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Marine Environment Resource

ISREM 2015

University of Wijaya Kusuma Surabaya

INTERNATIONAL SEMINAR

Resources, Environment, And Marine In The Global Challenge

"The Role Of Science and Technology In The Basis Of Environment To Support Sustainable Resource Development"

University of Wijaya Kusuma - Surabaya
29 - 30 September 2015

DITERBITKAN OLEH:
Pusat Pengkajian Hukum dan Pembangunan (PPHP)
Fakultas Hukum Universitas Wijaya Kusuma Surabaya
Jl. Dukuh Kupang XXV/54 Surabaya 60225 Telp.: 031-5677577
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WELCOME ADDRESS

Foreword of The Chair of Organizing Committee the 1st ISREM 2015

Assalammualaikum Warrahmatullahi Wabarakatuh
Good Morning.

On behalf of the Organizing Committee, we congratulate dating to the speakers, the invited guests and all participants of the first International Seminar Resource, Environment and Marine (ISREM) held by Wijaya Kusuma Surabaya University.

Through the International Seminar, it is expected that there is intertwined interaction, communication and exchange of current research information so as to generate concepts and new thoughts on the role of science and technology in the basis of environment to support sustainable resource development. In addition to publication in the form of proceedings, the best papers presented at this international seminar, to be published in the international journal. The total in the first ISREM is 200 participants consisting of speakers, participants and invited guests.

Finally, we would like to thank you to all the speakers, the invited guests, the parties and all the donors who have supported this event and hopefully the success of this international seminar provides many benefits for us all.

Thank you
Wassalamualaikum Wr Wb

Dr. Ir. Hary Sastrya Wanto, MS
Chair of the Organizing Committee

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Rector of Wijaya Kusuma Surabaya

To honorable Ministry of Marine Affairs and Fisheries Indonesia.
To honorable Governor of East Java
To honorable Coordinator of Kopertis
To honorable Kapolda
To honorable Invited Speakers
To honorable Rectors
Ladies and Gentlemen

Assalammualaikum Warrahmatullahi Wabarakatuh
Good Morning.

Praised be to Allah SWT for His love and compassion that today we all gather for the first International Seminar Resource, Environment and Marine (ISREM) held by Wijaya Kusuma Surabaya University.

I would like to thank you for coming to this scholarly forum especially I would like to express my deepest gratitude to the Keynote speaker Ibu Susi Puji Astuti, Ministry of Marine Affairs and Fisheries who has spent time to attend and support this event. I wish to extend sincere gratitude to all respected delegates, invited speakers, presenters and participants for attending this seminar and for becoming our esteemed guests on this occasion. It is indeed a great honor for us to have you all at the seminar.

As we know, the theme "The Role of Science and Technology in the Basis of Environment to Support Sustainable Resource Development" is timely in order to address the issues and concerns about Resource, Environment and Marine in the Global Challenge. Indonesia includes one of the countries which own the biggest natural wealth in the world. If natural resource of Indonesia in mainland is combined with in the sea, so it is only Indonesia which has the biggest natural resources in the world. The utilization of the natural resources in Indonesia tend to economical aspect, while the aspects of ecology, biology, technology, and humanity is still limited. Whereas they have the very high economical value. For that reason, the International Seminar is the event of discussion on ideas, problems and solutions about resources, environment and marine as well as the information result of current research for scientists, observers, entrepreneurs, industrialists and policy makers. Thus, it will create the harmony the research activities with the problems and the real needs. This International Seminar is the 1st ISREM and it is hoped that the next year will be held again the 2 nd ISREM and so forth with the specific target.

Ladies and gentlemen
In the same time of this event, it is also held directly MoU among all Higher Education supporting the First ISREM 2015 and it will be established ISREM network. We will cooperate about seminar/ conference, student and lecturer exchange, research together.
Finally, on behalf of Wijaya Kusuma Surabaya University, I would like to take the opportunity to extend my appreciation to the committee, all participants and all sponsors, that have generously assisted us to host this seminar. I hope that we all could gain benefits and insights through this seminar.

Thank you,
Have a wonderful and insightful seminar
Wassalamualaikum Warrahmatullahi Wabarakatuh.

Prof. H. Sri Harmadji., dr., Sp.THT-KL (K)

Rector of Wijaya Kusuma Surabaya University

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Member	:	Staf of SATPAM	

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SCHEDULE OF AGENDA

TIME	ACTIVITY	PIC
07.30-08.00	Registration	Sections of Secretariat and Registration
08.00-08.20	- Opening Ceremony - The National Anthem of Republic of Indonesia	Sections of Receptionist and Protocol
08.20-08.30	Speech By Chair of The Organizing Committee	Sections of Receptionist and Protocol
08.30-08.45	Speech and Official Opening by Rector of Wijaya Kusuma Surabaya University, Indonesia	Sections of Receptionist and Protocol
08.45-09.45	KEYNOTE SPEAKER The Fishery and Marine Ministry of Indonesia: SUSI PUDJI ASTUTI	Sections of programs, formulator, and taking minute Coordinator
09.45-10.00	MOU (All Higher Education supporting the 1st ISREM 2015)	Sections of Receptionist and Protocol
10.00-10.15	COFFEE BREAK	Section of Beverages and Meals
10.15-12.30	Invited Speaker	Sections of programs, formulator, and taking minute Coordinator
	Professor Dr. M. Dileep Kumar	
	Rexton F. Chakas, PhD	
	Professor Dr. Basri Rashid	
	Prof. Dr Ruswiati Surya Saputra, SE, MS	
	Prof. Dr. Ir. Achmadi Susilo, MS	
12.30-13.00	LUNCH	Section of Beverages and Meals
13.00-16.00	PARALLEL SESSION	Sections of programs, formulator, and taking minute Coordinator
16.00-Finished	COFFEE BREAK	Section of Beverages and Meals

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ABSTRACTS OF INVITED SPEAKER

COMMUNITY BASED NATURAL RESOURCE MANAGEMENT (CBNRM) FOR SUSTAINABLE NATURAL RESOURCE DEVELOPMENT: STRATEGIES

Dileep Kumar M.
Professor – Management
University Gorgasali. Georgia, Europe.
prof.mdk@gmail.com

Abstract: Sustainability is a crucial concept, which is widely deliberated by the scientists and researchers connecting its decisive objective with natural resource management in diverse settings. The complex system has created enormous issues to humankind since the nature, and resource systems operate at multiple levels. Users as communities in handling common-pool resources (CPRs), such as forests or fisheries are excellent examples of this complexity. The interaction of the social system with the nature has created such complexities that lead to think upon the challenges involved in analyzing complex systems in many cases. Community based natural resource management should be understood as the management of complex systems, with emphasis on scale and self-organization. Policies, strategies and operational plans are the need of the hour in managing the resources and nature for sustainability. The paper then consolidates the conceptual framework on Community Based Natural Resource Management (CBNRM) and that is the subset of diverse Natural Resource Management approaches and based on World Bank principles. The paper concludes by extending a strategic outlook at policy level enabling effective sustainable development and natural resource.

Keywords: Natural Resource Management (NRM), Community Based Natural Resource Management (CBNRM), Sustainability, Strategies.

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University of Wijaya Kusuma Surabaya, 29-30 September 2015
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MANAGING ENVIRONMENT THROUGH RESPONSIBLE TOURISM PRACTICES

Prof. Dr. Basri Rashid
Dean School of Hospitally and Environmental Management,
University of Utara Malaysia

Abstract: The future of tourism in many countries is essentially linked to the quality of the environment. This is because the scenic landscapes, coastline, rivers and lakes, and cultural heritage are the bedrock upon which tourism has been built. Ultimately, the economic viability and competitiveness of the tourism industry can only be sustained if the quality of these environmental based resources is maintained. This paper seeks to enrich the understanding of the importance of preserving the environment through effective responsible tourism practices. In addition to resolutions from various forums and conferences, the impacts of tourism on the environment have received special interest among academia and practitioners. Reviews of these works deepen the understanding and provide greater consciousness on the importance of balancing tourism development and environmental preservation. This understanding is essential for tourism and environmental related agencies in order to take further collective actions in a noble effort to preserve our precious environment. The responsible tourism practices suggested in this paper are beneficial to tourism stakeholders as they can be used as guidelines for developing appropriate measures so that the undesired environmental impacts at tourism destinations are kept to the minimum.

Keywords: environment, responsible tourism, sustainable, tourism destination

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MARINE MANAGEMENT: A TOOL OF NATIONAL PROGRESS AND PROSPERITY

Dr.Ruswiati Suryasaputra
Professor in Strategic Management
at Othman Yeop Abdullah Graduate School of Business
Universiti Utara Malaysia

Abstract: Marine management has been matter of debate and area of research for academicians and researchers. Due to its importance and role in national progress and prosperity various issues regarding structure, resources and execution got immense attention. Marine management plays important role in country's economic progress, prosperity and employability. Current study discusses the various problems, issues and benefits associated with marine management by going through previous literature. Moreover, it highlights the strategic importance and contribution in the context of Indonesia related to the economic progress, prosperity and natural resources that are pertinent and dependent on marine management.

Keywords : Marine management , prosperity , natural resources , Indonesia

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THE CONSTRUCTION OF MATHEMATICAL MODEL BETWEEN POPULATION OF *PIEZODORUS RUBROFASCIATUS* AND SOYBEAN POD DAMAGE FOR SUPPORTING FOOD SAFETY AND INTEGRATED PEST MANAGEMENT*)

Achmadi Susilo[1], Elika Yuniarti[2]
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The aims of this research are : (a) to predict the damage of soybean pod through the mathematical model of relationship between population density of *P. rubrofasciatus* and pod damage, (b) to predict the soybean yield through the mathematical model of relationship between population density of *P. rubrofasciatus* and pod damage where made by modification of Reynolds Transport Theorem (RTT). This research was used Completely Randomized Design with nine treatments and each was replicated three times. The treatment were : P0 = control, P1 = 1 nymph, P2 = 2 nymphs, P3 = 3 nymphs, P4 = 4 nymphs, P5 = 1 adult, P6 = 2 adults, P7 = 3 adults, and P8 = 4 adults. The population density of pod sucking bug was the independent variable, while dependent variables were : rate of pod damage, and dry pod weigh. Analysis of mathematical modeling was made by approaching of Continuum Theory and Reynolds Transport Theorem. The results showed that (1) Relationship between population of P. rubrofasciatus and pod damages in the form of mathematical model which is used to predict the soybean pod damage has error 0,02 – 0,10 %, and (2) Mathematical model where made by modification of RTT which is used to predict the soybean yield has error 0,023– 0,099 %.

Keywords : P. rubrofasciatus, Mathematical Model, Pod damage, soybean yield

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PARRALEL SESSION

Penataran Room

NO	AUTHOR
1	Miftahul Huda
2	Johan Paing
3	Sri Wulan Purwaningrum
4	Utari Khatulistiani
5	Andaryati
6	Endang Noerhartati
7	Tri Rahayuningsih
8	Endang Retno Wedowati
9	Diana Puspitasari
10	Maslihah
11	Nonot Wisnu Karyanto
12	Anang Kukuh Adisusilo
13	Nia Saurina
14	Shofiya Syidada
15	Emmy Wahyuningtyas
16	Mujianto

Candika Room

NO	AUTHOR
1	Nur Azizah Affandy
2	Harry Sastrya Wanto
3	Maryam Imam
4	Budhi Setiawan
5	Ratna Widyawati
6	Masfufatun
7	Sukian Wilujeng
8	Hidayatus Sya'diyah
9	Sri Arijanti
10	Markus Patiung

Bangsal Pancasila Room

NO	AUTHOR
1	M. Judi Wijaya
2	Marmi
3	Loo Hariyanto Raharjo
4	Nurul Hidayah
5	Dya Sustrami
6	Dini Mei Widayanti
7	Dhian Satya R
8	Yeti Mareta Undaryati
9	Indarwati
10	Jajuk Herawati

Wijaya Room

NO	AUTHOR
1	Rahmawiliyanti
2	Erna Hendrawati
3	Bambang Suprijadi
4	Dewi Nuraini
5	Erna Haryanti
6	Fahriyah
7	Dwi Bhakti Iriantini
8	Mira Pramudianti

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ABSTRACTS OF CALL PAPER

1 ENGINEERING

THE APPLICATION OF VALUE ENGINEERING IN SOIL IMPROVEMENT (PROJECT OF PELINDO III TELUK LAMONG SURABAYA)

Miftahul Huda[1], Adi Endra Novianto[2], Andrean Prasetyo[3]
[1]Lecturer in Civil Engineering Program, Faculty of Engineering UWKS, Indonesia
[2]Graduate of Civil Engineering Program, Faculty of Engineering UWKS, Indonesia
[3]Students of Civil Engineering Program, Faculty of Engineering UWKS, Indonesia

Abstract:This study was conducted on soil improvement works development Pelabuhan Indonesia III projects, Teluk Lamong Surabaya. The aim of the study was to obtain the optimization of the acceleration of soil consolidation using preloading with prefabrication vertical drain (PVD) and prefabrication horizontal drain (PHD). The method used in this study is the optimization of value engineering methods, which generally consists of phases: information, creativity, analysis, development and recommendation. The study concluded that the consolidation of the soil with alternative preloading system using landfill with γd = 1.91 kg/m3 and using PVD/PHD brand Geowork type MW-408/Geowork type SD 100 X 20 with a distance of 80 cm is a method the most optimal soil improvement. This alternative produces a faster consolidation of 53 days from the scheduled time and cost savings of about Rp 1.77 billion from the planned start-up costs.

Keywords: value engineering, consolidation, preloading, PVD/PHD.

1. Introduction

Teluk Lamong container yard owned Indonesian Harbour (Pelindo III) Surabaya is built as an extension of the harbour of Tanjung Perak Surabaya as well as anticipation over capacity in the second largest port in the Indonesia. Development work that has been done among others include; causeway construction, with an area of 70,000 m2, construction of the causeway, with an area of 34 704 m2 and the construction of the container yard of 20,000 m2. While the scope of the work carried out one of them is the work of existing embankment on soft soil. In one pile of work in soil mechanics phenomena that often cause problems are the geotechnical consolidation, especially on soft ground conditions. Soft ground generally has a shear strength and low permeability and compressibility are large, so that the time required for a longer consolidation. One of the ground improvement techniques that are often used in soft soil problems is the initial loading (preloading), the use of Prefabricated Vertical Drain (PVD) and Prefabricated Horizontal Drain (PHD)

Preloading the selection of material type and spacing using PVD / PHD to accelerate the consolidation of an important part in the implementation of soil deposits. Preloading by selecting the type of material, the use of the type of PVD/PHD and PVD mounting distance / PHD most optimal field conditions, is predicted to get the optimization in terms of time, quality and cost of implementing employment projects. Therefore, this study is very important and much needed especially to realize the optimization of the cost of implementation of ongoing projects.

2. Literature Review

2.1 Definition of Value Engineering

Value Engineering (VE) is a management technique by using a system which is an organized effort directed at the analysis and identify functions that are not essential and eliminate costs that are not useful to achieve the desired function with a total minimum cost while maintaining security (safety), performance (performance), reliability (reliability) and quality (quality) of the construction product / project. The application of value engineering (VE) in the construction industry has resulted in substantial savings in terms of materials and construction, cost and time. (Rompas et al., 2013). Society of American Value Engineers, defines that the Value Engineering is a business organized systematically and applying a technique that has been recognized, which is a technique to apply a product or service which aims to meet the required functions at the lowest price (Pontoh et al. , 2013).

2.2 Basic Principles of Value Engineering

The main purpose of creating a product basically is that the product created can be sold quickly, with maximum benefit and can give satisfaction to the consumer. Thus the designers of the product should not create the functions of the

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product as well as the use of excessive production ultimately useless, and the price is high. So the idea should be developed with a starting point of (Rumintang, 2008) :

1) The cost savings, which is using the lowest possible cost without reducing the functionality and quality of a product.
2) Time, which use the time as best as possible, it is intended to use the minimum time to get maximum results
3) Materials, using the material that truly meets function and quality.

2.3 Value Engineering Job Plan

The work plan (job plan) is a systematic approach of value engineering that is directed to carry out value engineering, including the implementation of the results. The work plan is also a key determinant of the success of the study (Marzuki, 200). Approach work plan engineered this value all stages in the studies carried out, ranging from the identification of items of work of the entire project, finding an item of work with the potential to unnecessarily high costs, to look for new alternatives creatively to display the same functionality as desirable as design previous (Yetty, 2004). The work plan is also helpful in determining the parts that have high costs compared with similar facilities (Pontoh et al., 2013).

2.4 Phases of Value Engineering

Some phases are commonly used in the value engineering (Saptono, 2012), namely: 1) Information Phase , 2) Creative Phase, 3) Analysis Phase, 4) Development Phase and 5) Recommendation Phase .

1) Information Phase ; The goal is to obtain the background of the project and defines the functions, a way to get all the facts, make sure costs, defining the function. Gets support techniques required data according to the specific job, divides the problem into functional groups. Questions to be answered: what and how the project and its cost, what is the function and value function (Labombang, 2007).
2) Creative Phase: The goal: to get an idea of design alternatives. Technique: collecting ideas and creative thinking and questions to be answered. Another question is what can fulfill the function
3) Analysis Phase : The objective: to evaluate the basic functions, evaluating new ideas, making comparison of alternatives and develop alternative chosen and prepare a report of recommendations. Technique: evaluating the basic functions of comparison, comparing the methods, products and materials, define life cycle cost and recommendation. Questions to be answered : what is the most optimal alternative to be able to display the function.
4) Development Phase : Taking into account the results of the analysis including the most optimal cost to be recommended.
5) Recommendation Phase : Provide recommendations on the results of the analysis and development related to product the most optimal alternative by considering the function and reliability of alternative products is proposed.

2.5 Theory of Settlement

The pace of consolidation are lower in saturated clay with low permeability can be increased by using vertical drainage (vertical drain) that shorten the track drainage in clay. Consolidation calculated due to the radial horizontal flow which causes the dissipation of excess pore water pressure more quickly, while the vertical drainage of very little significance. In theory, the greater the reduction in the final consolidation is the same, only the rate of the decline is different.

