SIMULATION OF DYNAMIC SYSTEM
MODEL IN THE DEVELOPMENT OF GREEN ENVIRONMENTAL TOURISM TO INCREASE ECONOMIC GROWTH IN PANGANDARAN

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Abstract

Pangandaran as a new autonomous region has a great potential in tourism, such as Pantai Pangandaran, Cagar Alam Pananjung, Pantai Batu Hiu, Pantai Batu Karas, Pantai Madasari, Green Canyon, Citumang. Therefore, this vision of Pangandaran is: "Pangandaran in 2025 became a worldwide tourism district, a place to stay safe and comfortable based on religious norms".

In Pantai Pananjung tourism, there are many things remaining to be managed. They are road infrastructure and other facilities such as garbage management, street vendors and parking arrangement.To realize this vision, it is necessary to create a model that is most appropriate to develop tourism through the development of green tourism. Therefore, the authors conduct research on "Simulation Model Dynamic Systems Development of Sustainable Tourism to boost economic growth in Pangandaran".

The Objective of this research are the development of Pangandaran Tourism Zone conducted by Tourism Agency of Pangandaran Regency, the recent environment condition of coastal attraction of Pangandaran; the economy growth of the people in Pangandaran Coastal in the last three years; Dynamic system model of the development of coastal attraction of Pangandaran need to be applied by The government of Pangandaran Regency;.

The result shows that the development of tourism of Pantai Pangandaran is influenced by socio- economic conditions and the environment and the ability of financial resources. They have implications for economic growth. Socio-economic factors such as national and local Budget investment and the 3rd parties to conduct the development of sustainable tourism. It means that the cooperation must be conducted among the Government, the Local Government and the third party to allow eligibility financially to carry out sustainable development. However, sustainable tourism development is inseparable from the preservation of the environment. Therefore, the construction is obliged to implement the environmental analysis that is capable in overcoming garbage as the impact of increasing population and a number of visitors. Therefore, the pollution of air, soil and water can be prevented. Furthermore, an increase in investment, the productivity of agriculture, industry and service sectors increased will increase people's income and foreign exchange area and the GDP as well as the ability of curbing inflation and ultimately to increase regional economic growth.

Keywords: dynamic system, tourism, green environmental, economic growth

INTRODUCTION

Pangandaran Regency is decided as the centre of tourism development of Province West Java. It will develop if all supporting sectors handled maxmimally. The commitment of The Government of Province West Java to create Pangandaran Regency as the centre of tourism development absolutely should be supported by all stakeholders.

However, the government of Province West Java still have obstacles to be solved such as road, trash handling, street vendors, parking arrangement, etc. In order to create a good tourism, re-operating Banjar – Pangandaran – Cijulang train track idea should be consider optimally. At this time, the road conditions are still much damaged and the repairing process is still ongoing. The discourse to re-operate the tourist train should also be supported by all parties. It means that many things must be repaired to realize the plan.

The effort to create Pangandaran as tourism area should be supported by good public services. It is important for the improvement of the public service quality is a key to make Pangandaran as a tourism city in Jawa Barat realize.

Pangandaran should be designed to be a sustainable tourism area by giving consideration to environment sustainability. It will works if the authority involve the people to preserve it. Planting Mangrove in Bulak Setra is a part of Sustainable Tourism through Energy Efficiency with Adaptation and Mitigation Measures" (STREAM) program obtaining the grant from World Tourism Organization to revitalize Pangandaran after tsunami disaster. An accurate spatial is also an important thing

in making Pangandaran as a sustainable tourism area. In fact. the management of green tourism development is done by all work units unintegratedly rather than by the specific work unit causing work overlapping among work units in Regency Pangandaran. Therefore, the regulation on Spatial and Zona Arrangement Plan in Pangandaran for the comfort and beauty of the tourism area must be realize soon. They are location arrangement for street vendors, the improvement of infrastructures, etc. It means that the authorithy must consider the zone arrangement providing space for street vendors, fishing boats, tourism boats, restaurants, hotel, and other public services.

The Objectives

The objectives of this research are as the following:

1. The development of Pangandaran Tourism Zone conducted by Tourism Agency of Pangandaran Regency;

2. The recent environment condition of coastal attraction of Pangandaran;

3. The economy growth of the people in Pangandaran Coastal in the last three years;

4. Dynamic system model of the development of coastal attraction of Pangandaran need to be applied by The government of Pangandaran Regency;

5. to determine the conditions and characteristics of the place within the next 10 years oriented to social, economic and environmental.

