there is any autocorrelation problem of this analysis or not. This model obtained the value of Obs* R Square 0.230 bigger than the actual level of 5 percent, it means that this model did not contain autocorrelation problem.

3.3. Distributed Lag Estimation Result

In this part of analysis, the model used is econometric dynamic distributed lag within the support of software Eviews 9.0. This analysis model has a purpose to understand the influence of domestic product regional bruto, the number of citizens, the regional autonomy policy and Forest Sustainability in previous

years towards Forest Sustainability in Bali from 1993 to 2019, whether it is simultaneously or partially. The summary of data analysis result using Eviews 9.0 can be seen on table 4 below.

Table 4 The estimation of Bali Forest Sustainability in 1993 to 2019

Variable	*Coefficient*	*t Statistic*	Sig
DPRB	0.047	2.712	0.044
People	0.064	- 3.068	0.027
Autonomy Policy	0.013	1.632	0.042
Forest $_{t\_1}$	0.053	4.208	0.034
Constant = 11.762		*F Statistic* = 517.270	
R *Square* = 0. 989		Sig = 0.000	

Sumber : Analysis Result, 2020

3.4. The Influence of the entire variables for short-term capacity

Simultaneously, all the included variable such as Domestic Product Regional Bruto, the amount of citizen, regional autonomy policy and Forest Sustainability has positive and significant influence toward Forest Sustainability from 1993 to 2019. Statistic test results showed how significant has been to reach the actual level of 95 percent. Economical growth is a process, not just temporary description of current economical condition. Regional and sectoral development should be done together in order to reach development in every region, this can be implemented based on its potential and regional priorities. Domestic Product Regional Bruto is the amount of additional value of every business and services of the region, applying the entire amount of goods and services produced by every economic unit. Every country has been agreed that to measure economic prosperity of a nation, the indicator used would be related to the value of product national bruto each capita (Suparmoko, 2016). The higher the amount of Product National Bruto (PNB) each capita is, the more prosperous a nation is. However, some argue that in order to obtain nation prosperity, extraction of resources is needed, which is why the development of a policy with solutions for this problem must be made, with alternatives, sustainability and consequences for those who does not follow it (Prabowo, Bachri, & Wiwoho, 2017).

In this era of decentralization, Indonesia developmental thinking has been moved from justice and balance to centralization governmental system. Related to the increasement of citizen, there will be higher demand for goods and services to fulfill their daily needs. The increased number of goods and services will need more natural resources to be produced. High growth of people can cause natural resources degradation because there are many forests areas that will be used as living place. The relation between the amount of citizens, economical growth, and environmental resources can be simply described by how people will develop, their economical condition will develop, and the demand of good and services also increase to maintain the level of people that live in a nation. However, if this demanded that products need to increase, natural resources will experience degradation, besides within the economical development, environmental pollution will be increased. Furthermore, it can be concluded economical development will cause two sides effects: The positive effect will be related to human life, there will be much value of goods and services, people will easier to obtain their daily needs. On the other hand, the negative effect will influence the environment. There will be a lot of pollution, and natural resources will be decreasing.

3.5. The Influence of Domestic Product Regional Bruto toward Forest Sustainability in Bali 1993-2019

Coefficient estimation value of Domestic Product Regional Bruto (DPRB) $\hat{\beta}_1 = 0.047$ It means that domestic income regional bruto has increased for a thousand, thus, Forest Sustainability in Bali will be increased for 0,047% within the other independent variable include as constant. It also applied for the opposite; if the domestic income regional bruto decreased for a thousand, thus Forest Sustainability will be decreased for 0,047% within the assumption of another independent variable is constant. This analysis obtained a result of significant and positive influence between Regional income toward Forest Sustainability in Bali. This is in line with the analysis of Panto (2003) which showed that Forest and its various functions happen not only on the economical side but also environmental side that has a very important role on the development process. Regarding to the analysis of Simon Kuznets, environmental conservation has an influence toward economical development which theoretically emerge from the theory of Environmental Kuznets Curve (EKC). This theory explained that the development of technology in a developing country tends to experience natural resources degradation while a developed country, did not experience any natural resources degradation even if they followed by the development of technology. Based on that finding, the curves for Environmental Kuznets Curve is reversed U letter (Gupito, 2012) The right method to reduce the unbalance between growth and economical development toward environmental quality is to develop an economical growth based on environmental knowledge and apply the concept of sustainable development. Economical development within environmental based is a sustainable development concept which is not only concerned on short-term capacity but also has a concern for long-term capacity, considering the balance between economical development and environmental conservation which is indicated by zero sign of social destruction and natural destruction (Gupito, 2012). Therefore, economical development based on environmental knowledge is one way to solve the problem on natural destruction during economical development in several developing countries.