Reduction or settlement occurs when the soil material receives a load on it. To determine which settlement occurs, in addition to unknown parameters of the soil and the depth of the groundwater level, should also be known to the history of the land itself. Settlement due to the consolidation of the foundation soil can be calculated using the following equation (Kristiyanti, 2010):

1) for normally consolidated soil (Soil Nc)

$$Sci = \left[\frac{Cc}{1+e_o} \log\left(\frac{p'_0 + \Delta p}{p'_0} \right) \right] xHi \quad \text{.....(1)}$$

2) for a more consolidated soil (Soil Oc)

a) if po + p <p'c

$$Sci = \left[\frac{Cs}{1+e_o} \log\left(\frac{p'_0 + \Delta p}{p'_0} \right) \right] xHi \quad \text{.....(2)}$$

b) if $p_0 < p'_c < p_0 + \Delta p$

$$Sci = \left[\frac{Cs}{1+e_0} \log \frac{p'_c}{p'_0} + \frac{C_c}{1+e_0} \log \frac{p'_0 + \Delta p}{p'_c} \right] xHi \quad \text{.....(3)}$$

Where :

Sci = compression consolidation of the soil layers to be reviewed, the i-th layer

Hi = a thick layer of soil to-i

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eo = initial void ratio of the soil layer to-i
Cc = compression index of the i-*th* layer
Cs = inflate the index of the i-*th* layer
Po '= effective vertical soil pressure of a point in the middle layer of the i-th ground under the weight of its own above that point in the field (efectif overburden pressure)
Pc ' = effective overburden pressure past, consolidation voltage effective in the past.

Due to the burden of preload that were above the effective vertical soil pressure of a point layer in the field occurred in the middle, and because of the depth and weight of the unit varies land perlapis then be computed by the equation:

Po '= ɣ. H ..... (4)

Additional information: generally soft ground in Indonesia can be considered a rather consolidated soil more, with a price:

Pc = Po '+ f ..... (5)

Where :
f = the greatest fluctuations in groundwater levels, with price fluctuations in the groundwater,
Δp = Extra vertical voltage i point being simulated (in the middle layer of the i-th) due to the addition of the load.

3) Time consolidation
The length of time consolidation according to Terzaghi (Kristiyanti, 2010) can be searched by the equation:

$$t = \frac{Tv.(H_{dr})^2}{Cv} \text{.....(6)}$$

Where :
t = time of consolidation.
Tv = time factor.
Hdr = length of drainage.
Cv = coefficient of consolidation

3. Research Method

The research methodology is a process and plan of thinking to solve the problem, ranging from preliminary research, the discovery of the problem, observation, data collection both written references and direct observation in the field. Perform data processing to draw conclusions on the problems studied (Pontoh et al., 2013). The object and location of the research conducted on soil improvement works Pelindo III development projects, Kalimireng Surabaya. The steps that need to be done in the research process, including:

1) The preparation phase, namely : to collect or find the data of the project, conducted a survey to the project site to get a general overview of the field and to study literature either through journals, books library, internet, or other materials that can be used as additional reference materials and knowledge.

2) Data research, grouped into two, namely a) primary data: is the source of data obtained directly from the original source (of the project) / basic data used in the analysis Value Engineering in the form of data generated through interviews and surveys directly on the project, b) secondary data: is the data to support that can be used as input and the reference in the analysis value engineering, including data on unit price list and analysis of labor, materials data or the building materials used, labor data, and other data which can be used as a reference in analyzing the value engineering.

3) Data collection method : a) primary data, namely ; by means of direct surveys on consultants and executors handling the project. It also made observations directly to the project site, b) secondary data, namely : by doing direct survey at agencies or companies are considered to be interested, including the companies : materials/building materials, consultants, contractors, contractor personnel work as well as other companies that can be used as reference material.

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4) Analysis of data: data that has been collected to analyze the value engineering to produce the existence of a cost savings or cost saving. Value engineering analysis conducted five stages, namely: a) information phase, b) creative phase, c) analysis phase, d) development phase, and e) recommendation phase.

4. Discussion

4.1. Information Phase

Soil improvement on Causeway construction work (area of 70,000 m2), construction of roads Causeway (area 34 704 m2) and construction of container yard (20,000 m2) using the method of preloading and PVD / PHD is based on the initial planning to have the data such as Table 1.

Table 1
Data Area Soil Improvement Works, Preloading and PVD/PHD

No	Description	Specifications	Remarks
1	Total Area Employment	304.704 m^2	Project Phase I
2	Volume Excavated	soil depth t = 3 meter	Project Phase I
3	Type of Soil Existing	Soft soil	
4	Preloading	γ_d = 1,85 kg/m^3, γ_{sat} = 2,099 gr/cm^3	Existing soil
5	PVD	Diamater = 10 cm, distance = 115,5cm. Merk Geowork, Type MW-408 pattern original triangular shape	original Planning
6	PHD	Following specification PVD Merk : Geowork, Type MW-408	original Planning
7	Poject Scheduling	21 months (without soil improvement)	Project Phase I
8	Time Consolidation	24 weeks (180 days)	Original Schedul

Area soil improvement have 3-meter-deep excavation volume of approximately 304 704 m2. Preloading for the acceleration of the planned consolidation trapisium shaped with the condition and size as in Figure 1. Land preloading taken from local soil with dry density γd = 1.85 kg / m3, and the density of wet γsat = 2.099 gr / cm3. To accelerate the consolidation and reduction in land used PVD method and PHD.

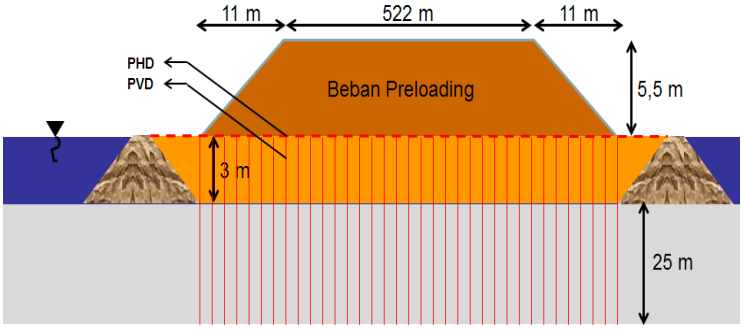

Figure 1. Transverse Pieces Soil Improvement Preloading

Table 2 is the average SPT test result data extracted from a ten point by sampling at locations pebaikan ground (secondary data, 2014)

Table 2
Technical Data of Test Results Mean SPT

Depth	Layer	SPT	Pore	Density	Coef. of Consolidation	Compression Index
z (m)	Ho (m)	(N)	e_o	γ (Kg/m3)	Cv (Cm2/s)	Cc
3	3	-	1.454	1.64	0.00097	1.500
6	3	2	1.622	1.59	0.00076	1.227
9	3	3	1.614	1.59	0.00077	1.278
12	3	2	1.622	1.59	0.00076	1.227
15	3	11	1.497	1.73	0.00104	1.500
18	3	13	1.478	1.74	0.00105	1.620
21	3	15	1.460	1.81	0.00110	1.710

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24	3	15	1.460	1.81	0.00110	1.710
28	4	18	1.437	1.87	0.00118	1.830

4.2 Creative Phase

Based on the theory of soft soil characteristics, consolidation and settlement process is strongly influenced by time. Therefore we need an alternative preloading material whose weight is heavier types that exist around the project site in order to provide greater pressure on existing land, so that the consolidation process can be faster. Another alternative is to set the type and spacing PVD and PHD sedemikaian in order to obtain the most optimal space to get the most rapid consolidation process. Of the two alternatives are possible occurrence of an acceleration in employment pengurugan and construction works that are therein so will result in the acceleration of the entire project work. The creative phase can be explained in detail in Table 3.

Table 3
Alternative Use Preloading and Space PVD / PHD

No	Description	Design Alternative (1)	Design Alternative (2)
1	Material Preloading	Existing soil γ_d = 1,85 kg/m^3,	Around the project soil γ_d > 1,91 kg/m^3,
2	PVD	D = 10 cm, S = 115,5 cm Merk Geowork, Type MW-408, Price Rp 16.700,- / m^2 (include installing + tool)	D = 10 cm, S = trial and error Merk Geosistem, Type CT-D822, Price Rp. 17.200,- / m^2 (include installing + tool)
3	PHD	Following PVD distance Merk/Type : Geowork SD-100 X 20, Harga Rp 17.200,- / m^2 (include installing + tool)	Following PVD distance Merk/Type : Geosistem, CT-100 X 20, Harga Rp 17.900,- / m^2 (include installing + tool)

Based on the material specification PVD / PHD on the market, chosen PVD / PHD alternatives that have better quality than the original planning material with a relatively cheaper price. Comparison of material specifications PVD / PHD original plan and an alternative design can be seen in Table 4.

Table 4. Original and Alternative Material Specifications PVD and PHD

No	Specification	MERK : GEOWORK TYPE : MW-408	MERK : GEOSISTEMTYPE : CT-D822
1	Structure	Non Woven Geotextile	Non Woven Geotextile
2	Material	Polyster(PET)	Polyster(PET)
3	Pore Size	75 < Aos ≤ 90	63 < Aos ≤ 75
4	Permeability	1.7 x 10-4 m/s	2.5 x 10-4 m/s
5	Grab Strength	259.64 N	504.24 N
6	Type	Corugated	Fishedcore

4.3 Analysis Phase

1) Analysis of Consolidation

Based alternatives have been determined, then analyzed to calculate the total settlement and consolidation needed to 9 layers of soil and the depth of 28 meters. Table 5 shows the total reduction in the original preloading ground wearing ɣdry = 1.85 kg / m³ obtained at 2.818 meters. While Table 6 shows the total decline by using alternative preloading ground ɣdry > 1.85 kg / m³ obtained at 2,619 meters.

Tabel 5
Analysis Result of Consolidation Preload Material (ɣdry =1,85 kg/m³)

No	Layer (m)	Z (m)	Eo	Cc	Soil Density (γ)	Eff. Soil Density (γ')	(δ'o)	(Δδ)	Sc NC-Soil (m)
1	3.0	3.0	0.450	1.311	1.61	0.61	1.83	1.188	0.590
2	3.0	6.0	1.622	1.227	1.59	0.59	1.77	1.11672	0.298
3	3.0	9.0	1.614	1.278	1.59	0.59	1.77	1.09296	0.306
4	3.0	12.0	1.622	1.227	1.59	0.59	1.77	1.05732	0.286
5	3.0	15.0	1.497	1.500	1.73	0.73	2.19	0.97416	0.288
6	3.0	18.0	1.478	1.620	1.74	0.74	2.22	0.891	0.287
7	3.0	21.0	1.460	1.710	1.81	0.81	2.43	0.8316	0.267

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8	3.0	24.0	1.460	1.71	1.81	0.81	2.43	0.78408	0.253
9	4.0	28.0	1.437	1.83	1.87	0.87	3.48	0.7128	0.243
							Total Settlement =		**2,818**

Tabel 6
Analysis Result of Consolidation Preload Material (γ_{dry} =1,91 kg/m³)

No	Layer (m)	Z (m)	Eo	Cc	Soil Density (γ)	Eff. Soil Density (γ')	(δ'o)	(Δδ)	Sc NC-Soil (m)
1	3.0	3.0	1.454	1.500	1.64	0.640	1.920	1.192	0.385
2	3.0	6.0	1.622	1.227	1.59	0.590	1.770	1.120	0.299
3	3.0	9.0	1.614	1.278	1.59	0.590	1.770	1.097	0.295
4	3.0	12.0	1.622	1.227	1.59	0.590	1.770	1.061	0.298
5	3.0	15.0	1.497	1.500	1.73	0.730	2.190	0.977	0.289
6	3.0	18.0	1.478	1.620	1.74	0.740	2.220	0.894	0.288
7	3.0	21.0	1.460	1.710	1.81	0.810	2.430	0.834	0.267
8	3.0	24.0	1.460	1.710	1.81	0.810	2.430	0.787	0.254
9	4.0	28.0	1.437	1.830	1.87	0.870	3.480	0.715	0.244
							Total Settlement =		**2,619**

2) Analysis of Time Consolidation

By using Terzaghi formula (equation 6), the length of time of consolidation for each type of soil preloading can be calculated as shown in Table 7.

Table 7
Time Calculation Results Consolidated Material Preload

Time (Week)	Preload material (γ_{dry} =1,85 kg/m³)				Preload material (γ_{dry} =1,91 kg/m³)			
	Cv	Uv	U	Acceleration	Cv	Uv	U	Acceleration
10	7,21E-08	0,052465	64	For U = 90%, obtained acceleration 20 weeks plus 4 days, faster 4 weeks 4 plus days (faster 31 days)	9,57E-08	0,061295	75	For U = 90%, obtained acceleration 16 weeks plus 4 days, faster 7 weeks plus three days (faster 52 days)
11	7,21E-08	0,055025	68		9,57E-08	0,064287	79	
12	7,21E-08	0,057542	71		9,57E-08	0,067145	81	
13	7,21E-08	0,059819	74		9,57E-08	0,069887	84	
14	7,21E-08	0,062077	76		9,57E-08	0,072525	86	
15	7,21E-08	0,064256	79		9,57E-08	0,075071	88	
16	7,21E-08	0,066363	81		9,57E-08	0,077533	89	
17	7,21E-08	0,068405	82		9,57E-08	0,079919	91	
18	7,21E-08	0,070389	84		9,57E-08	0,082236	92	
19	7,21E-08	0,072317	86		9,57E-08	0,084489	93	
20	7,21E-08	0,074196	87		9,57E-08	0,086684	94	
21	7,21E-08	0,076028	96		9,57E-08	0,088825	99	
22	7,21E-08	0,077818	99		9,57E-08	0,090915	100	
23	7,21E-08	0,079566	100		9,57E-08	0,092959	100	
24	7,21E-08	0,081278	100		9,57E-08	0,094958	100	

Table 7 shows that the consolidation use material preloading with ɣdry = 1.85 kg/m³ obtained on condition of degree of consolidation of 90% is for 20 weeks 4 days (faster 31 days from the initial planning). While time consolidation use material preloading with ɣdry = 1,91 kg/m³ on condition the degree of consolidation of 90% is for 16 weeks 4 days (faster 52 days from the initial planning). Thus the use of material preloading with ɣdry = 1.91 kg/m³ is faster than material preloading with ɣdry = 1.85 kg/m³.

3) Comparative Analysis of Usage Type PVD / PHD

Figure 2 shows the time efficiency of compaction obtained from comparisons between material types PVD/PHD alternatives planning.

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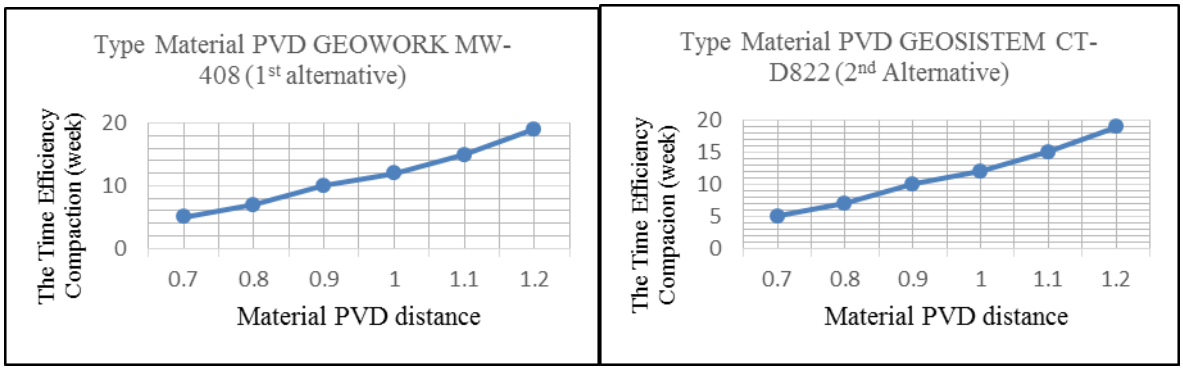

Figure 2 Comparison of Efficiency Time Compaction Material PVD / PHD

4.4 Development Phase

1) Usage of Soil Preloading

The analysis showed that the of material preloading with ɣdry = 1.91 kg/m³, the position degree of consolidation resulted in a 90% decrease for 16 weeks 4 days (53 days faster than the original planning schedule). While the cost savings obtained by taking into account: the operational costs of the project, the nett present value (interest 8.5%) obtained a total cost savings of approximately Rp1.100.000.000,-. Meanwhile, if the material is used for preloading with ɣdry = 1.85 kg/m³ resulted in a decline for 20 weeks 3 days with a total cost savings of Rp. 610 000 000, -. (faster 26 days from the original planning schedule)

2) Usage Type and Distance PVD/PHD

The calculation result of the time and material costs which uses the brand PVD material Geosistem CT-D822 and PHD brands Geosistem CT-100 X 20 with a distance of 80 cm obtained cost savings of Rp 590,000,000, -. Meanwhile, if using PVD material Geowork brands MW-408 and SD 100 X 20 Geowork distance of 80 cm in cost savings gained Rp. 670 000 000, - From these results the brand Geowork obtain greater cost efficiency than brand Geosistem.

4.5 Recommendation Phase

In this phase, the method of delivering the results of value engineering studies done in writing. Information summarized succinctly and clearly to facilitate delivery. In the submission, provide explicitly for a comparison between the old design with the proposed design, the advantages of the proposed design and the amount of savings. The amount of the cost savings obtained by subtracting the cost analysis with the original design of the proposed design.