The Development of Green Tourism

Tourism is the need of all human being entire the world. Once the increase of the welfare and prosperity of a nation in

economy, the man nature will appear to do travelling to avoid routinity for a while in order to obtain the balance, harmony and happiness of their life (Gamal Suwantoro, 1997). Oka A Youti (2010:37) argue that tourism is a journey for pleasure. While, Macintosh (1995: 55) in Oka Yoeti (2010) said that tourism is a number of symptoms and relationships that arise, interaction among tourist, companies providing services for tourist, and the government and people as the host in attracting and servicing tourist process.

According to Ngafenan in Karyono (1997: 27), tourism object is all kind of object which may the tourist visit to the attraction things such as beauty scenary, historical bulding, culture and other modern recreation centers. Gamal Suwantoro (1997: 3) argue that it is the process of temporary journey of an individual or group to other places. The impulse to go is caused by of all kind of their interests such as economy, social, culture, politic, religion, healthy or just for seeking experiences or learning.

Based on the definitions above, the government need to conduct tourism development that could increase public welfare as their commitment in creating a good quality public services. This can be done by conducting green tourisn development. It should create multy positive effect such as providing tourism public services and increasing public welfare without damaging environment.

In order to create green developments in which tourism development is one of them, we need the plan in adjusting future tourism development. It will works if there is paradigm change from import substitution industry into resource based industry strategy. However, we need

policy instrument in completing the change to boost economy growth that can be made in development and resource-based industrialization strategy option, particularly in coastal and marine resource management. It is important especially in line people empowerment effort in order to support autonomy issues and overcome a prolonged national economy crisis. One of tourism object which can be developed in Provine West Java is Pangandaran particularly coastal resource as the national asset that is not arrange optimally yet.

The development of tourism is a sustainable process to do matching and adjustment between the available supply and demand of tourism to achieve the target (Nuryanti, 1994). Meanwhile, the development of tourism potency is the effort to enhance the resources of a tourism area by mean of build both physical and unphysical development of tourism system in order to improve productivity.

The development of tourism area is an alternative expected to be able to back up the economy potency and preserving effort. Ramli (2007) argued that the development of tourism area done by re-arrange the potensial and natural resources altogether. The next step, it is developed the arrangement model of green-oriented tourism area. Moreover, Ramli said that the development of good tourism area need the following requirements:

1. Selection toward Potensial is conducted to select and decide what and where the tourism area to be developed according to the budget amount;

2. The evaluation of ptensial location toward area, this job need the consideration of possible conflict among the respective administration areas;

3. The measurement of potensial distance is conducted to obtain information on distance among potensial which need map of tourism area potency.

The development of tourism should consider geographical and environmental approaches. According to Bintarto, geographical scope comprise of: a. physical scope that contain topological aspect (location, wideness, shape and boundary), physical aspects (land, climate, water), biotical aspects (human being, animal, plant); b. non-physical scope that comprise of social aspects (tradition, custom, group, community), economy aspects (trading, industry, plantation, transportation), cultural aspects (education, religion, culture).

Geographycal approach according to Bintarto devided into: a. spatial approach, spatial approach is a method of atypical geographical approach. In the implementation, this approach should follow the valid geographical principals. Those principals are deployment, interrelation and description principals. Geographical approach comprise of topic human activity and regional approaches, b. ecological approach, geography and ecology are two different science field. Geography discuss about the interrelation of human being life and the physical factor which make spatial system connecting a region with other regions. While ecology, particularly ecology and ecosystem. The concept of those science fields is different. However, in the implementation, the similarity of the discussed object, those science fields have correlation. Ecologycal approach is a methodology for approaching, researching and analyzing

one symphon or one problem by applying the concept and the principal of ecology.

According to Gamal Suwantoro, (1997), the basic factor of tourism development is attraction potensial owned by the tourism object referring to the success of the development that include of the following various feasibility: 1). Financial feasibility: this feasibility is about the commercial measurement of the tourism development. The estimation of profit and loss should be estimated from the beginning. 2). The feasibility of regional sosio economy' this feasibility conducted to know whether the investation to develop a tourism object will have sosio economy impact regionally or not, able to create jobs or not, able to increase foreign exchange earning or not, able to increase revenue from other sector or not/. 3). The feasibility of environment, the analysis of environmental impact is able to be used as a reference of the development activity of tourism object.