3.6. The Influence of amount of citizen toward Forest Sustainability in Bali 1993-2019

Coefficient estimation value of total citizen $\hat{\beta}2 = 0.064$ It means that if the amount of citizen increased by million, therefore Forest Sustainability in Bali will increase 0,064 percent within the assumption of another independent variable is constant. Dynamic between people development and deforestation is not a novel issue, several studies claim that people development is the cause of deforestation in Indonesia (Hosonuma et al., 2012; Margono et al., 2012). This case makes sense because the amount of citizen in Indonesia was almost 250 million people in 2013 within the high population rate, 1,7 percent each year (BPS Data, 2018) Citizens is the main factor of Forest Sustainability. Rin line with the analysis of Krisna et, al (2018) indicates that human live together with the environment. Most cases indicated that many people lived near forests, which threatens forest sustainability. However, people in Bali are different; they tend to get along with nature ad forest. There are many people in Bali who even though they live close to the forest they have not tried to harm it, they tried to maintain it while living under the balance of nature.

Regarding to Bali traditional culture, an important term to mention is *Tri Hita Karana* which means there should be a balanced relationship between humans and their environment. One of Hinduism core beliefs is that balance between human and environment should be obtained by human effort on religious actions and rituals, after all, according to the religion, God is present in nature. A research by Sunderlin & Resosudarmo (2014) supported that people high-rate population will cause the demand of new land, whether it for

place to stay or for economical activities, Forest area become the main target of this demand. However, the opinion of population as the only cause of forest degradation is not totally right. Many other aspects behind the high population growth that contribute to deforestation need to be explored further. Basically, on interpreting causality correlation between human and environment based on Vedas (scripture) and Hindu basic framework called *Tattwa*, *Susila* and *Acara*. *Tattwa* thought provide a deep philosophical thinking regarding it main belief and forestry concept. *Susila* thought is a framework to behave based on norm, and *Acara* is a framework to connect oneself with *Ida Sang Hyang Widhi Wasa* within the traditional ritual as it basic law. Whoever and whenever it is, human purpose of life is to obtain physical and spiritual happiness. Hindu holy people formulated their life purposes withi *Moksartham Jagadhita Ya Ca Iti Dharma.* More detail, they believe there are human life purposes which called *Catur Purusa Artha (Dharma, Artha, Kama, Moksa)* and three main causes of happiness called *Tri Hita Karana (Parhyangan, Pawongan, Palemahan)* which contain the principle of regional development in Bali. To manifest those purposes of life, Hindu taught four lifestyles called *Catur Marga* which contain of *Jnana* (wise thinking), *Karma* (work based on norm), *Bhakti* (full of love) and *Yoga* (discipline life). It should be realized that the environmental burden in supporting development will be heavier and harder. Natural harmonization will be more real and quite difficult to reach or even have irreversible point of damage if people do not take this matter seriously. If a point of disharmony has reached a clear climax, the power of natural production will not be restored, and there will be misery. To be able to preserve the environment, it is necessary to raise public awareness, humans must be aware and no longer desire to conquer nature and its surroundings. Utilization of natural resources must be based on policy of maintaining harmony and balance.