Table 8
Recommendations Alternative Development Results

No	Material	Design		
		Original	1st Alternative	2nd Alternative
1	Material Preloading (Cost Saving)	Not Designed	γ_d = 1,85 kg/m^3, Rp 660.000.000,-	γ_d = 1,91 kg/m^3, Rp 1.100.000.000,-
2	PVD	Not Designed	D = 10 cm, S = 80 cm GEOSISTEM CT-D822	D = 10 cm, S = 80 cm, GEOWORK MW-408
	PHD	Not Designed	GEOSISTEM CT-100 X 20, following span of PVD	GEOWORK SD 100 X 20 following span of PVD
	Cost Saving (assumed rate 8,5%)	Not Designed	Rp 590.000.000,-	Rp 670.000.000,-
3	Time Consolidation		20 weeks + 3 days	16 weeks + 4 days
4	Project Scheduling	21 months	20 months + 3 days	19 months + 7 days
5	Time Saving		27 days	53 days
6	Total Cost Saving		Rp 1.150.000.000,-	Rp 1.770.000.000,-

From Table 8 obtained planning is the most optimal use of land preloading with γd = 1.91 kg / m3, obtained Rp 1.100.000.000,- cost savings, - and using PVD / PHD brand Geowork MW-408 / Geowork SD 100 X 20 with spaced 80 cm, the cost savings gained Rp 670.000.000,-

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5. Conclusion and Recommendation

The study concluded that using value engineering, soil remediation existing on the job compaction on location cousway, road cousway and locations stacking containers in the project Kalimireng Pelindo III Surabaya obtained some alternative use of materials preloading, type and spacing PVD / PHD different with planning beginning with the time and cost savings are significant. The most optimal alternative is to use materials that have a preloading γ_{dry} = 1.91 kg/m³ and the use of PVD/PHD, merk Geowork and distance of 80 cm. If the alternative is implemented it will get a time savings for 53 days and the total cost savings of Rp 1.770.000.000,-

Suggested to the owners of public and private projects and all parties involved in construction projects, particularly in the work of soil compaction, the results of this study can be implemented on improvement projects and similar soil compaction projects in Indonesia.

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INTEGRATED PLANNING MODEL FOR DISADVANTAGED RURAL DEVELOPMENT ACCELERATORS ON COASTAL REGION

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Abstract: *In the era of the Cabinet Jokowi - JK , there are two ministries that received sufficient attention,* that are the Ministry of Maritime Affairs and the Ministry of Rural. Priority development program that puts the development of marine and backward villages need to be received and the support of all parties. According to the government's plan that will disburse 1.4 M for every village by 2018, it is necessary anticipatory measures that investment funds can be targeted and efficient. Moreover , in order that the process of rural development can be orderly, well organized and manageable. So there is no "removeable" phenomenon as still seen in some urban roads. This paper is just a conceptual idea. It is still an embryo that will be followed up with research and in-depth assessment. This P3KT approach models will see a village in the perspective of a self-contained residential area, because the number of villagers average of no more than 10,000 inhabitants. As a self-contained residential areas then a village needs to have minimal infrastructure. This minimal facilities and infrastructure that need to be set in a village Master Plan. In the end, as well as urban areas, each village should have a Master Plan for the Long Term.

Keywords: Integrated Regional Planning, backward village, coastal areas.

1. Introduction

1.1 Background

On August 17, 2015, the Republic of Indonesia reached 70 years old. Begins with structuring State, fully with the dynamics of military aggression from within and outside the country, followed by physical development in a sustainable manner with the model Repelita which began in 1969. Since then, the face of the Indonesia began to change rapidly with national development. But unfortunately, only Java growth a revolution of development. Even then also just in the capitals of provinces and the closest cities. While far from a big city, let alone which are outside Java , the changes like as an evolutionary development . Slow and requires patience . Various programs have been executed apparently not able to change the smallest region of our country, namely the village .

The current administration , the cabinet Jokowi - JK, also did not want to miss. There are two ministries were established to implement this flagship program, the Ministry of Maritime Affairs and the Ministry of Rural . This agenda has also received the approval of the legitimacy of the Parliament Act - Law no. 6 in 2014. This law mandates the allocation of 1.4 billion fund for each village in 2016. Mr. Bambang Brodjonegoro , as Minister of Finance, confirmed that the village fund should be used to build infrastructure . This step is of course very encouraging. However, if observed and studied more in depth , turns this program also has a gap mis-use of funds at the village level. For those reasons, this paper tries to help to unravel the potential problems that might come up and oversee the utilization of the budget effectively and efficiently through systemic procedures, especially for the villages in the coastal areas.

1.2 Problems and Restriction

In the concept of Integrated Planning Model For Disadvantaged Rural Development Accelerators Coastal Region, there are some strategic phase carried out, namely: advocation, Acceleration, and Community Empowerment tailored to the needs and conditions of each country in the region. Of the three stages of strategic, namely stage Development Acceleration will be prone to irregularities and weak system of Communication and Information in disadvantaged areas will result in the problem of how villagers can utilize Budget / Village Fund large enough will be given by the government, can be effectively and efficiently through the procedure of systemic, particularly the discussion is limited to underdeveloped villages located in the region coast. As for the strategic phase Empowerment Coastal Villages will not be studied in this paper because the existing rules and procedures through the Minister of Rural Development State RI. This paper tries to focus on aspects which adopted the Integrated Regional Planning Program Urban P3KT the Accelerated Development of Disadvantaged Rural Coastal Region.
From here expected to be found appropriate Regional Planning Model in Disadvantaged Rural Development in Coastal Region. In addition, this paper can be utilized by the Ministry of Rural and Marine Affairs Ministry as an input in the concept of accelerated development, Coastal Villages Region .

2. Literature Review

2.1 Coastal Village Profile

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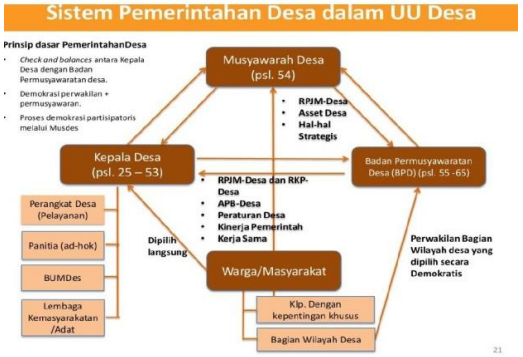
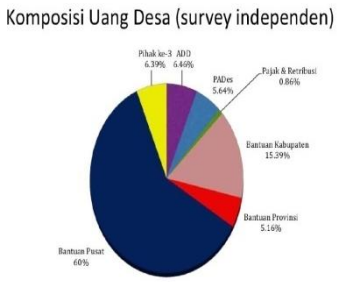
The village is a community unit which has borders with the authority to regulate and administer governmental affairs, the interests of local communities based on community initiatives, the right of the origin , or traditional rights are recognized and respected in the system of government of the Republic of Indonesia (Law No. 6/2014 article 1). The system of village administration and village money composition according to the law are as follows :





Coastal villages have different characteristics to the villages in the hinterland. The difference is not only in the geographic-ecological aspects, but also on the characteristics of the economic and socio-cultural. Geographically, the coastal village located on the border between land and sea. Coastal villages have direct access to coastal ecosystems (sand or rocky), mangroves, estuaries, and coral reef ecosystems. Geographic-ecological conditions affect the coastal village of economic activities in it. Economic activity in the coastal village is characterized by the activity of the utilization of resources and services of the coastal environment. Economic activities include fishing, trade, marine tourism, and transportation. Now totaling 8,090 coastal villages, spread over 199 district, in 30 provinces in Indonesia (Data as of 2005), which are spread throughout the large and small islands. In it, there are about 16 million people spread in a variety of jobs: (a) the fishing about four million, (b) fish farmers amounted to 2.6 million, and (c) other as much as 9.7 inhabitants. Among the 16 million people, about 5.2 million are classified as poor (Table 1). The coastal villages certainly have different characteristics, which would require a different approach to development also vary.

Tabel 1. General Condition of Coastal Communities in Indonesia, 2002

No.	Coastal Condition	Amount
1	Coastal Village	8,090 desa
2	Jobs:	16,420,000 jiwa
	- Fishing	4,015,320 jiwa
	- Cultivator	2,671,400 jiwa
	- Others	9,733,280 jiwa
3	Live below the poverty line (32,14%)	5,254,400 jiwa

Source : DKP (2007)

There are numbers of critical issues in the development of coastal villages, one of which is related to the agrarian aspect. Agrarian issues in the coastal village can be distinguished between agrarian issues that occur in the coastal village located on the big island (mainland), and in the coastal village located on the small island (small island). Coastal villages on the larger islands have a number of critical issues both on land and water. At the source of agrarian land, issues that arise are about : (a) the status of residential land, (b) the pattern of control over aquaculture, (c) the pattern of land tenure for salt production, and (d) mangroves.

Tabel 2. Coastal Village Agrarian Issues in the Mainland

Agrarian Source	Actual issue
Land	• Status residential land status, ponds, salt, mangrove • Reclamation , abrasion , spatial conflict
Sea	• Overfishing , pollution , ecosystem damage • Rights marine resource management by communities

Sumber : DKP (2006)

Tabel 3. Coastal Village Agrarian Issues in the Small island

Agrarian Source	Actual issue
Land	• mangrove • Granting the concession as " Rental " Small Island (private

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	property regime) • relocation fishermen
Sea	• *private property regime* • *state property regime*

Sumber : DKP (2006)

2.2 History of P3KT

In the 1960s, the process of urbanization is starting rapidly. This is indicated by the development of some of the city into a big city, such as Jakarta, Surabaya, Bandung, Medan and so on. The process of transformation of strategic activities, such as industry and trade have prompted further growth and development of these towns. The role and functions of such cities as a driving force in national development had begun. At that time, the demands of basic urban infrastructure began to increase. The Indonesian government began necessary to meet the basic infrastructure needs, not only to meet the needs of its population, but it is also necessary to further strengthen the function and role of these cities in regional development and national development. Through state funds, Dep. PU Cipta Karya, the Indonesian government to build the basic infrastructure of the city, such as roads, drinking water, sewage and garbage. At that time, the sectoral approach to development is done. Road infrastructure, water and others, are still built in the sectoral and fragmented, with very little integration, coordination and integration. So there are the "knock-down" phenomenon, which is of course not effective and efficient because they have to work twice as wasting energy, time and money.

With increasing urbanization rapidly and growing big cities in Indonesia, the government began to feel the need to formulate an urban policy to direct the growth and development of large cities is a comprehensive and long-term time dimension. Then in the mid 1970s, began to develop concepts "City Master Plan" which is better known as the "Master Plan". The master plan was prepared on the basis of socio-demographic studies, physical and economic as well as projected for the long term. In this master plan, the functional relationship between urban activities and the principle of efficiency into consideration. The end result of the master plan is realized in the form of land-use planning (zoning plan) of each component of urban activities such as industry, housing, commerce, recreation and so on .

3. Research Method

This paper was presented as a qualitative study with data collection secondary through literature study, the data obtained were analyzed and be discussed comprehensively. So in the end, it can be concluded and suggestions to be developed and acted upon by all stakeholders to the Model Planning Integrated As Accelerators Rural Development of Disadvantaged Coastal regions

4. Discussion

COASTAL VILLAGE DEVELOPMENT MODEL

The final target of the selection of this model is the independence of the village to meet their basic needs, ie food, energy, health and basic education by utilizing the authority of village autonomy. And according to the assertion of Mr. Bambang Brodjonegoro, as the Minister of Finance that the village funds should be allocated for infrastructure development. So the most appropriate model is P3KT. In the manufacture of integrated rural development plan, there are a few things to be a primary consideration, namely :

1. The issue of strategic coastal region (ecological, social, economic, agrarian and geopolitical)
2. Potential region
3. The need for infrastructure
4. Availability of the existing Village Fund

Therefore it is necessary to know why coastal village is categorized as backward villages :

1. Geographically disadvantaged villages generally relatively difficult to reach because of the far away from the archipelago, coastal and outlying islands or because the other geomorphological factors that are difficult to reach by a good network of transportation and communication media
2. Support of Natural Resources not owned by coastal villages or if having but the environment is an area that can not be protected or exploited, or be left behind due to excessive use of resources in the past.
3. Limitations of Human Resources inhabited only by people with limited education, knowledge, skills relatively low and undeveloped traditional institutions
4. Limitations Infrastructures especially transport, communications and the difficulty availability of clean water, lack of irrigation, health facilities, education and other services that resulted in local people have difficulties to economic and social activity
5. The existence of the village in a disaster-prone areas and social conflict can cause disruption of economic and social development activities

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6. The central and regional government policies that are less in favor of the coastal village, the error approaches and development priorities over the years, as well as the non-involvement of indigenous institutions in development planning.

To keep pace with the coastal villages it is necessary for the development of coastal village with village funds provided by the government since 2015 to perform activities :

1. Develop local rural economies through local resource user villages (natural resources, human resources and institutional) and the participation of all stakeholders related directly or cross-sectoral.
2. Empowering rural communities through increased community access to education and health services, job creation, improvement of access to venture capital (banking, insurance), technology (appropriate to labor-intensive), as well as market information
3. Improving the institutional capacity of local government (village up to the sub-district) and society (Non Governmental Organization)
4. Decides isolation behind coastal villages through increased infrastructure and transport communications, so it can be connected with the village and surrounding area a more open
5. Develop a coastal village in the border area as the front porch of the Unitary Republic of Indonesia the development of centers of economic growth based on natural resources and the development of leading sectors
6. Accelerate the rehabilitation and restoration of areas of post-disaster and post-conflict and disaster mitigation.

Of the condition and capabilities of each village behind the coast of different kinds to be made analysis and discussion in accordance with the character of each village, but as a whole can be made of planning the preparation of the Master Plan prepared by the scale of priority which will be made in advance, and which should next realized. Master Plan should be planned for at least five continuous years, due for 2015 has been given directives from the central government, the village fund for the first time this year prioritized infrastructure provision. For that condition largely underdeveloped villages coastal infrastructure is indeed a very minimal presence, should take precedence planning dock or mooring a fishing boat which is a major requirement profession locals, and rural road networks linking the pier, local district office, markets, health centers and place of education, as well as the post of Security and Order that already exist or will be planned at a later stage. Completeness of water supply network needs to be completed in conjunction with the provision of roads and bridges across rural activity center scale.

In the second year could be followed up by completing the roadside drainage channels and electrical energy network setup (such as Poles and wires) as well as site preparation Renewable Energy Center later. Similarly, clean water supply facilities need to be realized because the network has been installed in the first year. Operator to support subsequent activities have already started training and apprenticeship prepared elsewhere that have been in operation. As well as the realization of the first year program that has not been realized.

In the third year can be continued with the construction of market infrastructure that can be accessed either from the entire village and by a buyer who will buy the cultivation of local villagers. Currently skills training both for increased production as well as other skills of rural communities to increase the welfare of rural communities, which is associated with the use of natural resources held in the village. Likewise Health in the form of minimal health center in each village has to be there along with health care workers. As well as the realization of the second year program that has not been realized.

Procurement fourth year could be a boat fishing equipment, fishing gear or completeness of the safety of shipping and the establishment of cooperation with supporting facilities. Procurement Means of Communication and Information minimal level of RT / RW has been online with the Rural Village to spread information later. As well as the realization of the three year program that has not been realized. And in the fifth year of the Master Plan can be used to enhance existing facilities eg. provision of places of worship, care facilities and existing infrastructure, strengthening the means of communication and information in order to isolated villages being open, people become familiar with informatics techniques and can use it to improve their welfare and adding insight.

Thus, there is continuity from the first year until the fifth year. So that, when the Village Fund obtained in the year it is not sufficient, it can still be continued in the next year, and vice versa if the year was still there the Village Fund unused can advance the program next year with the realization of the year. To avoid mis-use of funds received by the village in order to conform with the quality assurance program and should be, the need for monitoring and assisting officers from relevant agencies for guidance, supervision and evaluation in accordance with the Master Plan that has been agreed upon later.

5. Conclusion

At this time, Management of Coastal Areas in the village is not optimal, particularly in connection with the management of modern enterprises, even traditional management is not significant to the existence of technologies that always echoed, has not touched the majority of rural communities left behind on the coast. This led to the utilization of marine and coastal resources to the production of less efficient resulting added value of production is less than optimal , while traditional business community developed coastal villages causing the utilization of natural resources there is less effective .

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With the large village fund and will routinely submitted in each fiscal year of the government to all villages in Indonesia, need to anticipate the readiness of village officials, especially in coastal villages through mentoring continuously by relevant agencies to the making of Master Plan Rural Development, which will be a guide in the development of Rural Development which includes infrastructure such as , transportation , water supply network, means of Information and Communication, Infrastructure Wharf / Berth Boat adequate, market to distribute the production from fisheries and aquaculture processing, development of Domestic Industry that can be done to increase the welfare of rural communities in Coastal Villages, as well as the renewable energy source that can be developed according to the location of the village (Solar Energy, Wind Energy and Tidal energy).

This problem can only be solved if there is interference of cross-sector of the Ministry of Maritime Affairs to build a jetty and protection of preservation of marine life, the Ministry of the village with the adequate improvement of rural infrastructure and improving the welfare of rural communities, the Department of Defense and Security to ensure security and public order, coastal villages, the Ministry trade and Industry to open market access results of aquaculture and agriculture that exist and provide management training marketing and processing results of operations, the involvement of universities and the scientific community to conduct research and disseminate the results of research on community empowerment coastal villages, as well as the Ministry of Primary and Secondary Education with emphasis on early childhood education Elementary and minimal in every coastal village that rural children can catch up with other regions in Indonesia .

6. Recommendations

For Practitioners: From this paper, academics can participate as a companion to the village officials to create a master plan for continuous development

For Government: This paper can be used as a basis for thought and consideration for the creation of public policy on rural assistance plan.

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INTRODUCTION ENERGY MECHANICAL THROUGH EDUCATIONAL GAMES TO CALCULATE CALORIES SO THAT CHILDREN COULD AVOID DIARRHOEA

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Abstract. Diarrhoea is a disease which still became problem in public health for developing countries, including Indonesia. East Java province have got 1st ranked who have quite high in diarrhoea's prevalence. In 2013 in East Java profile, children in 6-12 years aged got 3,301 children which get diarrhoea.
Purpose of this research is to create media learning base on multimedia in the form of Game Education for children in particular Primary School. Through this game, children can get visualization the energy mechanical needed in their activity. Children can know relationship about speed, time and distance to produce energy mechanical. The activity are given in this game are cycled.
Results of this research is to give lesson to children that cycling with a maximum speed of 20 km / hour by pressing the keypad continuously. Every 60 seconds, game has shown bring a good choice of food and drink hygienic and unhealthy. The child can choose food and drink, and game will calculate the calories of healthy foods chosen by the child of 2.5 cal / kg / hr. The longer a child cycling, the greater the required health level. If the child does not take health foods and drinks, game will automatically display the child with diarrhoea. Conversely, if the child choose healthy foods and beverages that children can complete the game properly.