THE CONCEPT OF REGIONAL ECOCOMY

Economy is a research about individu and community to make a choice wit or without money by using limited resources but they are able to be used in ways to produce goods and services and distribute them for today and future comsumcy need to indiividuals and groups (Sukirno, 1994:9).

It can be concluded that local economy is an economic situation in a region by considering some indicators from the local economy. This will show description on the different of public welfare in one to another region. As Tarigan (2006:13)

said that the objective of economy is build prosperity. While the development of local economy indicator is prosperity shown by income. Moreover, Tarigan (2006:13) argued that regional revenue is the level of the income of the community in the region or region of analysis. The income level can be measured from the total revenue of the region as well as the average income of the community in the region.

Tarigan (2006:13) describe some concepts of regional income or revenue as the following: (1). Gross Regional Domestic Product (GRDP) based on market price, (2). Net Regional Domestic Product (NRDP) based on market price, (3). NRDP based on factor cost, (4). Income, (5) Regional income based on Current Pricing and at Constant Prices, (6) income per capita. While Piter Abdullah (2002: 102) said that regional economy can be shown by the following 22 indicators: (1). GRDP, (2) economic growth rate, (3) GRDP per capita, (4). Per capita GRDP growth rate, (5). Income distribution, (6). Domestic investation, (7). Domestic investation % toward GRDP, (8). Investation growth rate, (9). Saving, (10). Saving % toward GRDP, (11). Saving growth rate, (12). Household consumption expenditure per capita, (13). Household consumption per capita growth rate, (14). Government consumption expenditure, (15). Government consumption expenditure growth rate, (16). Agriculture sector productivity, (17). Agriculture sector productivity growth rate, (18). Industry sector productivity, (19). Industry sector productivity growth rate, (20). Service sector productivity, (21). Service sector productivity growth rate, (22). Inflation rate.

Factors effecting regional economy are regional potensials owned by the area. According to Piter Abdullah (2002) regional potensial is regional competitiveness shown by regional economy, financial system, infrastructures and nature resources, science and technology, human resources, institutionals, governance and governmental policy, management and micro economy.

The Concept of Dynamic System Model

Wirabhuana on Widodo (2010) said that dynamic system mothod is a methodology to understand various complex problems. This is learning problems by point of view system which is the lements of the system interact each other within feed back relationship in order to produce a certain behavior. The interactions in this structure are translated into mathematical models which are then simulated with computer help to obtain historical behavior. While Iphop Kumala Sriwarna (2005) argued that dinamic system is a method to strengthen leraning in complex system. Dinamic system model is often built and used to represent, analyze, and explain dinamica from complex system. Then she said that dynamica or system behavior can be described by its structure and its parts.

The main objective of dynamic system is to comprehend how this behavior produced by using qualitative and quantitative models. In this case, dynamic system analyze problem from system point of view in which those elements interact one to another within a feed back relationship in order to produce a certain behavior. Interaction in this structure translated into mathematical

models afterward computerized simulated to obtain its historical behavior. Dynamic system structure is a close system. Environmental factor affect toward system is possible to occur and this external change is considered as exogen variabel. Iphov Kumala Sriwarna (2005) said that the following are basic concepts of dynamic system: 1. Closed scope, 2. Feed back loop as the basic component of system, 3. Level and rate, 4. Conditions to be achieved, real condition, and the different of the conditions to be achieved and the real conditions.

While Tasrip in Aminuddin (2014) argued that there are four basics in establishing dynamic system, information feed back theory, the process of making decision, experimental approach in system analysis and digital computer.

To simplify how to sistematicaly thinking, dynamic system structure is simplified into loop causal diagram. The logic is the process (rate) as the cause that produces the state/level as a result or vice versa. After forming the element of cause and effect, then it can be determined the type of effect caused by the cause that is when direction (+), opposite direction (-). Positive blame has acceleration or slowing behavior Negative negals have behavior toward the target or limit. There are two types of targets, the target to explicit (> 0) and the target to implicit (near zero).