3.7. The Influence of Regional Autonomy Policy toward Forest Sustainability in Bali 1993-2019

Nowadays, forestry policy developments are experiencing ups and downs due to the pressure from inside and outside the country. There are several problems regarding the forest which cause some new issues. Because forestry problems are not only about forest and land conversion but also about other elements such as social, economic, and even political conflicts. National strategy for forestry management until today still has not been able to meet the clear vision and mission as a result of spatial planning that has not been completed, thus, it can cause further conflicts and problems. The impact of decentralization of forestry policies in the era of regional autonomy has generally not shown the expected results. The distribution of authority to local governments has caused the emergence of stigma and shifting mindset where it increasing local incomes is main priority when they obtain a great responsibility to manage their own regions without financial support from the central government to maintain their activities. On the other hand, unclear definitions of administrative authority and misunderstandings are found among central government, province and district toward decentralization tend to be obstacles of regional forest development. Moreover, the authority for Regional government whether it is for Mayor or Regent, it is important to make forest management licenses for private sector has made a significant contribution to regional efforts on increasing Regional Original Income. However, as the concern regarding the extent of degraded forests arises due to forest exaggerated use, big institutions carelessly avoid the rules of sustainability and only concerns with its economical benefits. Even though the local people are the main target of empowerment effort in the era of regional autonomy, the local people has not received any reasonable and sustainable benefits.

3.8. The Influence of Forest Sustainability in Previous years toward Forest Constancy in Bali 1993 - 2019

Statistical findings for Forest sustainability in previous years indicated that t value has positive score of 4.208 which is bigger than critical value t table of 1.721. Statistical analysis result t test of forest sustainability in previous year gain the significance of 0,034 which is smaller than the error rate of α = 0,05, thus it can be concluded that the previous sustainability has positive and significant impact toward forest sustainability in Bali 1993-2019.

The obtained result of this analysis regarding an influence of forest sustainability in previous years toward forest sustainibility in comparison with the most recent year in Bali indicates that the previous forest sustainability can be used for this current era within the notes that people must maintain it sustainability. Conception of Hindu teaching *Tri Samaya* especially *Atita* must take an important role in decision making and organizing a plan for the forest sustainability policy. It is proved through the observation that regression of habits and values of the regions culture result in positive value of 0,053 which is estimated that the previous sustainability would increase by 1 hectare, therefore the current sustainability of forest in Bali will experience an increase by 5,30 percent within the assumption of independent variable included as constant. in the other word, the current forest sustainability is influenced by previous year condition. current condition *(Wartamana)* is reality owned by people and *Nagata* (future condition) influenced the plan, because current organized planning can be used to know future opportunities, predict the upcoming obstacles and decide the plan to overcome every obstacles to create sustainability.

3.9. The Amount of Citizen as Dominant Variable which influenced Forest Sustainability in Bali 1993-2019

Based on the value of *standardized of coefficient beta* can be known that variable of total citizen is the most influenced variable on this analysis with standardized of coefficient beta value of 0,292. Compared to other three variables 0,037 (DPRB), 0,053 (previous year sustainability) and 0,028 for regional autonomy. The quality of environment will be well maintained if humans are able to manage the carrying capacity of limit between the minimum and optimum. Organizing capacity below the minimum is a condition of resources that are not used properly, whereas if it approaches or exceeds the maximum carrying capacity there will be a risk in environment, such as environmental pollution. The carrying capacity of environment will be optimally functioned if it did not have any population pressure on itself, in other words the population amount and the available resources in the environment are balanced. This condition is hardly found in developing countries. The reality faced by developing countries in general is that, urban environment gained large population pressure while in rural areas, resources are not optimally used. People are the main actor of environment sustainability. It is in line with the analysis of Krisna (2018) which explained that human life must be side by side with environment. Hinduism also taught them about environment conservation. Humans may have a rule over nature, regulate, occupy and enjoy within the conditions of it devotion. Bhakti is compassion realized in the form of *Yadnya*. Making sure the environment is harmonious is part of the obligations and needs for Hindus. Inside *Atharwa Weda* XII:1 explained that:

Satyam brhad rtam naram diksa tapo brahma yajnya prthirviam dharayanti

Likewise in the Tri Sandya mantra explained that:

Om bhur bhvah swah
Om Narayana evedam sarwam yad bhutam yasca bahwyam

Mahadewa sarvaprani hitam karah

This means:

Om is an earth, sky and air.
Narayana is all of this, which has always existed and will be there
Mahadewa give grace to all beings