Keywords: educational game, children, calories, diarrhoea.

Introduction

Diarrhoea, including that of parasitic origin, remains one of the most common illnesses among children and, as reported by the World Health Organization, is one of the major causes of infant and childhood mortality in developing countries (Boschi-Pinto:2008). Diarrhoea is a major cause of childhood morbidity and mortality in socio-economically developing countries. More than one million episodes of Diarrhoea occur every year among children under five years of age causing approximately 2.5million deaths (Kosek M:2003) Various microbial agents have been incriminated in Diarrhoea among which are enteric bacteria, parasites and viruses. Candida, Trichosporon and Geotrichum are fungi that have been reported to cause Diarrhoea. Different groups of viruses have been showed to be responsible for the high incidence of acute viral Diarrhoea among children during their first years of life (Giordano M.O:1990). These viruses include rotavirus, norovirus, adenovirus and astrovirus. The contribution of the various pathogens to Diarrhoea may differ substantially between regions depending on local meteorological, geographic and socio-economic conditions. Underlying reasons for the spread of diarrheal diseases are found in poor hygiene and sanitation, limited access to safe drinking water as well as inadequate education of health care providers and recipients.
In children, intestinal parasitic infections, particularly soil-transmitted helminthiasis is the cause of common health problems in tropical countries. Younger children are predisposed to heavy infections with intestinal parasites since their immune systems are not yet fully developed (O'Ryan M:2005), and they also habitually play in faecal contaminated soil. In addition to considerable mortality and morbidity, infection with intestinal helmets has been found to profoundly affect a child's mental development, growth and physical fitness while also predisposing children to other infectious agents. Several factors like climatic conditions, poor sanitation, unsafe drinking water, and lack of toilet facilities are the main contributors to the high prevalence of intestinal parasites in the tropical and sub-tropical countries (Giordano M.O:1990). Further, lack of awareness about mode of transmission of parasitic infections increases the risk of infection. Hence, a better understanding of the above factors, as well as how social, cultural, behavioural and community awareness affect the epidemiology and control of intestinal parasites may help to design effective control strategies of these diseases.
Diarrheal diseases are leading cause of preventable death, especially among children under five in developing countries. Diarrheal is defined as a child with loose or watery stool for three or more times during a 24-hour's period. The frequency and severity of diarrhoea is aggravated by lack of access to sufficient clean water and sanitary disposal of human waste, inadequate feeding practices and hand washing; poor housing conditions and lack of access to adequate and affordable health care (Kosek M:2000). Studies have been conducted in the past to establish risk factors of diarrhoea. Study conducted in Egypt showed that some socio-demographic characteristics like maternal age and child's age are some determinant factors for the occurrence of episode of diarrheal disease (O'Ryan M:2005) Similarly, study in Ghana showed that water availability, sanitary facilities, hygienic practices, flies infestations and regular consumption of street food are also some predicting factors for the occurrence of diarrheal disease (Henry

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F.G:2004). In Ethiopia, Yohannes and his colleagues found the incidence of diarrhoea to be higher in the second half of the infant's life when inborn immunity is weak and exposure to contaminated weaning foods increases (Babaniyi O.A:1991). Diarrheal diseases account for 1 in 9 child deaths worldwide, making diarrhoea the second leading cause of death among children under the age of 5. For children with HIV, diarrhoea is even more deadly; the death rate for these children is 11 times higher than the rate for children without HIV. Despite these sobering statistics, strides made over the last 20 years have shown that, in addition to rotavirus vaccination and breastfeeding, diarrhoea prevention focused on safe water and improved hygiene and sanitation is not only possible, but cost effective: every $1 invested yields an average return of $25.50 (Boschi-Pinto:2008).

One of the biggest causes of child mortality in Indonesia is diarrhoea, which can be prevented with lifestyle clean and healthy as washing hands with soap and brush your teeth. Based on Profile Healthiness in Province of East Java on 2012 shows that 64% of Indonesia children under 12th years get diarrhoea, this condition made Indonesia got 13th level cause of death in the world (Talwar O:1990).

Educational games are developed for many domains, such as social sciences, math, language arts, physics, biology, and logic (Wilhelm I:1990). The question of how effective educational games (including electronic educational games) are has led to many discussions regarding whether and how these games can assist traditional classroom instruction in order to help kids learn while they play in their leisure time. However, only few educational game designers claim that their games are really effective in education, and even fewer support these claims with results from formal empirical studies [10]. Children like learning with fun. Educational game is one of the way to give education to children. However their no study to made educational games to give visualization for children how to prevent children have healthy lifestyle so they are spared from diarrhoea. This research is to made educational game and focused to give knowledge about calorie's needed in the form of educational game.

Literature Review

2.1 Diarrheal

Diarrhoea and malnutrition are known to have a bi-directional relationship, that is, they are potentially causing each other. Diarrhoea may lead to malnutrition due to reduced dietary intake, mal-absorption and mal-digestion. On the other hand, malnutrition may cause and worsen diarrhoea and other infections due to a weakened immune system (Nel, 2010). It has been suggested that poor nutritional status is a risk factor of diarrhoea (Chowdhury et al., 1990; Chen et al., 1981; Schorling et al., 1990). A pooled analysis of nine cohort studies from different countries also indicated that a higher cumulative burden of diarrhoea prior to 24 months of life was associated with an increased prevalence of stunting at 24 months of age (Checkley et al. 2008).

The data suggest that malnutrition is associated with an increased risk of death from diarrhoea and that the risk varies by type of diarrhoea (Table 1). All of the community-based studies reported an increased risk of mortality from diarrhoea among children who had low weight for their age (10–15). A dose–response relation was reported in the studies from India (10, 11), the Philippines (15), and Sudan (13), where the child's weight for age was stratified into multiple categories. The study in the Philippines also included age-stratified data and reported that the highest risks of mortality from diarrhoea associated with malnutrition occurred among children aged 6–11 months. In the study in Sudan, the risk of mortality was inversely related to children's height for age and weight for height. A similar trend between malnutrition and an increased risk of mortality was observed in some, but not all, of the hospital-based studies (16–31). These studies examined a range of outcomes, including deaths from isolated diarrhoea, from non-bloody diarrhoea, and from dysentery. Eleven of the 16 studies were conducted in Bangladesh, India, or Pakistan. Most reported malnutrition using a dichotomous classification of the percentage of the median weight for age or weight for height. Estimates of risk varied with one of the highest point estimates (an odds ratio of 8.9) reported in the case–control study of deaths from dysentery in Bangladesh (26).

Table 1. Effectiveness of specific interventions against risks of diarrheic diseases (Curtis & Cairncross 2003)

Intervention	Reduction in diarrhoeal risk (%)
Hand washing with soap	47
Sanitation	36
Hygiene promotion	35
Improve water quantity	20
Improve water quality	16

2.1 Calories Needed For Children

Children aged 7-10 years old need lots of energy and nutrients because they're still growing. The amount of energy that food and drink contains is measured in both kilojoules (kJ) and kilocalories (kcal) and is commonly referred to as calories.

A healthy balanced diet for children aged 7-10 should include:

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- at least five portions of a variety of fruit and vegetables every day
- meals based on starchy foods, such as potatoes, bread, pasta and rice (choose wholegrain varieties when possible)
- some milk and dairy products (choose low-fat options where you can)
- some foods that are good sources of protein, such as meat, fish, eggs, beans and lentils

School-age children need about 1,600 to 2,500 calories per day. Children between the ages of 5 and 6 need 41 calories per pound of body weight, and those between 7 and 11 need 32 calories per pound. Don't worry too much about your child not eating enough, since children this age usually eat when they are hungry. Serve healthy foods and encourage your child not to eat too many calories if they start to gain extra weight.

Table 2. Calories Needed Each Day for Boys and Man (Curtis & Cairncross 2003)

Age	Not Active	Somewhat Active	Very Active
2–3 years	1,000–1,200 calories	1,000–1,400 calories	1,000–1,400 calories
4–8 years	1,200–1,400 calories	1,400–1,600 calories	1,600–2,000 calories
9–13 years	1,600–2,000 calories	1,800–2,200 calories	2,000–2,600 calories
14–18 years	2,000–2,400 calories	2,400–2,800 calories	2,800–3,200 calories
19–30 years	2,400–2,600 calories	2,600–2,800 calories	3,000 calories
31–50 years	2,200–2,400 calories	2,400–2,600 calories	2,800–3,000 calories
51 years and older	2,000–2,200 calories	2,200–2,400 calories	2,400–2,800 calories

Table 3. Calories Needed Each Day for Girls and Women (Curtis & Cairncross 2003)

Age	Not Active	Somewhat Active	Very Active
2–3 years	1,000 calories	1,000–1,200 calories	1,000–1,400 calories
4–8 years	1,200–1,400 calories	1,400–1,600 calories	1,400–1,800 calories
9–13 years	1,400–1,600 calories	1,600–2,000 calories	1,800–2,200 calories
14–18 years	1,800 calories	2,000 calories	2,400 calories
19–30 years	1,800–2,000 calories	2,000–2,200 calories	2,400 calories
31–50 years	1,800 calories	2,000 calories	2,200 calories
51 years and older	1,600 calories	1,800 calories	2,000–2,200 calories

2.2 Educational Game (eduGame)

Contemporary approaches to game-based learning consider the matching of learning content and game genres, the learning principles that games incorporate, the design of educational games and simulations, the effectiveness, sources, and institutional usage of games, and the design of meaningful play in games. However, these approaches have predominantly focused on the schools, higher education, corporate, and military sectors. The design and pedagogy of games for early childhood presents unique challenges not relevant to other sectors. The predominant and overarching challenge being the developmental level of learners in this age group. The developmental level of learners impacts both the pedagogical approaches that can be used as well as the learning tasks that can reasonably be presented. When considering developmental levels it is important to consider both the innate variability of development between individuals, and also the multiple types of development including cognitive, psychomotor, emotional/social, and psychosexual. To further compound this challenge the types of development can have strong interdependencies such as where psychomotor development can impact social and cognitive development, e.g. muscle development affecting speech and consequent social engagement.

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The distinction between play and games is indicated below in Figure 2 whereby games are a form of play with rules. Of the many definitions of what a game is, that offered by below covers the key constituents of conflict, rules, and goals. "A game is a system in which players engage in an artificial conflict, defined by rules, that results in a quantifiable outcome."

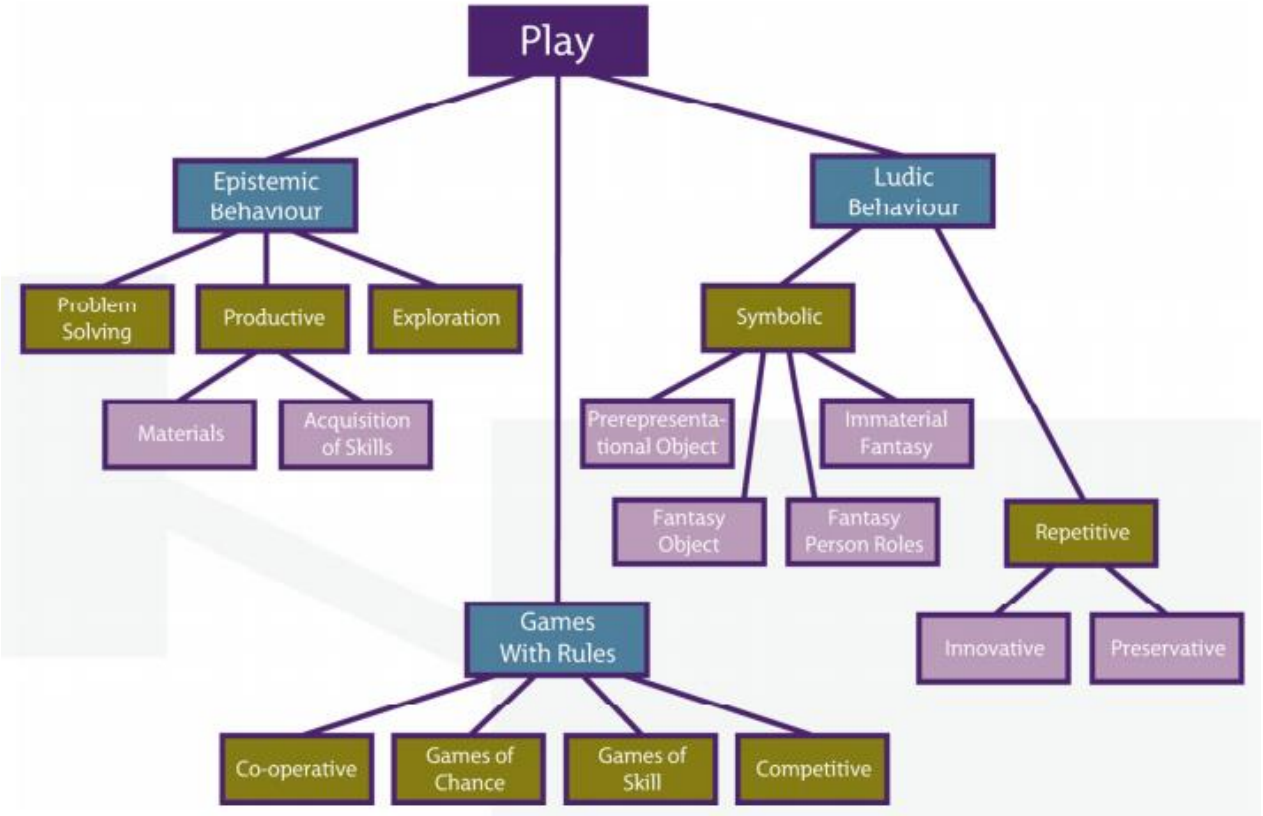

Figure 1. Proposed Taxonomy of Children's Play (Salen, 2003)

Although the definition of a game is clear, how the conflict, rules, and goals are manifested to leverage the benefits of play, are not. Play in early childhood is known to perform an important role in learning. It is significant in cognitive, psychomotor, emotional, social, and psychosexual development, as is considered in the following sections. However, the transition of these play benefits to digital game-based learning presents questions as to the content areas addressed, appropriate gaming strategies employed, and the underpinning pedagogies applied. In the following sections these questions are addressed with particular reference to the impact of developmental level on the pedagogy and design of educational games.

3. Research Method

Most foods and drinks contain calories. Some foods, such as lettuce, contain few calories (1 cup of shredded lettuce Consuming a healthy diet throughout the life course helps prevent malnutrition in all its forms as well as a range of no communicable diseases and conditions. But the increased production of processed food, rapid urbanization and changing lifestyles have led to a shift in dietary patterns. People are now consuming more foods high in energy, fats, free sugars or salt/sodium, and many do not eat enough fruit, vegetables and dietary fibre such as whole grains has less than 10 calories). Other foods, like peanuts, contain a lot of calories (½ cup of peanuts has 427 calories). Estimated amounts of calories needed to maintain energy balance for various gender and age groups at three different levels of physical activity. The estimates are rounded to the nearest 200 calories and were determined using the Institute of Medicine equation, as seen in Table 3.

Table 3. Calories Needed For Children

Age	Weight (kg)	Height (cm)	Calories Need (gr)
0-6 months	6,0	60	10
7-11 months	8,5	71	16
1-3 years	12,0	90	25
4-6 years	17,0	110	39
7-9 years	25,0	120	45

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Cycling is the third most popular recreational activity in the world. An estimated 3.1 million people ride a bicycle each month. As a form of exercise, cycling has broad appeal. Toddlers, pensioners, the able-bodied or people with disabilities can all enjoy cycling if they have the right equipment. Read our guide to cycling for beginners, which includes tips on staying motivated. Cycling is one of the easiest ways to fit exercise into your daily routine because it's also a form of transport. It saves you money, gets you fit and is good for the environment. It's a low-impact type of exercise, so it's easier on your joints than running or other high-impact aerobic activities. But it still helps you get into shape. For example, someone who weighs 80kg (12st 9lb) will burn more than 650 calories with an hour's riding, and tone their legs and bottom. If you ride up hills or off-road, you'll also work your upper body. The best way to build your cardiovascular fitness on the bike is to ride for at least 150 minutes every week. This research choose cycling to give visualization about calories needed for children as seen in Figure 2.

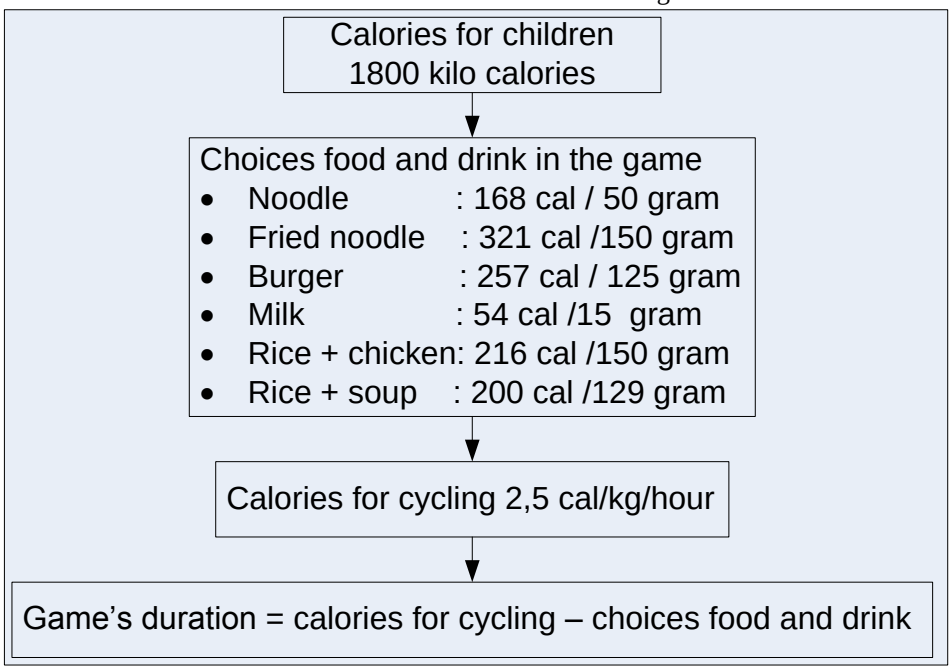

Figure 2. Research Method

Discussion

This section discuss the implementation of educational game. Figure 3 shows the child as players can choose foods and drinks that appear on the screen monitori when they play. The child can press the space bar to move the characters begin play. Food and beverage options that exist in the game is noodles, rice, fried chicken, vegetables. If children choose healthy foods that children get a high-calorie protein. But if children choose unhealthy foods or fast then the game will not last long, this is because the fast food choices have a low protein.