Simulation System Modeling

Model defined as a decription of a limited system. This limited system is a system that comprise of all concepts and variables which have correlation with certain dynamic problems. Model is an imitation and simple form of system representing characteristic of the real system. Model is used for simplify us in leraning real system behavior. Model developing by dynamic system have the following characteristic:

1. Describing causal relationship of the system;

2. Simple mathematical equation;

3. Synonim with industry, economy, social global nomenclature;

4. Be able to involve a various variables;

5. Be able to produce a sustainable changes if it is necessary.

This simulation system modeling made as a tool in solving real world including activity plan, and as operation research tool as well as system analysis for make complex decision and the unpredictable future posiblity.

In general, model established to forecasting or policy drafting. Dynamic model emphasize on process. Different with static model, dynamic model approach is deduvtive and able to discard the weaknesses in assumptions made in order to obtain the agreements of the assumptions.

This model emphasize to the change process from one to other situation (Tasrif on Noor Saman and Wahid (1998). While Muhammad et al (2001) argued that there are three alternative can be used in establishing dynamic model as the following:

1. Verbal;

2. Visual;

3. Mathematicaly

METHOD

This research is conducted by applying dynamic system simulation to know the condition and characteristic the tourism area within the next 10 years as well as oriented to social, economy and environmental aspects.

This research analyze two interrelated variables, green tourism development and economy growth variables. According to Sumantoro (1997), dimensions and indicator of green tourism development variables are as the following: (1). Financial feasibility, (2). 2). Sosio economy feasibility 3). The feasibility of environment. Financial feasibility shown by these indicators: a. commercial measurement of tourism development, b. profit and loos estimation; while socio economy shown by: a. investation, b. regionaly socio economy impact (able to provide job, foreign exchange revenue, other sector revenues); and environmental feasibility: environmental impact analysis (physical and non-physical).

Economy development indicator used in this research refer to Pieter Abdullah (2005), but only 10 indicators because of limited time and expense. The 10 indicators are as the following: (1). Economy growth rate, (2). GRDP per capita, (3). Domestic investation, (4).saving, (5). Household consumption expenditure per capita, (6). Governmental consumption expenditure, (7). Agriculture sector productivity, (8). Industrial sector productivity, (9). Sercive sector productivity, (10). Inflation rate.

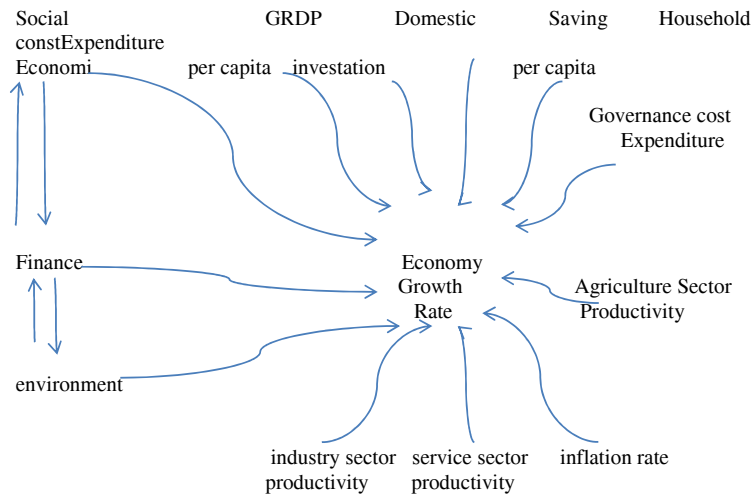The population is all stakeholders who get involved in green tourism development, Tourism Agency, Public Work Agency, Cleanliness and landscaping agency, Environment Agency, Agricultural Agency, Industry and commerce Agency, Education Agency, Public Health Agency, Transportation Agency, ICT Agency., community and tourists. While the sample of this research as the following:

1. The apparatus determined purposively, ie from each agency, For the Local Plan Agency is the Head and all Head of Division Programs, for the Sub-district is Head of Sub-district and Head of Government Section;

2. Tourism proprietors are stratified randomly from: hotel, restaurant, communications, and souvenir owners;

3. Street vendors;

4. Community figures living in Pangandaran area determined randomly;

5. Foreign and domestic tourists who accidentaly came to Pangandaran tourism area.

Quesionaires spreading, interview and reference research are used as data collecting technique.

The stages of dynamic system analysis: modeling and simulation using powersim program and validation test using Microsoft excel. While the outline of problem solving stages by using dynamic system approach in this research as the following: model formulation; simulation and model validation; policy analysis.

The dynamic system model of green tourism development in icreasing economy growth in tourism area of Pangandaran discussed by Wirabuana on Widodo and Tasrif shown in Figure 1.