Thus, damaging, and polluting environment means insulting God. Inside *lontar agastya parwa* and *Arjuna Wiwaha* (Hindu Traditional Literature) explained that there are three actions which cause happiness for people. Those three actions called as *Tapa,* Yadnya and *Kirti. Tapa* means life under control and holding fast to the truth, *Yadnya* means sacrificing their ego and *Kirti* means doing real work to create a harmonious relationship among God, human and nature. Related to those explanations, there are six *kirti* that has to be applied on this universe conservation 1) *Jagat kirti* (earth conservation), 2) Samudera *kirti* (marine conservation), 3) *Danu kirti* (lake conservation), 4) *Jana kirti* (preservation among humans), 5) *Atma kirti* (self-conscious) and 6) *Wana kirti* (Forest Conservation). Besides Hinduism concept about life purposes, environmental conservation (forest), which also applies on every religion literary text. Rituals that specifically correlate with nature conservation are also performed such as the *Bhuta Yadnya* ritual which is intended to harmonize and purify the universe to reach Bhutahita or *Jagadhita*. According to Hindu the basic elements that build nature called as *Panca Maha Bhuta (Pertiwi, apah, teja, bayu dan akasa). Panca Maha Bhuta* formed by a subtle element called *Panca Tan Mantra* which consists of *gandha* (smell), *rasa* (taste), *sparsa* (light), appearance (form), *sabda* (sound). This taught is foundation of love toward natural environment in Hindu. Bali is the right place to obtain those concepts. The concept of *Segara-giri or pasir ukir*, *Padma Bhuwana* until *Tri Hita Karana, Tri Mandala, Tri Angga* and other Hindu teachings, this is the argument which underlying in Bali that the dominant population is the variable that influences forest preservation.

3.10. The Influence of All Variables in Long-Term Capacity

For coefficient constant and long-term coefficient, counted by the amount of regression in short-term coefficient divided by δ which δ = (1 - 0.053) = 0.947, δ = 0.947 is an *adjustment coefficient* means a participated coefficient of Forest Sustainability similar with the estimation Forest Sustainability. In this case, it needs an adjustment time of 0,947 x 12 months = 11,36 months = 341 days.

The contribution of natural resources for economical development until 1930 explained that a region economical condition in one area or development of people in one area can be seen by how much those areas owned natural resources. Until today, there are many that state that the country experiences poverty, which is a conclusion that results on their own experience because they lack natural resources. The limitation of low income in countries is caused by not existing enough resources whether it is based on quality or quantity. Contribution of natural resource will become lower, but based on the reality, if a country have more advanced in economical strength based on quantity, the variant of it natural resource will change from potential natural resource to a real natural resource. Factually, there will be more concern regarding economical growth and economical development, there are many natural resources that need to be processed, and it will reduce the existing natural resources, especially non-renewable resources, however renewable resources will be harder to get. Though they are renewable, if these resources keep being used, and they are not carefully used, they will become a rare item. Moreover, the activities of Forest Sustainability can not be separated with the aspect of planning, which means deciding rationally and strategically what activities

should be done in the future in order that economical and social growth do not interfere with the environment.

4.

Conclusion anda Implication

4.1. Conclusion

The result of this analysis showed that simultaneously and partially, Domestic Product Regional Bruto, the number of citizens, regional autonomy policy and Forest Sustainability from previous years have significant influences towards Forest Sustainability in Bali, from 1993 to 2019 within the trust level of 95 percent. Variable of people number is a determinant that has dominant influence on Forest Sustainability in Bali that carried out the value of standardized of coefficient beta with highest number pf 0,292.

4.2. Implication

Forest as the source of development has real benefit for human life, whether it ecologically, social culture or economic in dynamic way. Therefore, people need to take care of nature, to protect it and use it well, being a responsible citizen to ensure the prosperity in Indonesia, for both the current generations and the next generations. Natural resources management and its relation with the environment not only is considered beneficial for temporary resources but for long-term capacity. This can be done by internalization of negative externality which caused by economical development and strong commitment to conserve the forest. Thus, it will be related to governmental vision of Bali which called as *Nangun Sad Kerti Loka Bali*.

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