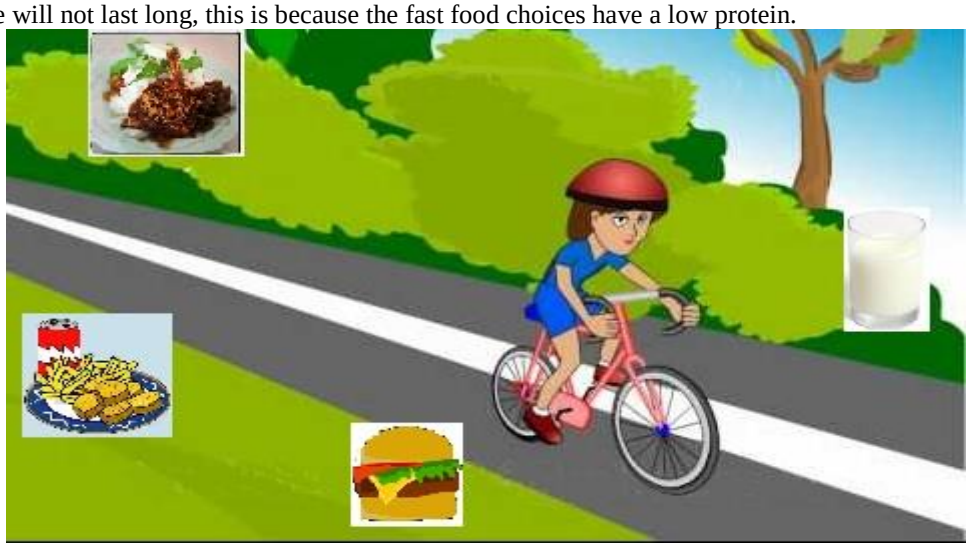

Figure 3. Cycling Game

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Figure 4 shows the child can finish the game well. This can happen if players choose nutritious foods and beverages or high protein. The duration of the game adjusted to the maximum distance that can be performed by children aged 7-8 years, which is 5 kilometres and visualized in this game as the length of the game is 10 minutes, with 2 minutes long game equivalent to 2 kilometres distance distance of cycling.

Figure 4. Finish the Game

Conclusion

This research has conclusion:

- The number of calories needed for cycling children was 2.5 calories / kg / hour.
- Mileage maximum of 7-8 years old children riding a bike is a maximum of 5 kilometers, and in this game is visualized with an old game for 10 minutes indicating 2 minutes to 1 kilometer.
- The game can provide visualization on calorie needs required for children, where children can choose a selection of food and drinks provided. Every food and beverages provided always adds to the needs of calories needed by children to continue cycling.

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THE PHYSICAL AND MECHANICAL PROPERTIES OF CONCRETE USING CEMENTITIOUS VOLCANIC ASH OF MOUNT BROMO

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Abstract : This study uses volcanic ash waste from the eruption of Mount Bromo as a substitution of cement (cementitious) for mixture material of concrete, and observing its effect on physics and mechanic properties of concrete. The mix design analysis of concrete material uses DOE method with the characteristic strength is 300 kg/cm^2, and w/c factor 0.5. The volcanic ash that is used are 0%, 5%, 10%, 15%, and 20% from the weight of the cement, and have granular size grain number 200. The test that is conducted are compressive strength test, porosity test, and modulus of elasticity test.
The test result shows that compressive strength from concrete of volcanic ash waste is 5% and 10% reached the charactersitic strength, even though its under normal concrete for about 2% - 3%. The significant distinction occurs on porosity concrete value with mixed volcanic ash is over 10%, compare to 5% and 10%. The modulus of elasticity test result shows that volcanic ash concrete 10% and 15% shows the better elaticity, compared to normal concrete.

Keywords: Concrete, cement, cementitious, volcanic ash

1. Introduction

Concrete remains as the main material for building material, made from a mixture of portland cement or hydraulic cement, fine aggregate, coarse aggregate, and water, with or without additives, which form a solid mass. The function of cement as aggregate binder during the process of forming concrete. The portland cement is a hydraulic cement produced by grinding clinker which consists of hydraulic calcium silicates, that generally contains of one or more forms of calcium sulfate as an additional material is milled together with the main material. Raw material for producing the cement are materials that contain lime, silica, alumina, iron oxide, and other oxides (Table 1). The most elements that is contained in the cement is CaO or lime which is the type of rock classified as natural resources that is not able to be updated. Exploration of the limestone have been done continuously and excessive would disrupt the balance of the environment, such as reduced availability of groundwater. Furthermore, the impact of dust pollution arising from mining limestone is able to pollute the air around the mine (Samekto 2001). Therefore, some researches was conducted in order to obtain the alternative material substitution of cement.

The price of cement continuously increasing is also the reason of why researches are also conducted in order obtain the alternative material substitution of cement. The price of cement also affects the price of building materials. It is expected by using alternative materials substitution will be able to reduce the use of cement to the mixture of building materials, and affects the reduction of cement production. This study used the volcanic ash as a partial substitution of cement (cementitious).

The volcanic ash of this research is the result of Mount Bromo eruption that occurred on November 2010. The volume of volcanic ash was very large and has no economic value for the public. According to Amin (2010), the volcanic ash contains of chemical compounds that have the potential and allow it to be used as the ceramic material. While IGA Suradharmika (BPPT 2011), Chairman of the Technical Implementation Unit Development of Ceramics and Porcelain Art Technology (UPT-PSTKP) BPPT-Bali said they have been utilizing volcanic ash from Mount Merapi and Mount Bromo as ceramic glaze materials with high combustion temperatures 1250^{o}C. The statement indicates that the volcanic ash has the potential and more likely to be used as a building material, such as a mixture for the manufacture of paving blocks, bricks, rosters, tiles and concrete.

The problem that is observed in this study is how the influence of volcanic ash as cementitious material towards the physical and mechanical properties of concrete. Based on explanations above, this research attempts 1) determine the physical properties and chemical elements contained in the volcanic ash, 2) to determine the mechanical properties that the compressive strength of the concrete using a mixture of cementitious volcanic ash of Mount Bromo as substitution partial cement at age 3 , 7, 14, 21 and 28 days, 3) to determine the physical properties of concrete using volcanic ash of Mount Bromo are porosity and modulus of elasticity at age of 3, 7, 14, 21 and 28 days.

The aim of this research is volcanic ash of Mount Bromo can be used as a partial substitute of cement in the concrete

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mixture. Thus, the volcanic ash becomes useful materials and high value. The impact is expected to reduce the exploitation of limestone which is the main raw material for producing cement, which could lead to catastrophic landslide in the mountain area of limestone and damage to the natural balance.

2. Literature Review

a. Concrete

Concrete is made from mixture of cement, fine aggregate, coarse aggregate and water. Cement which is had already been given water will become a cement paste and aggregate becomes a binder. Due to its unique will require a fairly extensive knowledge about concrete technology, such as basic materials, how to make, how to evaluate, and variations of additives.

Based on volume density, there are two types of concrete, such as normal concrete and lightweight concrete. Normal concrete is concrete with a unit weight of 2200 kg/m^3 to 2500 kg/m^3 and made using a mixture of natural aggregate materials were crushed or without crushed. In order to change the properties of concrete, during the mixing step, admixture is added as necessary. For example, in order to improve the strength of concrete, previous studies found that using additives fly ash in concrete mix. However, nowadays, using fly ash will cost a lot due to its high value and easy to get.

b. Cement

Cement is an essential material in producing the concrete, due to its function as a binder to grain aggregate in order to be one entity. Raw material for making cement are materials that contain limestone, silica, alumina, iron oxide, and other oxides as in Table 1 (Samekto 2001). When cement is mixed with water and turn into a paste, then mixed with sand and water, it will be formed as a cement mortar. If aggregate was added, it will turn to concrete. If aggregate bound by a cement paste that serves as glue and can be harden, the quality of the cement greatly affects the quality of concrete. Thicker the cement paste, thus more powerful the bond. However, if it is too thick, it will not guarantee a good attachment (Samekto 2001).

Table 1. Cement elements

Chemical Elements	Percent
Lime, CaO	60 - 65
Silica, SiO_2	17 - 25
Alumina, Al_2O_3	3 - 8
Ferro, Fe_2O_3	0.5 - 6
Magnesia, MgO	0.5 - 4
Sulfur, SO_3	1 - 2
Soda/potash $Na_2O + K_2O$	0.5 - 1

Source : Samekto (2001)

However, the availability of raw materials for cement in the field that is started to decrease and its complicated process makes cement becomes expensive. Therefore, a lot of researches has been done to obtain alternative materials of cement with similar function nonetheless with affordable price. The important point in order to get the best quality cement: basic materials must be in a good quality and the mixture should be really homogeneous. The basic materials are clay and limestone mixed with a certain ratio.

Portland cement in Indonesia, which appropriate to SII 0013-81, is divided into five types, such as: (1) type I is a Portland cement for general purposes. For example, used for the manufacture of pavement, masonry, etc., (2) type II is a modified portland cement, a type that consists of half of type IV and half of type V (moderate). Nowadays, a number of type IV produced cement substitute. This type can also be used for drainage of buildings in places that have a slightly high concentration of sulfate, (3) the type III is portland cement with early rigidity which is required when concrete with the mold must be dismantled as soon as possible or when the structure must be immediately used, thus would be able to use for repairing concrete buildings that is soon to be operated, (4) type IV is a portland cement with a low heat of hydration. This type of cement is required when the speed and the amount of heat that arises must be minimum. For example, for a massive building such as large gravity dams. Growth from this type is much slower than type I, (5) type V is a sulfate-resistant Portland cement, which is used for concrete in order to face ferocious sulfate action, such as in soil or ground water containing high sulfate.

a. Cementitious

The studies that utilizing alternative materials in order to use as cementitious has been carried by the experts with the aim to obtain a cement substitution materials within the mixture of building materials, thus reducing the cost of

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concrete-producing that started to increase (Sunyoto, 2006). Furthermore, it is expected to improve the quality of the concrete higher, or to increase robustness and durability of concrete.

Norman et al. (2008) using the pulp waste material as cementitious to produce concrete, and the result shows that there is an increase in the compressive strength and modulus of elasticity of concrete for the waste mixture is less than 5% of the weight of the cement.

Research with utilizing fly ash, which is the coal waste as a partial substitution of cement produces strong concrete higher than concrete without fly ash (Subakti, et al., 2012). The use of fly ash has been applied to the manufacture of concrete works in the field, mainly by batching plan that produces ready mix concrete.

A research result that has been conducted by Saputra (2011) using volcanic ash as additional material substitute for cement in the mixture of *Self Compacting Concrete* (SSC), and obtained an increase in the strength of concrete with mixture of volcanic ash, and optimal result is achieved by the concrete with a mixture of volcanic ash by 15% of the weight cement.

b. Volcanic Ash

The volcanic ash or pyroclastic fallout is the materials that is ejected into the air during volcanic eruption, consisting of large rocks to fine-sized, large (gravel boulders) usually falls around the crater to a radius of 5-7 km from the crater and the smooth ones could reach within hundreds of kilometers or even thousands of kilometers from the crater because it can be carried away by the wind. For example, the eruption of Mount Krakatau in 1883 can orbit the earth for days, also the eruption of Mount Galunggung in 1982 could reach Australia (Wibowo 2005).

The composition of the volcanic ash consists of three substances, such as the gas that comes from the hot magma which formed by magma and ground or water in its stream, rock, and silica. Heat and toxic clouds comes from mixing sulfur dioxide, carbon dioxide and hydrogen fluoride. When exposed to humans, it can lead to blindness, skin burn and chronic lung disorder, also may cause the machines damaged and not functioning, and contaminating the environment. Volcanic ash can be aired until the troposphere (8-12 kilometers above sea level), and can settle for a few weeks and change the weather locally. However, the occurrence of volcanic ash and the heat can not be predicted when it would happen. From observation by microscope with magnification of 400 times, volcanic ash from the eruption of Mount Bromo (2010) have forms, ranging spiky, angular, rounded up. Volcanic glass that has a tapered forms known as glass shard (Jeffry 2010).

The characteristics of volcanic ash relatively different from the dry dust as there are in general, especially in the dry season. Volcanic ash is formed from frozen magma that erupted explosively. Most of the details of this ash has a tapered shape, and because of the large silica content, this ash has a high absorption properties.

Table 2 Chemical Compound of Volcanic Ash of Mount Bromo

Parameter	Analysis result (%)	Cement (%)
Silicon dioxide (SiO2)	20.45	20 - 25%
Aluminium dioxide (Al2O3)	34.23	3 - 8%
Ferric Oxide (Fe2O3)	3.07	0.5 - 6 %
Kalsium Oxide (CaO)	1.55	60 - 65%
Magnesium Oxide (MgO)	5.43	0.5 - 4%
Titanium dioxide (TiO2)	0.18	
Alkali (Na2O)	0.87	

Source : Result of Laboratorium Test in TAKI ITS 2012

The volcanic ash particle size smaller than 2.38 mm. Volcanic ash is derived from the liquid magma which has a temperature about 600°-1200°C upon cooling will form a solid, such as minerals (solids having a crystal form) such as mineral plagioclase, pyroxene, hornblende, quartz and volcanic glass (solids that do not have a crystal form). When the mineral and glass clump together into a single entity called igneous rocks. Magma may freeze inside and outside the earth's surface. Magma out to the surface by effusive will form the lava (igneous), while the magma coming out explosively to form fractions (granules) solids which may be the cores of rock, granular crystals, or grains of volcanic glass, which has a size ranging from gravel to fine ash, which has a circular shape to a pointed. Because of the tapered shape, so if it gets into the eyes will quickly feel sore, and if entry into the respiratory tract is

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likely to be harmful.

The chemistry in Bromo volcanic ash, namely are lapili and silica. Lapili is kind of volcanic eruptions, shaped rigid hollow or round. In Latin, *lapillus* is the name for the result of explosive volcanic eruptions measuring 2 mm to 64 mm. Silica is an element contained in cement, with the silica content in the volcanic ash of Mount Bromo, the ash can be used as a cement substitute material. The content of chemical elements in the volcanic ash of Mount Bromo is shown in Table 2.

Until now, the volcanic ash has not been used optimally by the local peoples. Therefore, research of volcanic ash as an alternative material for the manufacture of concrete mix is done to improve its economic value. The volcanic ash has the potential to be developed as a fine aggregate in concrete. If Bromo volcanic ash can be used as a fine aggregate in the concrete mix, so the glut of volcanic ash that can overcome the shortage of natural materials, especially in the supply of materials as materials for concrete.

3. Research Method

This research was conducted in the laboratory. Materials for concrete mixes, namely cement, fine aggregate and coarse aggregate were tested in the laboratory to determine the feasibility of material requirements, such as sieve analysis test (ASTM C136-2001), specific gravity (ASTM C128-93), weight of volume (ASTM C29-2003), the humidity test (ASTM C556-2001), water absorption test (ASTM C128-2001), and the cleanliness of the sludge test (ASTM C117-1995), and the wore-test for crushed stone (ASTM C131-2003). Volcanic ash testing contains of density test, weight of volume test, and chemical analysis to determine the chemical elements contained. Cement was used portland cement type 1, production of Semen Gresik. Coarse aggregate was used crushed stone comes from Gempol, Pasuruan, and fine aggregate was sand from Lumajang. Volcanic ash was used is waste from the eruption of Mount Bromo with a grain size sieve No.200.

Analysis of the composition of the material was needed for concrete mix using DoE method, water cement factor is 0.5, and slump is 70-100 mm. Compressive strength characteristics was 30 MPa, and the material composition shown in Table 3. The volcanic ash was used to mix with percentage of variation of 0%, 5%, 10%, 15% dan 20% of the total weight of cement.

Table 3 The Mix Concrete Requirements for 1m^3

	Volume (m3)	Cement (kg)	Fine Aggregate (kg)	Coarse Aggregate (kg)	Water (liter)
1m3 (SSD condition)		308	693.70	1288.30	185.00
1m3 (original condition)		308	742.95	1296.80	142.20
1 mixed	0.00157	0.48	1.17	2.04	0.22

The experiment that was conducted is the compressive strength test (ASTM C39M-2001), porosity test (ASTM C642-1997) on concrete specimen age of 28 days to determine the percentage of pores in the concrete. The specimens were cylinder diameter of 100 mm, and height of 200 mm. Modulus of elasticity test (ASTM C469-2002) was used the specimen cylinder diameter of 150 mm, height 300 mm age of 28 days.

4. Discussion

The test result of sand and crushed stone were obtained that materials have been fulfilled the requirements of standard for use as concrete mix. The test result of sand obtained that gradation of granular was in zone 2 with fineness modulus is 3.69%, moisture is 0.8%, water absorption is 1.42%, weight of volume is 1.42 kg/l and specific gravity 2.63 kg/cm³. The test results obtained gradation of crushed stone granules are in zone 2, grain fineness modulus of 7.8%, 2% moisture crushed stone, water absorption of 1.7%, a specific gravity of 2.75 kg / cm³, volume weight of 1.26 kg / l and resistance to wear of 19.7%. Testing result of volcanic ash density of 2,67 kg / cm³, and the heavy volume of 1,126 kg / lt. Chemical elements contained in volcanic ash are shown in Table 2. It is known that the percentage content of SiO2 resembles cement, Al2O3 content is very large compared to cement and CaO content is very small compared to the cement.