Figur 1

The Dynamic System Model of Green Tourism Development (Source: Wirabuana on Widodo and Tasrif)

RESULT

Based on data processing by using powersim program, dynamic system model of the development of Panganndaran Tourism area that is necessary to be applied by the Government of Pangandaran Regency is as shown by Figure 2.
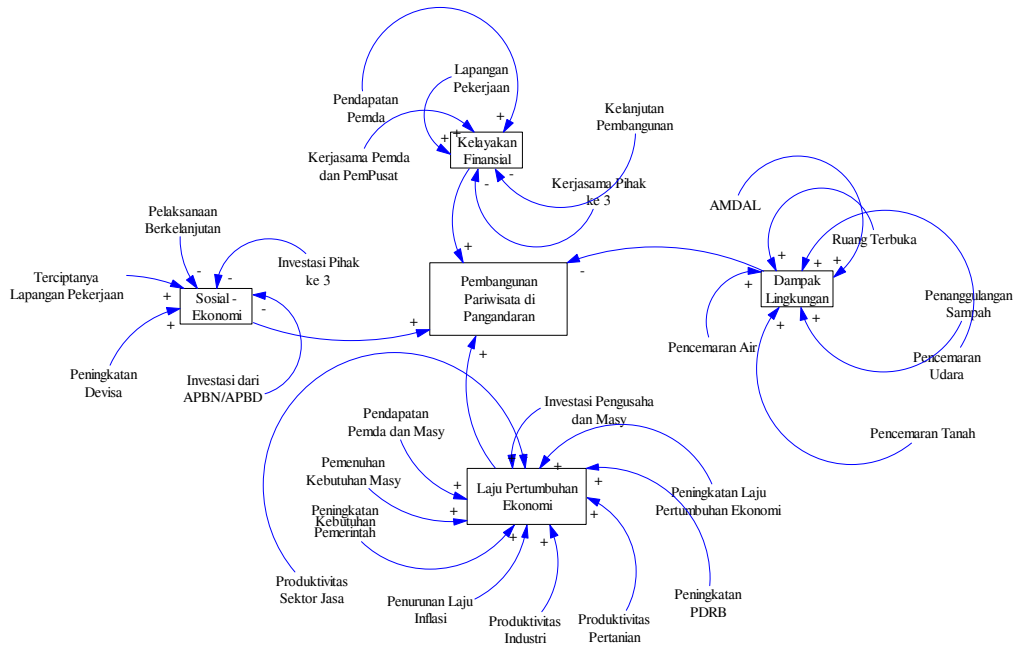

Figure 2

The Dynamic System Model of Green Tourism Area Development of Pantai Pananjung Pangandaran, Pangandaran regency

Figure 2 shows that dynamic system model of the development of green tourism in Pantai Pananjung Pangandaran area are as follows:

1. The success of the development of tourism area in Pantai Pananjung Pangandaran is affected by the following factors: a. financial feasibility for the development of ideal tourism area; b. the social economy of the community living around Pantai Pananjung Pangandaran; c. The economy growth of the community living around Pantai Pananjung Pangandaran; d. manangement of good environmental impact.

It also shows that financial feasibility positively affected to the development of tourism area. It means that the development of an ideal tourism area should fully handled and good designed. If in one period the budget is not sufficient, the development should be designed for some periods until it accomplished, for instance it is designed for five year budgeting.

Figure 2 describe that the influence of environmental impact on the development of tourism area is negative. It means that if the environment of the tourism area does not manage well, the development of tourism area doesn not work. Therefore, the design of environmental impact analysis should be made seriously by considering all aspects affecting the environment of tourism area. The development of tourism area should be along with environmental development in each period. It needs change of mindset of the community realizing that any activities of their life in economy, culture and other developments need

to have environmental awareness. They must take place to preserve the environment.

The development of social economy conducted by the government and community living in Pantai Pananjung Pangandaran should be able to attract tourists to visit to the tourism area. Figure 2 shows that the influence of social economy is positive toward the development of tourism area. The good social economy will support the development of tourism area. The increase of economy growth shown by investors in providing public services for tourists such as hotel, restaurant, communication facility, souvenir etc will provide employment. Therefore, the community living in tourism area are able to increase their income and they are able to pay their tax which is a source of income of the government and eventually the development of tourism area will run well. The more economy grow, the more positive of GRDP growth and the more tourism area developed.