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4.1 Result of Cement Paste Test

Cement paste was made from mixture of cement, water and volcanic ash with variation of 0%, 5%, 10%, 15% and 20% of total weight of cement was needed. Normal consistency of test result obtained that paste with cementitious of volcanic ash 0%, 5%, 10%, 15% and 20% respectively by 30%, 31.55%, 31.90%, 32.60%, and 33, show that the greater the content of volcanic ash in the mix of pasta, the greater the moisture content is needed. Setting and hardened time test of cement paste with cementitious of volcanic ash 0%, 5%, 10%, 15% and 20% obtained setting time 120 minutes, and hardened 210 minutes, indicating that the setting and harden time of paste of volcanic ash cementitious there is no difference with a paste without cementitious of volcanic ash.

4.2 Result of Compressive Strength Test

Compressive strength test of concrete specimens aims to determine the ability of concrete with cementitious of Mount Bromo volcanic ash to withstand compressive loads, thus knowing the value of the optimal percentage of volcanic ash for mixes and able to withstand high compressive loads. Figure 1 shows the test results of the compressive strength of concrete ages 3 to 28 days, obtained that the concrete of volcanic ash cementitious 10% reach the highest strength value than the other volcanic ash concretes and below that value are concrete with cementitious of volcanic ash is 5%. The strength increased of concretes with volcanic ash cementitious from age 3 to 28 days is not very significant as in concrete without volcanic ash, and its strength achieved is lower than concrete without volcanic ash. The low value of the compressive strength of concrete with volcanic ash cementitious can be caused by CaO in the volcanic ash required will react when mixing, after being given water, the percentage of CaO is insufficient, so it is up first dissolved in water before the reaction mixture is finished.

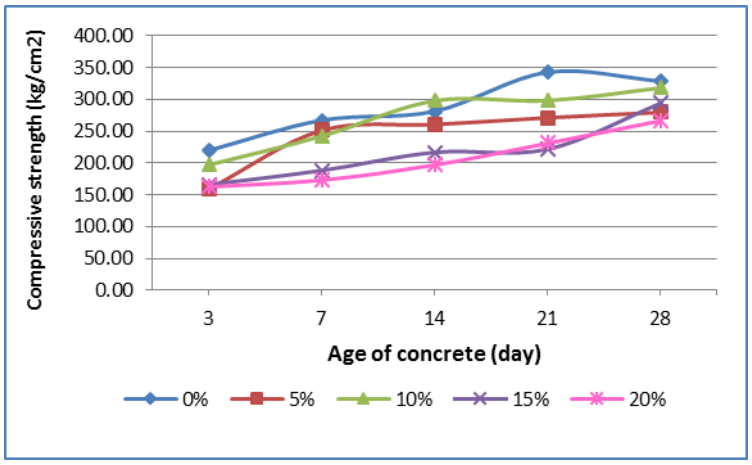

Figure 1 Relationship between compressive strength and age of concrete specimens

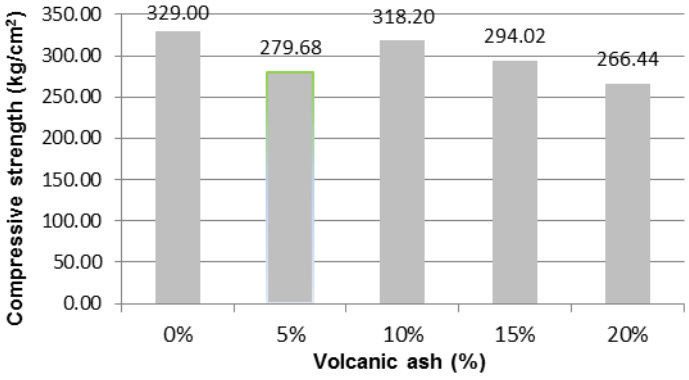

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Figure 2 Compressive strength value of each percentage of specimens

At the age of 28 days (Figure 2), concretes with volcanic ash cementitious 10% could reach plan of compressive strength value of 300 kg/cm^2, that is 318,20 kg/cm^2. Concrete with volcanic ash cementitious 5%, 15% and 20% did not reach the value of compressive strength of the plan, but can reach over 250 kg/cm^2. This indicates that the volcanic ash is 5% to 10% can be used to mix concrete compressive strength of the plan between 250 kg/cm^2 to 300 kg/cm^2, and volcanic ash of 15% and 20% for the compressive strength of the plan between 200 kg/cm^2 to 250 kg/cm^2.

Although at age of 28 days, concrete with mixture volcanic ash cementitious 15% compressive strength value is higher than concrete volcanic ash 5% (Figure 2), there is the possibility of anomaly research going on here, because it is based on the development of strength from age 3 to 28 days (Figure 1), an increase of volcanic ash concrete strength of 15% occurs very slowly.

4.3 Result of Porosity Test

Porosity test result are shown in Figure 3. The highest percentage value of porosity occur in concrete with volcanic ash cementitious 20%, in amount of 6.60%, and the lowest occur in concrete with volcanic ash cementitious 10%, that is 5.43%. This indicates that concrete with volcanic ash 5% to 10% have pores smaller than concrete with volcanic ash above 10%. When the volcanic ash for concrete mixture are used above 10%, is likely to lead to concrete has a greater percentage of pores. This causes the concrete matrix is not widely available solid or more void, the more cavity will reduce its ability to withstand the load of work. But the percentage of porosity between volcanic ash concrete with no volcanic ash did not show a very significant difference. This indicates that the volcanic ash in concrete mix does not lead to large porosity in the concrete matrix.

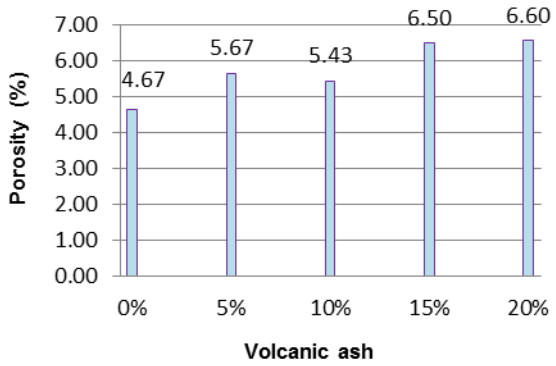

Figure 3 Porosity test result an average porosity of the concrete specimen age of 28 days

Porosity value is linearly related to the compressive strength as shown in Figure 4, visible porosity of concrete with volcanic ash cementitious of 10% shows a low value, but the compressive strength value is high. This proves if the concrete has low porosity, then the compressive strength of the concrete will be high, because not too many voids or empty spaces on concrete matrix, or concrete is very dense so it can withstand the load becomes high strength. Figure 5 shows a very strong linear relationship between the compressive strength by percentage of porosity, coefficient of determination R^2 of 67.10%.

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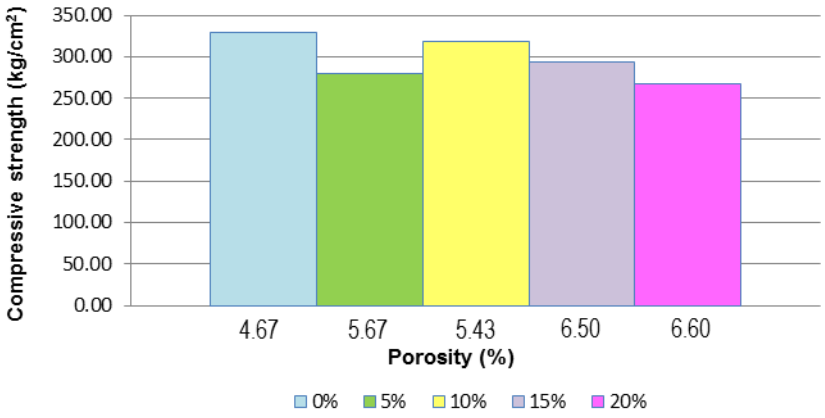

Figure 4 Relationship between compressive strength value and porosity

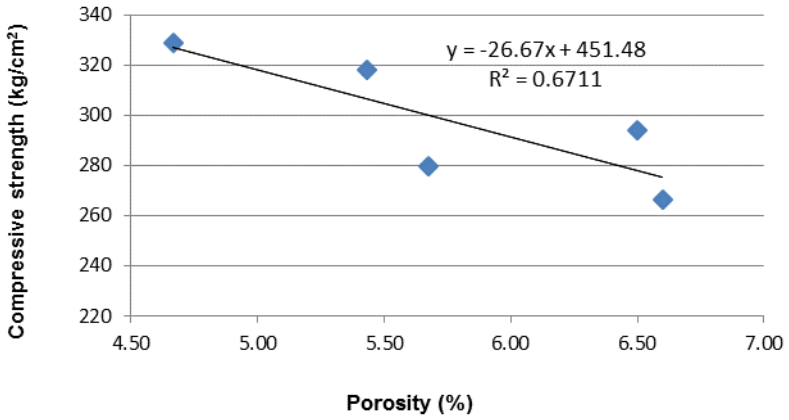

Figure 5 Linear regression of relationship compressive strength value and porosity

4.4 Result of Modulus of Elasticity Test

Modulus of elasticity test to determine the elasticity properties of concrete with volcanic ash cementitious through the relationship between it stress and strain (Figure 6). Before testing the modulus of elasticity, first was tested compressive strength of concrete specimens to determine the maximum load. From the results of laboratory tests, 40% of the maximum load is used as a reference to determine the maximum load reduction in concrete. The compressive stress of the plan will be recorded decrease in the strain using a dial gauge.

The modulus of elasticity result of concrete age of 28 days is shown in Table 4, and compared with the results of theoretical analysis of modulus of elasticity according to SNI 03-2847-2002, the formula is $E = 4700\sqrt{fc'}$. It is known that modulus of elasticity of concrete with volcanic ash mixture tends to be more elastic, in to withstand the load can longer than concrete without volcanic ash, and not easly collapse. Concrete with cementitious of volkanic ash 10% (Figure 6), while holding the load, the stress that occurs enough high, indicating an excellent ability to withstand loads and strain that occurs is longer, that is shown the concrete is elastic. Strain that occurs in concrete with volcanic ash 15% quite long, but a small load bearing capability. This shows that the concrete with volcanic ash mixture of 10% will be able to accept the load well, and it is a maximum percentage for the concrete mix.

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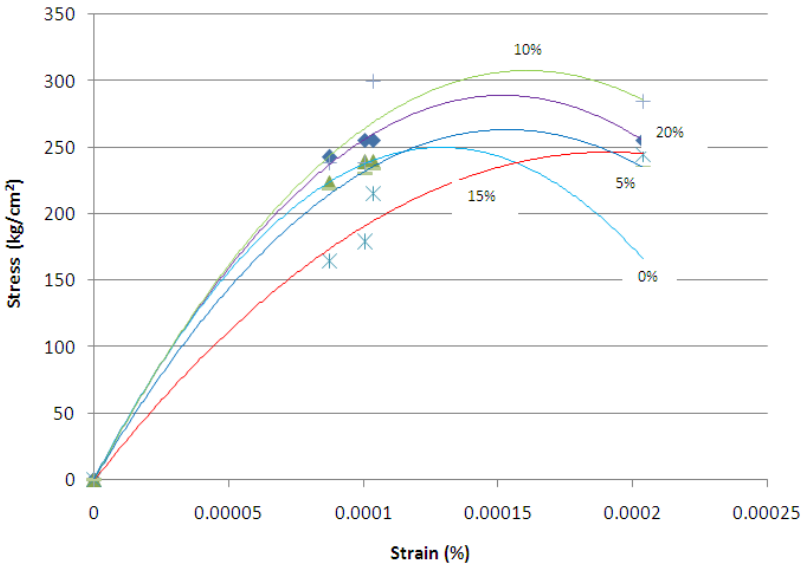

Figure 6 Relationship stress and strain of concrete specimens

Table 4. Comparison of modulus of elasticity between SNI and test result

Volcanic ash %	E SNI	E result test	Difference
0	81406.39	26630.25	0.33
5	81406.39	29304.75	0.36
10	81406.39	32333.97	0.40
15	81406.39	35513.24	0.44
20	81406.39	31326.07	0.38

5. Conclusion

From discussion above are obtained some conclusions as follows :

- The result of laboratory test are known volcanic ash characteristics, which is a specific gravity of 2.67 kg/cm^3, weight of volume of 1.126 kg/cm^3. Compounds in volcanic ash are mostly used as pozolan elements namely SiO_2, Fe_2O_3 and Al_2O_3.

- Optimal percentage of Mount Bromo volcanic ash as cementitious is 10%, because it can achieve high compressive strength value. This is due to the chemical content of CaO and SiO_2 contained in the volcanic ash of Mount Bromo less when compared with to portland cement.

- Lowest porosity occurs in concrete with mixture 10% of volcanic ash, which amounted to 5.5%. This proves that a low porosity is linearly related to it compressive strength value.

- The test results show that the modulus of elasticity of concrete were given a mixture of volcanic ash have better elasticity properties than concrete without volcanic ash. Concrete with volcanic ash of 10% produce the highest stress and strain, showed the concrete has the ability to withstand higher loads than other concretes.

- Declining performance of concrete strength caused by the volcanic ash contains CaO in small quantities, so when the reaction with water, CaO is up first dissolved in water before the reaction mixture is finished.

1.

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POTENSIAL MIXTURE OF LAPINDO MUD AND WOOD SAWDUST AS AN ALTERNATIVE MATERIAL BRICK

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Abstract: Bricks are important component for building construction activity both for structure or building aesthetic. Lapindo mudflows are the materials that have a similar character with the clay so that it can be used as substitutes material. On that process, sengon sawdusts are chosen for additional mixing material because of its shape are particular and easy to be treated. Both of materials have been tested at factories that product bricks, ceramics, tiles, etc. In this research, the bricks that will be made contains of mixing lapindo mudflows and sengon sawdust with compositions are 5% sawdusts: 95% lapindo mudflows, 10% sawdusts: 90% lapindo mudflows, 15% sawdusts: 85% lapindo mudflows, dan 20% sawdusts : 80% lapindo mudflows. Percentage of the sawdusts determined by total mass for 1 unit of the brick. To produce a brick that made from alternative materials that suitable with SNI 15-2094-1991 and SII 0021-1978 will be tested for compressive strength, absorbtion, salinity, appearance, and it precision size. For this study used sawdust without any combustion process, but must pass a 1.4 mm sieve because of a pre-study process, wood sawdust that is burned is not proper to use as because of wood sawdust only becomes charcoal, not to ashes, so it can not continue to be used as a brick. From the result of this research, the bricks which contains 5% sawdusts : 95% lapindo mudflows are qualified for SII 0021-1978 on K25 with the value of compressive strength is 27,66 kg/cm² so that proper to used as building materials.

***Keywords*:** brick, lapindo mudflows, wood sawdust

1. Introduction

Brick is one important component in building construction activities for parts of the wall or partition. Brick chosen because the price is relatively cheap, easy to obtain, and has a high enough strength base material that is generally taken from a red brick excavation lush rice fields or clay. It is an exploitation of nature that can damage the local environment caused by excessive excavation of clay. Therefore, the manufacture of bricks needed for quality improvement resulting in an effective, economic value or inexpensive, practical and environmentally friendly. One way that is done to improve the characteristics of the bricks, using alternative materials.

Revisiting the Lapindo mud overflow events that occurred in Sidoarjo (East Java Province) on May 28, 2006 adverse impacts and to this day can not be stopped. The volume of mudflow output reached 10000-15000 m3 / day (Sidoarjo Mud Management Agency, 2012). Various studies have been conducted to determine the content of the compound in the Lapindo mud, and trials to be a variety of building materials, among others as a mix concrete, paving blocks, ceramic, tile, and brick. From the research Lab TAKI-ITS (Dian, 2007), the Lapindo mud consists of chemical compounds contained in cement and clay, among others SiO2 and Al2O3, it can be concluded that the Lapindo mud can be used as a substitute for clay to make bricks.

In the manufacture of bricks are often also added substitutes (Hand, 2010), in this case the selected industrial waste sawdust from the property. The addition of filler material is sawdust derived from wood sengon been highly refined grains so easily processed (Risnasari, 2008) . In terms of chemistry, sawdust burned will produce the same chemical compound with chemical compounds contained in the Lapindo mud that SiO2 and Ca. Availability sawdust abundant, allowing it to be used as material for the production of building materials , especially bricks.

Scope of problem

The boundary problem formulated in this study include:

1. The basic material used in this study is the Lapindo mud.
2. Mix or filler material used is wood sawdust sengon taken from the property industry in Dukuh Kupang Surabaya.
3. The water used is taken from Concrete Laboratory of the Faculty of Engineering University of Wijaya Kusuma Surabaya.
4. Percentage mixture of sawdust is 5%, 10%, 15%, and 20% of the total mass of the brick units with the following details: - 5% sawdust: 95% Lapindo mud
   - 10% sawdust: 90% Lapindo mud

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- 15% sawdust: 85% Lapindo mud
- 20% sawdust: 80% Lapindo mud

5. The size of the bricks is 230 x 110 x 50 mm in accordance with SNI 15-2094-1991
6. Burning carried out at a brick industrial site in Jalan Sepanjang brick.
7. Tests covering quality, the resulting compressive strength, absorbency and bulk density, the views are, and salinity.

Research purposes
The purpose of this study is:
1. To determine the effect of sawdust material in Lapindo mud mixture on making bricks for the outside view of the test, compressive strength, size and precision, absorption, and salinity.
2. To determine the exact composition between Lapindo mud and sawdust to be made of bricks with the best quality standards SNI 15-2094-1991 and SII 0021-1978.

2. Literature Review

Quality Standards Bricks
Assessment of quality bricks from a mixture of Lapindo mud and sawdust must fulfill the terms of red bricks. The terms bricks SNI 15-2094-1991 and SII 0021-78 include:

a. Outside view
Red brick must have ribs sharp and angled, the sides should be flat, showing no cracks and deformation were excessive, is not easily crushed or broken, the color is uniform, and reads aloud when struck. (Yuda Romadhona, 2007)

b. Size
SNI 15-2094-1991 set a standard size for bricks as follows:
a. Length 240 mm, width 115 mm and thickness 52 mm
b. Length 230 mm, width 110 mm and thickness of 50 mm
Whereas the standard size bricks according to SII-0021-78 are shown in Table 1 :

Table 1. Standard Size For Bricks Modul

Modul	Thickness (mm)	Width (mm)	Length (mm)
M-5a	65	90	190
M-5b	65	140	190
M-6	50	110	220

Deviations are permitted by the standards for length is a maximum of 3%, to a maximum width is 4%, while for thickness is a maximum of 5%. The maximum size of a brick deviations are allowed in SII - 0021-78 , is as follows :

Table 2. Deviation Maximum Size List

Class	Size Deviation (mm)					
	M-5a and M-5b			M-6		
	Thickness	Width	Length	Thickness	Width	Length
25	2	3	5	2	3	5
50	2	3	5	2	3	5
100	2	3	4	2	3	4
150	2	2	4	2	2	4
200	2	2	4	2	2	4
250	2	2	4	2	2	4

Deviations largest standard size bricks which allowed the SII - 0021-78, which is 3 % for the maximum length; The maximum width of 4 %; and a maximum thickness of 5%. While the difference between the maximum -sized brick by brick the minimum size allowed, which for a length of 10 mm, a width of 5 mm, and a thickness of 4 mm.

c. Compressive Strength
The compressive strength is the ability of a material to withstand mechanical loads or style as a material 's ability to withstand the load or mechanical force until its failure.

Table 3. Bricks Compressive Strength Classification (SNI 15-2094-1991)

Brick Quality	Bricks Compressive Strength	
	Kg/cm²	N/mm²
I	>100	>10
II	80 – 100	8 s/d 10
III	60 – 80	6 s/d 8

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Meanwhile, according to SII - 0021-1978 are the class division based on the compressive strength of brick, can be seen in Table 4.

Table 4. Compressive Strength Of Brick (SII 0021-1978)

Class	Bricks Compressive Strength		Deviation (%)
	Kg/cm²	N/mm²	
25	25	2,5	25
50	50	5,0	22
100	100	10,0	22
150	150	15,0	15
200	200	20,0	15
250	250	25,0	15

d. Absorption

Absorptive capacity is the maximum capacity of bricks absorb water. Brick is good when soaked with water no bubbles are too many and not destroyed.

e. Salinity

Tests conducted to determine the salt content of the brick with the following requirements:
- If the surface of the bricks is less than 50 % covered with a layer of white crystals , then no harm.
- If 50 % of the surface covered with a layer of white brick, but the surface of the bricks can not be separated/peeled, then there is a possibility of harm .
- Meanwhile, if more than 50 % of the surface covered in a layer of white brick and brick surface dissolves, then the harm.

3. Research Method

At the pre-study, conducted two treatments on wood sawdust variables to receive the results of appropriate materials, namely:
1. The sawdust is burned to form ash.
2. Sawdust without burned

From these results, the process of making the bricks with a mixture of Lapindo mud and sawdust that has been burned, is not feasible because the sawdust only becomes charcoal, so it can not continue to be used as bricks. For this study used sawdust without any combustion process, but must pass a 1.4 mm sieve. In this research uses comparative percentage:

- 5% sawdust: 95% Lapindo mud,
- 10% sawdust: 90% Lapindo mud,
- 15% sawdust: 90% Lapindo mud, and
- 20% sawdust: 80% Lapindo mud.

Outside that percentage, bricks produced are not in accordance with the expected outcomes.

From the percentage that has been determined, then calculate the composition of the materials to be used . The bricks used in this study using a size of 230 mm x 110 mm x 50 mm, has a volume of 0.001265 m³. To determine the material composition of the mixture is done by trial and error based on the mass of bricks. On the percentage of 100 % for 1 unit Lapindo mud bricks obtained Lapindo mud mass of 2.25 kg, which is then used as a reference for determining the mass of material composition for each type of brick. The results of the composition of the mixed material of each type of bricks are shown in Table 5.

Table 5. Mixed Compotition of Bricks

No.	Type	Mixed Compotition	SG (Kg)	LL (Kg)
1	I	5% SG : 95% LL	0,1125	2,138
2	II	10% SG : 90% LL	0,2250	2,025
3	III	15% SG : 85% LL	0,3375	1,913
4	IV	20% SG : 80% LL	0,4500	1,800

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4. Discussion

Outside view

Standard terms feasibility of bricks on the outside view of the test include shape, color, and the mass of the body. From the results obtained looks beyond bricks to form a flat smooth surface, no cracks with a right-angled ribs. On the bricks with a mixture of 20 % SG : 80 % LL are cracks on the surface. The rift was caused due to the large amount of sawdust. Overall test results outside the view of the shape of the brick can be concluded that the bricks of material Lapindo mud and wood sawdust fit for use.

Table 6. Brick Shape After Combustion Processes

Type	Mixed Compotition	Specimen Identity	Shape		
			Flat plane		Lateral
			Flat	Cracked	Siku-siku
I	5% SG : 95% LL	1	□	-	□
		2	□	-	□
		3	□	-	-
		Prosentase	100%	-	67%
II	10% SG : 90% LL	1	□	-	□
		2	□	-	□
		3	□	-	□
		Prosentase	100%	-	100%
III	15% SG : 85% LL	1	□	-	□
		2	□	-	□
		3	□	-	□
		Prosentase	100%	-	1 0%
IV	2 % SG : 80% LL	1	-	□	□
		2	□	-	□
		3	-	□	□
		Prosentase	33%	67%	100%

Table 7. Brick Colours After Combustion Processes

Type	Mixed Compotition	Colour		
		1	2	3
I	5% SG : 95% LL	Red	Red	Red
II	10% SG : 90% LL	Red	Red	Red
III	15 SG : 5% LL	Red	Red	Red
IV	20% SG : 80% LL	Red	Red	Red

From the results obtained looks beyond bricks to form a flat, flat surface, no cracks with a right-angled ribs. On the brick with a mixture of 20 % SG : 80 % LL there are cracks on the surface. The rift was caused due to the large amount of sawdust. Overall the test results outside the view of the shape of the brick can be concluded that the bricks of material Lapindo mud and wood sawdust fit for use.

Table 8. Brick Mass Before Combustion Processes

Type	Mixed Compotition	Mass (gram)			Mass Average (gram)
		1	2	3	
I	5% SG : 95% LL	1710	1725	1770	1735
II	10% SG : 90% LL	1554	1613	1549	1572
III	15% SG : 85% LL	1411	1329	1400	1380
IV	20% SG : 80% LL	1120	1128	1022	1090

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Table 9. Brick Mass After Combustion Processes

Type	Mixed Compotition	Mass (gram)			Mass Average (gram)
		1	2	3	
I	5% SG : 95% LL	1452	1465	1410	1442,3
II	10% SG : 90% LL	1010	1132	1094	1094
III	15% SG : 85% LL	1029	1005	1021,3	1021,3
IV	20% SG : 80% LL	885	1015	920	920

The above table shows that the brick material Lapindo mud and sawdust will produce bricks with the highest mass of 1.4423 kg, which is lighter brick 20 % compared with the mass of bricks in general, ie 2-5 kg. Brick lighter mass is influenced by the amount of sawdust contained in it, where more and more percentage of sawdust will become lighter brick produced. The bricks with lighter mass will be more profitable because, if applied as building walls will reduce the load on the structure.

Size and Precision

In this study, the manufacture of bricks SNI 15-2094-1991 use standard size of 230 x 110 x 50 mm. After the burning process to change the size or shrinkage, such as on Table 10 below:

Table 10. **S**ize Changes Bricks After Combustion Processes

Type	Mixed Compotition	Specimen	Size (mm)		
			P	L	T
I	5% SG : 95% LL	1	198	95	50
		2	205	100	50
		3	200	95	50
	Deviation (%)		12.61	12.12	0
II	10% SG : 90% LL	1	210	100	50
		2	210	100	50
		3	210	100	50
	Deviation (%)		8.7	9.09	0
III	15% SG : 85% LL	1	210	100	50
		2	210	102	50
		3	210	97	50
	Deviation (%)		8.7	9.39	0
IV	20% SG : 80% LL	1	202	102	49
		2	202	97	50
		3	199	97	50
	Deviation (%)		12.61	10.3	0.67

From the tables and calculations above, it can be seen that the bricks with a mixture of Lapindo mud and sawdust undergo significant changes in size after the firing process. The changes are influenced by the water content contained in the Lapindo mud lost during the drying process and the combustion process. The size of the brick used in order to determine how many bricks are needed for each 1 m². By using bricks with a mixture of Lapindo mud and sawdust, requires ± 53 bricks for every m². From the experimental results in the measurement of length, width, and height can be concluded that a change in the standard sizes above SNI 15-2094-1991 and SII 0021-1978 so it needs to be replicated to the size of the brick mold.

Water Absorption

Testing of water absorption on the bricks to demonstrate the maximum ability of bricks to store water . Results of testing water absorption are shown in Table 11. Absorption of power brick is very influential on the bonding strength of brick masonry. Absorption power brick should be controlled so that the possibility of loss of water is not too large that it interferes with the species so that the strength of the bond will be reduced.

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Table 11. Water Absorption

Type	Mixed Compotition	Specimen	Weight (kg)		Water Absorption (%)	Average Water Absorption (%)
			Dry (a)	Wet (b)		
I	5% SG : 95% LL	1	1,45	1,71	17,63	23,27
		2	1,47	1,83	24,9	
		3	1,41	1,80	27,3	
II	10% SG : 90% LL	1	1,01	1,35	33,7	30,2
		2	1,13	1,43	25,8	
		3	1,14	1,49	31,1	
III	15% SG : 85% LL	1	1,03	1,35	31,1	30
		2	1,01	1,31	30,3	
		3	1,03	1,32	28,6	
IV	20% SG : 80% LL	1	0,89	1,25	41,2	41,8
		2	1,02	1,45	42,4	
		3	0,86	1,22	41,9	

Absorption of the test results on all specimens showed that all specimens exceeded the tolerance absorption in SNI 15-2094-1991 which is 20%. Therefore, to avoid damage caused by the construction of high absorption, the species used must be added water or held special maintenance eg flushing water. The amount of absorption due to:

1. The existence of pores contained in bricks, resulting in water more quickly and easily absorbed into the brick. Pori - pores in the bricks is caused by sawdust that have shrunk after experiencing the combustion process.
2. The presence of cracks as a result of combustion. If the absorption of large bricks, the bricks will absorb water species and may make the water so that the mixture becomes dry bricks and species not attached and the power brick would be reduced.

From the test results of water absorption in the brick mixture Lapindo mud and sawdust obtained results:

1. The bricks have a water absorption exceeds the standards ISO 0021-1978 15-2094-1991 and SII is 20%.
2. The brick requires special treatment, which is soaked in water before use so as not to interfere with the bond strength of species, as well as absorbing water when applied to the walls of the building resulting in damage to the construction.

Compressive Strength

The bricks must meet the standard compressive strength was determined by SNI 15-2094-1991 and SII 0021-1978. The results of the test tap shown in Table 12 .

Table 12. Compressive Strength

Tipe	Prosentase Campuran	Benda Uji	Ukuran (cm)		Luas (cm^2)	BebanTekan (kg)	KuatTekan (kg/cm^2)	KuatTekan rata-rata (kg/cm^2)
			Panjang	Lebar				
I	5% SG : 95% LL	1	9.9	9.5	94.05	2200	23.39	27.66
		2	10.25	10	102.5	1900	18.54	
		3	10	9.5	95	3900	41.05	
II	10% SG : 90% LL	1	20.2	10.2	206.04	2200	10.68	10.41
		2	20.2	9.7	195.94	2100	10.72	
		3	19.9	9.7	193.03	1900	9.84	
III	15% SG : 85% LL	1	10.5	10	105	600	5.71	8.89
		2	10.5	10	105	1000	9.52	
		3	10.5	10	105	1200	11.43	
IV	20% SG : 80% LL	1	10.5	10	105	600	5.71	8.65
		2	10.5	10.2	107.1	800	7.47	
		3	10.5	9.7	101.85	1300	12.76	

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Compressive strength achieved the highest average by a brick with a mixture of 5 % sawdust : 95 % Lapindo mud that is equal to 27.66 kg / cm2 . The value has exceeded the standard SII 0021-1978 in class 25, namely 25 kg / cm2. From the test results of the compressive strength of bricks produced :

1. Bricks with a percentage of 5 % sawdust : 95 % Lapindo mud produce compressive strength of the total of 27.66 kg / cm2.
2. Bricks with a percentage of 5 % sawdust : 95 % Lapindo mud 0021-1978 SII meet the standards in class 25 3. To get a brick with a compressive strength according to standards SII 0021-1978 , the percentage of sawdust mixed materials used to make the bricks should not be more than 5 %.

Judging from the resulting compressive strength of bricks, it can be seen the influence of water absorption, the size of a brick, and the brick mass of compressive strength is:

1. The higher the water absorption of bricks due to the pores caused by shrinkage of wood sawdust after the combustion process, the resulting compressive strength would be lower.
2. The greater the shrinkage of the size of a brick, the brick compressive strength would be lower. The depreciation of significant size due to the loss of water content in the Lapindo mud during the process of drying and firing.
3. Bricks with a mixture of mud and sawdust lapindo mass produce lighter so as to reduce the load on the structure.

The relationship between the mass of the compressive strength of bricks is on the bricks with higher mass, will produce a high compressive strength. Brick with a compressive strength corresponding SII 0021-1978 standards are achieved by a brick type I with a percentage of 5% sawdust: 95% Lapindo mud compressive strength 27.66 kg / cm² and a mass of 1.4423 kg.

Salinity

Brick soaked half in a state to stand for 24 hours, after which the observed surface conditions. Results Assay Test Salt as shown in Table 13 .

Table 13. Salinity

Type	Mixed Compotition	Specimen	Salinity			Brick Surface Condition
			< 50%	50%	> 50%	
I	5% SG : 95% LL	1	✓	-	-	
		2	✓	-	-	
		3	✓	-	-	
II	10% SG : 90% LL	1	✓	-	-	Exfoliate
		2	✓	-	-	
		3	✓	-	-	
III	15% SG : 85% LL	1	✓	-	-	
		2	✓	-	-	
		3	✓	-	-	
IV	20% SG : 80% LL	1	✓	-	-	
		2	✓	-	-	
		3	✓	-	-	

Salinity test results on the bricks with a mixture of Lapindo mud and sawdust bricks obtained with salinity below 50 % so that the bricks are eligible to be used as building materials.

5. Conclusion

From these studies it can be concluded that:

1. The shape of the bricks are in accordance with the standards that the surface is flat, flat and angled at the corners.
2. The bricks have gone through the process of burning good for 6 days with a temperature of 900º C.
3. Percentage of the mixture of sawdust bricks influence the masses, the more the percentage of a mixture of sawdust, the more light the mass of bricks. Massa bricks lighter will reduce the load on the structure.
4. The mass of bricks affect the compressive strength is generated, where the bricks with higher mass will produce a greater compressive strength. Massa brick by brick The highest percentage of type I with 5% sawdust: 95% Lapindo mud that is equal to 1.4423 kg.
5. The bricks that have been burned shrinkage or changes in significant measure due to loss of water content in the Lapindo mud during the drying process and combustion.
6. Depreciation size of the bricks affect the compressive strength of brick, which is the size of a brick with a higher

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depreciation value will generate lower compressive strength.
7. The bricks with a mixture of 5% sawdust: 95% Lapindo mud reached the standard SII 0021-1978 in 25 classes with an average compressive strength of 27.66 kg / cm2 above the minimum limit at 25 kg / cm2, making it feasible to be used as building material.
8. To get a brick with a compressive strength according to standards SII 0021-1978, the percentage of the mixture of sawdust used is a maximum of 5%.
9. The bricks fit for use because it contains salt content of less than 50% according to standard ISO 0021-1978 15-2094-1991 and SII making it safe for use as a building material.

6. Recommendations

For Practitioners:
1. It is recommended to review the size of the brick mold that at the time after the burning, the size of the brick did not have major deviations so in accordance with SNI 15-2094-1991 and SII 0021-1978.
2. Due to the resulting absorption is high enough then need special treatment before it is used is drenched with water so that when the brick is installed does not absorb water of the species.
3. Because the brick-making material consisted of wood, it is necessary in terms of the resilience of bricks against the pest.
4. Require viscosity test to determine the condition of the spikes that occur at the bricks when plugged spikes.

For Government:
The results of this study deserve to be considered as an alternative substitution of bricks for government projects particularly housing. In addition to utilizing the waste, reducing environmental impact, improving the social impact for communities affected by the Lapindo mudflow.

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OPTIMIZATION OF SORGHUM INSTANT NOODLES PRODUCTS: A STUDY OF THE CHARACTERISTICS OF RED SORGHUM (SORGHUM BICOLOR) AND WHITE SORGHUM (KD4)

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Abstract: Various potential alternative food sources can be developed to support diversification and food security program of the Indonesian, one of them is sorghum. It is the most important food source in the fifth rank after wheat, rice, corn and barley. Research is aimed at developing sorghum as an alternative food product of sorghum noodles. Research used Randomized Block Design (RBD): 2-factors RBD experiments with 3 replications. Factor I: Types of flour (T): T1: red sorghum flour (*Sorghum bicolor*) and T2: white sorghum flour (*KD 4*). Factor II: Concentration (K): K1:25%; K2:50%; K3:75%; and K4:100%. Observations: organoleptic parameters of taste, color, aroma, elasticity, moisture content, carbohydrate, protein, and fat. Data analysis: organoleptic test used Friedman test, chemical analysis used an analysis of variance followed by Duncan test 5%. Results of the study: 1) Rendement of grain was 6 tons/ha, rice 4,2 tons/ha, flour 4,2 tons/ha, bran 0,6 tons/ha, sorghum bran 1,2 tons/ha; 2) sorghum noodles as sorghum flour product diversification; 3) The best treatment for some combinations of sorghum noodles: T1K1 (K1=25%); 4) second best treatment for sorghum noodles: T2K2 (K2 = 50%); 5) The water content of the noodles = 2-3%; 6) carbohydrate noodles = 39-45%; 7) protein noodles = 8-9%; 8) fat noodles=2-4%; 8) organoleptic parameters of taste, color, and aroma were significantly different, while the appearance was not significantly different; 9) noodle products testing parameters = score of 3 (neutral)-5 (really liked), color = 3 (neutral)-5 (really liked); aroma = 3 (neutral)-5 (really liked); crispness = score of 4 (like) - 5 (really liked)

Keywords: *Sorghum flour, characteristics, alternative food, and noodles*

1. Introduction

Sorghum as a potential alternative food sources which can be developed to support diversification and food security program of the Indonesian takes the fifth rank after wheat, rice, corn and barley. This research "Optimization of Sorghum Instant Noodles Product" is conducted in order to develop the potential of sorghum as an alternative food source to Support Food Security Program.