2. Figure 2 shows that financial feasibility for developing tourism area affected by the following factors: a. regional revenue, b. cooperation between local and central government, c. cooperation with private sector, d. availability of employment.

Figure 2 describe regional income affect positively toward financial feasibility to develop tourism area of Pantai Pananjung Pangandaran. The higher regional income, the higher regional income allocation for the development budget of tourism area. The higher budget of tourism area development, the better development

of tourism area. The limited budget of central and local government should be solved by private sector participation in providing public services to support the development of tourism area. One more important thing is the government coaching to continue to facilitate the community to increase employment that will greatly affect the implementation of the development of tourism area runs well.

3. Figure 2 shows that environmental impact for the continuity of tourism area development will affected by some factors such as: a. outdoor, b. soil pollution, c. air pollution, d. trash and environmental impact management.

Figure 2 shows that open space as human needs for oxygen demand for health, then the percentage of its availability must be fullfilled. Likewise, soil contamination, water and air pollution due to household and industry waste need to be overcame in such a way that it does not pollute to an unacceptable threshold. Garbage problem from upstream to downstream should be sought a more practical and useful innovation as well as to educate the community to be used to love of hygiene and their environment. Therefore, in every activity of their life, they always keep the environment clean and throw garbage in the right place. Besides, honesty culture and responsibility in work must be developed among the apparatus, so that the apparatus who has the task of examining every waste generator that can pollute the environment is firmly enforced. If there is an entrepreuner who break the rules must be responsible for his false

by giving him sanction such as revoke his business license.

4. Figure 2 tells that the rate of economic growth can affect the successful development of tourism in Pantai Pananjung Pangandaran which is influenced by some factors: a. Local government and community revenue; b. Investment of entreupreneurs and communities; c. the increase in economic growth rate; d. the increase of GRDP; e. Agricultural productivity; c. Industry productivity; g. Service sector productivity; h. Decrease in inflation rate; i. the Increase of government needs and j. Fulfillment of community needs.

Figure 2 shows that if government revenue and community income increase, it will have a positive effect on economic growth. Similarly, increased investment of entrepreneurs and society will affect the growth of economic growth. In addition, the rate of economic growth also will affect economic growth. The rate of economic growth is also marked by an increase in GRDP that will affect economic growth. Economic growth is determined by potential growth in the region including the potential of agriculture, industry and services sector. Therefore, the sectors must be nurtured by the government and developed by the work units which has the main tasks and functions in those sectors. Furthermore, if economic growth increases, it will be able to suppress inflation rate. The development of human life will also affect the increase of government budgetary needs to run the wheels of government and implement other

functions such as development, service and community empowerment so that society will more independent and able to meet their own needs.

5. Based on Figure 2, it can be explained that the socio-economic can affect the successful development of tourism around Pantai Pananjung Pangandaran which is influenced by the following factors: a. investment local/national budget; b. Third party investments; c. the increase of foreign exchange; d. employment and e. implementation of sustainability.

Figure 2 defined that the increasing of local and national budget will affect to the stability of social economy development. Moreover, the private sector investation will affect public social economy for it is able to provide employment. Therefore the availability of employment will reduce urbanization. The higher ability of the community, the more the source of regional income increas that eventually affect the blessing of foreign exchange and it will return to the community for the implementation of socio-economic development of the community.

CONCLUSION

The result shows that the development of tourism of Pantai Pangandaran is influenced by socio- economic conditions and the environment and the ability of financial resources. They have implications for economic growth. Socio-economic factors such as national and local Budget investment and the 3rd parties to conduct the development of sustainable tourism. It means that the cooperation must be conducted among the Government, the Local Government and the third party to allow eligibility financially to carry out sustainable development. However, sustainable tourism development is inseparable from the preservation of the environment. Therefore, the construction is obliged to implement the environmental analysis that is capable in overcoming garbage as the impact of increasing population and a number of visitors. Therefore, the pollution of air, soil and water can be prevented. Furthermore, an increase in investment, the productivity of agriculture, industry and service sectors increased will increase people's income and foreign exchange area and the GDP as well as the ability of curbing inflation and ultimately to increase regional economic growth.

The simulation of dynamic system model of green tourism area development is affected by social economy and environmwntal impact variables. Economy growth variable are be able to be applied as a model in the development of tourism area in Pantai Pananjung Pangandaran.

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