The research objective of the 1st year is to get a flour blend which has the formulation and initial design of sorghum flour as a substituent of wheat flour in producing the product of wet sorghum noodles that can be accepted by consumers. It includes the quality of sorghum flour and wet noodles viewed from three aspects, namely: Organoleptic aspects; by producing products with flavor, color, aroma, and flexibility that can be acceptable to consumers, the chemical aspects; by producing products with moisture content, protein content, and carbohydrate content in accordance with SNI, and by producing products that are safe for consumers. Diversification of food should be improved in the direction of food security of the Indonesian. One potential source of food and not fully utilized is sorghum (Sorghum sp), and the tendency of food crises in the future makes sorghum has a bright prospect to be developed. Development of sorghum-based food industry needs to be supported by a strong R & D base. Cooperation between R & D institutions both national and international and private partners needs to be improved to strengthen aspects of post-harvest and sorghum agro-industry development, especially sorghum-based food diversification towards food security.

Benefits of this research / urgency (virtue) study are: the diversification of sorghum-based products supports the diversification and food security program of the Indonesian, reducing dependence on imported wheat, obtaining sorghum-based flour blends, making sorghum wet noodles products and other sorghum products to be popular in community. Findings / Innovation targeted are: gaining Appropriate Technology for the process of making sorghum flour, obtaining sorghum-based flour blends, gaining Appropriate Technology for the process of making sorghum wet noodles, obtaining sorghum wet noodle products, and gaining technology for products of wet noodles and instant noodles with sorghum bran. Application of the research used for supporting construction and development of science and technology - socio-cultural are: increasing the economic value of sorghum, diversifying products processed based on sorghum, supporting the diversification of food, supporting the food security program of the Indonesian, reducing dependence on imported wheat so that sorghum products become popular in the community, and the research results can be implemented by a third party (industrial, private, or government).

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2. Literature Review

1.2 Sorghum is known as' 'brother' of wheat or corn, grain crops (Cereal) are rich in calories, so it is considered as one of the staple food rice substitution, in addition to maize, cassava or sago. Sorghum besides shapes and tastes like rice, is also highly nutritious. If it is seen from the table of Nutrition Directorate of the Ministry of Health, it has higher nutritional content than other staple foods such as rice, flour (wheat), corn and cassava. He says that 332cal calories per 100g of sorghum is slightly lower than rice (360cal), wheat (365cal) and corn (361cal). And the carbohydrate content of 73g per 100g of sorghum is also much less than rice (78,9g) and wheat (77,3g). However, this grain has more high protein content (11g per 100g) than wheat (8,9g), rice (6,8g), corn (8,7g) or even cassava (1,2g). He says that sorghum has Calcium (28mg per 100 g), Iron (4,4mg), Phosphorus (287mg), and vitamin B1 (0,38mg). 1 g protein content of sorghum is 1.6 times higher than rice. Sorghum also has iron content of 5.5 times more than rice (2.05 times), the phosphorus, vitamin B1 3.1-fold, 4.7-fold and 4.6-fold fat calcium. Besides, sorghum also contains phenols and tannins with a high composition. Two of these compounds are able to fight cancer-causing free radicals.

1.3 Sorghum can be used as raw material for semi-finished products. It is directed to enrich the potential of sorghum, which will be used as raw material for advanced products. The product forms are generally dry, have more compact shape and can be retained as well as very flexible to be used. Semi-finished products are in the form of sorghum flour. Based on the physical properties, sorghum flour has characteristics that are not different from wheat flour. It includes the grain fineness of the flour, the smell and the nature of amilograf.

1.4 One form of the use is as substituent sorghum flour for wheat flour in noodle-making process. Noodles are food product made from wheat flour with or without the addition of other foodstuffs and food additives. The addition of other foodstuffs and food additives are permitted to have distinctive shapes of noodles. Noodles are food that is shaped wrench and have a diameter from 0.07 to 0.125 inches. It is made with the addition of eggs or egg yolks. Eggs are used to improve the nutritional quality and also to provide color to the resulting noodles (Meltz, 1970).

3. Research Method

The research method consists of four stages. Stage 1: research on the optimization of sorghum products. Stage 2: research on the optimization of sorghum flour blend products. Stage 3: research on the optimization of sorghum wet noodles products. Stages 2 and 3 use Randomized Block Design (RBD) with two factors and three replications. Factor I: Types of Sorghum Flour (T); T1 is red sorghum flour (Sorghum bicolor), T2 is white sorghum flour (KD4). Factor II: Percentage of Sorghum Flour (S); S1 is 25% sorghum flour; S2 is 50% sorghum flour; S3 is 75% sorghum flour; and S4 is 100% sorghum flour. Stage 4: research on the optimization of sorghum bran products, uses Randomized Block Design (RBD) with one factor and three replications. Factor I: Types of Sorghum Flour (T); T1 is red sorghum flour (Sorghum bicolor), T2 is white sorghum flour (KD4). Observations include Organoleptic parameters of taste, color, aroma, elasticity, water content, carbohydrates, protein, and fat. Data analysis uses Organoleptic test using Friedman test, whereas chemical analysis uses analysis of variance continued with Duncan test 5%.

4. Discussion

Results from Stage 1: research on the optimization of sorghum products is presented in Tables 1 and 2, and Figure 1.

Table 1. Test Results for Color of Sorghum Products

No.	Product	Red Sorgum /T_1 (Sorghum bicolor)	White Sorgum /T_2 (KD4)
1.	Grain	Red ++	White dark
2.	Rice	Red +	White
3.	Flour	Red	White
4.	Bran	Red	White
5.	Dust	Red	White

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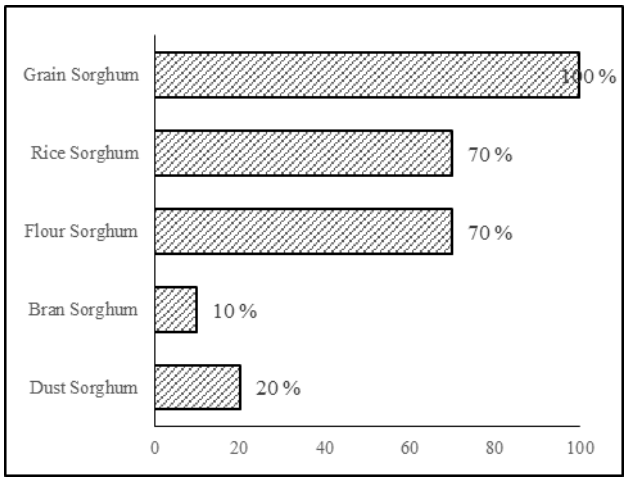

Figure 1. The yield of Processing Sorghum (Sorghum seed production is 6-7 tons per hectare)

Figure 1 showed that sorghum T1: red sorghum flour (Sorghum bicolor) and T2 : white sorghum flour (KD 4) had potential to be developed to support the food industry. The following was another advantage of red sorghum (T1) and white sorghum (T2).

Table 2. Observations of water levels

Raw material (T)	Grain Sorghum (kg)	Rice Sorghum (kg)	Sorghum Flour (kg)	Sorghum Bran (kg)	Sorghum Dust (kg)
T_1	12.3	12.3	11.9	12.1	12.4
T_2	11.5	11.5	12	12.2	12.3

Stage 2: Optimization of Sorghum Flour Blend Products is presented in Table 3.

Table 3. Color Test for Flour Blend

Treatment	Colour
T1S1	Reddish white
T1S2	Reddish white +
T1S3	Reddish white ++
T1S4	Reddish white +++
T1S1	White cloudy
T1S2	White cloudy +
T1S2	White cloudy ++
T1S2	White cloudy +++

The results of calculation of the percentage of Organoleptic were parameters of color, flavor, and appearance of sorghum flour blend with treatment for sorghum flour types (T); T1 : red flour / Sorghum bicolor (T1) and T2 : white flour / KD4 and treatment for concentration of sorghum flour (S); S1 = 25%, S2 = 50%, S3 = 75%, and S4 = 100%; the meaning of scores were, 1: dislike, 2: rather like, 3: neutral, 4: like, and 5: really liked. It showed that the highest score for color parameter was in treatment T1S4 (T1 = red flour / Sorghum bicolor (T1) and concentration of sorghum flour S4 = 100%) with a percentage of 50% and score 5 (really liked). The second was in treatment T2S3 (T2 = white flour / KD4 and sorghum flour concentration S3 = 75%) with a percentage of 50% and score 5 (really liked). The first highest score for flavor parameter was in treatment T1S3 (T1 = red flour / Sorghum bicolor and concentration of sorghum flour S3 = 75%) with a percentage of 50% and score 5 (really liked). The second highest score for flavor parameter was in treatment T2S2 (T2 = white flour / KD4 and S2 sorghum flour concentration = 50%) with a percentage of 53.4% and score 5 (really liked). The first highest score for appearance parameter was in treatment T1S3 (T1 = Flour red / Sorghum bicolor and concentration of sorghum flour S3 = 75%) with a percentage of 45% and score 5 (really liked). The second highest score for appearance parameter was in treatment T2S2 (T2 = White flour / KD4 and sorghum flour concentration S2 = 50%) with a percentage of 51.7% and score 5 (really liked). Friedman test results of the product showed the sorghum flour blend for color parameters

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(.846 Sig> 0.05), flavor parameter (.109 Sig> 0.05), and the appearance (Sig 0.343> 0.05). It means that these parameters were not significantly different for the parameters of color, flavor, and appearance of the sorghum flour blend produced by factors in the types and concentration of sorghum flour. It indicated that all would be accepted by the panelists, though the color of sorghum flour was not different and the more flour used the more the color would darken. It was the advantage of both types of sorghum flour blend. The test results of water content, carbohydrates, protein, fat, ash, fiber, amylose, amylopectin, gel strength, gelatinization temperature, and water absorption showed the water content (10.81 to 12.43%), carbohydrates (71.87 -74.19%), protein (9.76 to 12.17%), fat (1.88 to 3.11%), ash content (1.45 to 2.37%), crude fiber (1.62 -2.02%), amylose (23.53 to 25.39%), amylopectin (40.66 to 42.52%), starch (65.21 to 66.76%), gel strength (0,25- 0.46%), gelatinization temperature (84.3 to 87%), and water absorption (6.89 to 8.69%). Results of analysis of variance showed the water content (Sig 0824> 0.05), carbohydrates (Sig 0540> 0.05), protein (Sig 0492> 0.05), fat (Sig 0.000 <0.05), ash (Sig 0998> 0.05), crude fiber (Sig 0567> 0.05), amylose (Sig 0.000 <0.05), amylopectin (Sig 0.000 <0.05), starch (Sig 0.000 <0.05), gel strength (Sig 0.000 <0.05), gelatinization temperature (Sig 0.000 <0.05), and water absorption (Sig 0.000 <0.05). It means that the water content, carbohydrates, protein, ash, and crude fiber were not different in reality. On the contrary fat, amylase, amyl pectin, starch, gel strength, gelatinization temperature, and water absorption showed that those parameters were significantly different. The water content of the sorghum flour blend <14%, in which this condition was required to safe water, so it was used to prevent the growth of microbes (Winarno, 1974). Protein of sorghum flour blend <14%, it means that this was in accordance with SNI for flour which has maximum protein 14%. When carbohydrate content of sorghum flour blend was compared with the products of rice, corn, and wheat (Table 4), then sorghum could be aligned. If it was compared with the vitamin and mineral content, so that sorghum was superior (Table 5). Another advantage of sorghum was the availability of red sorghum (T1) and white sorghum (T2). It made the color of the products produced also varies. Results of variance analysis showed that the carbohydrate content was significantly different, the more high concentration of sorghum, the more increasing of carbohydrate. Ash content <3% and crude fiber content <2% were appropriate with SNI 01-3751-1995, in which the maximum limitation of ash content on the flour was 3%. Gelatinization temperature was influenced by the concentration of starch, in which the more viscous solution, the temperature reached was slower, up to the viscosity of certain temperature was not increasing (Winarno 1995). Gel strength and water absorption of sorghum flour blend also showed that the sorghum flour blend had the ability to absorb water maximally due to the availability of balance amount of protein in the flour.

Table 4. Nutrient Content of Rice, Corn, Wheat, and Sorghum

Nutrition	Rice	Corn	Wheat	Sorghum
Carbohydrate	78,9	72,4	77	73
Protein	6,8	8,7	8,9	11
Fat	0.7	4,5	1,3	3.3

Table 5. Vitamin and Mineral Content of Rice, Corn, Wheat and Sorghum

Nutrition	Rice	Corn	Wheat	Sorghum
Vitamin B1(mg)	0,12	0,27	tad	0,38
Calcium (mg)	6	9	16	28
Ferro (mg)	0,8	4,6	1,2	4,4
Phosphor (mg)	140	380	106	287

Stage 3: Optimization of Sorghum Wet Noodle Products. The results in physical observations of sorghum wet noodles is presented in Table 6.

Table 6. Wet Noodle Color Test Sorghum

Treatment	Colour
T1S1	Reddish white
T1S2	Reddish white +
T1S3	Reddish white ++
T1S4	Reddish white +++
T1S1	White cloudy
T1S2	White cloudy +

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T1S2	White cloudy ++
T1S2	White cloudy +++

Calculation results for the Organoleptic parameters percentage of taste, color, flavor, and elasticity of sorghum wet noodles with treatment for sorghum flour types (T) were red flour / Sorghum bicolor (T1) and white flour / KD4 (T2); and treatment for concentration of sorghum flour (S): S1 = 25%, S2 = 50%, S3 = 75%, and S4 = 100%; the meaning of scores were 1: dislike, 2: rather like, 3: neutral 4: like, and 5: really liked. It showed that the highest score for taste parameter was in treatment T1S4 (T1) = red flour / Sorghum bicolor (T1) and the concentration of sorghum flour S4 = 100%) with a percentage of 43.7% and score 5 (really liked). The second was in treatment T2S1 (T2 = white flour / KD4 and concentration of sorghum flour S1 = 25%) with a percentage of 46.7% and score 5 (really liked). The highest score for color parameter was in treatment T1S4 (T1 = red flour / Sorghum bicolor (T1) and the concentration of sorghum flour S4 = 100%) with a percentage of 50% and score 5 (really liked). The second highest score for color parameter was in treatment T2S3 (T2 = white flour / KD4 and the concentration of sorghum flour S3 = 75%) with a percentage of 53.4% and score 5 (really liked). The highest score for flavor parameter was in treatment T1S2 (T1 = red flour / Sorghum bicolor and concentration of sorghum flour S2 = 50%) with a percentage of 53.4% and score 5 (really liked)). The second highest score for flavor parameter was in treatment T2S3 (T2 = white flour / KD4 and sorghum flour concentration S3 = 75%) with a percentage of 45% and score 5 (really liked). The highest score for elasticity parameter was in treatment T1S4 (T1 = red flour / Sorghum bicolor and concentration of sorghum flour S4 = 100%) with a percentage of 40% and score 5 (really liked). The second highest score for elasticity parameter was in treatment T2S1 (T2 = white flour / KD4 and concentration of sorghum flour S1 = 25%) with a percentage of 41.7% and score 5 (really liked). Friedman test results of sorghum wet noodles products showed taste parameters (Sig 0.977> 0.05), the color parameters (Sig 0.403> 0.05), flavor parameter (.456 Sig> 0.05) and elasticity (Sig 0,000 <0, 05). It meant that the parameters of taste, color, and aroma were not significantly different for those parameters resulted from factors in the type and concentration of sorghum flour. It indicated that all would be accepted by the panelists, though the color of sorghum flour was no different and the more flour used the more the color would get darker. It was the advantage of both types of flour produced by sorghum blend. On the contrary elasticity parameter was significantly different. It indicated that the factors of sorghum flour types and concentrations influenced the preferences of panel. The test results of water content, carbohydrates, protein, fat, ash, fiber, amylose, amylopectin, gel strength, gelatinization temperature, and elasticity showed the water content (28 to 32.87%), carbohydrates (45 to 63.55%) , protein (8.22 to 9.11%), fat (2.56 to 3.78%), ash content (1.29 to 2.27%), crude fiber (1.59 to 2.02%) , amylose (from 17.65 to 20.15%), amylopectin (42.27 to 43%), starch (from 61.27 to 63.68%), elasticity (17.45 to 36.67%). And conversely the breaking power of sorghum noodles (0.61 to 1.03%), and the results of analysis of variance showed the water content (Sig 0.005 <0.05), carbohydrates (Sig 0.000 <0.05), protein (Sig 0.000 <0.05), fat (Sig 0132> 0.05), ash content (sig 0.603> 0.05), crude fiber (sig 0.568> 0.05), amylose (sig 0360> 0.05), amylopectin (sig 0.110> 0.05), starch (sig 0845> 0.05), elasticity (sig 0.000 <0.05), and power breaking noodles (sig 0.000 <0.05). It indicated that the water content, carbohydrates, protein, elasticity, and power breaking of noodles were significantly different. While fat, amylase, amyl pectin, starch and crude fiber were not significantly different. The water content <33%, protein> 3%, and the ash content <3% of sorghum wet noodles, it means that it fulfilled the quality requirements of wet noodles (SNI 01-2987-1992). Elasticity of sorghum wet noodles was strongly influenced by the concentration of sorghum flour, in which the more increasing concentration the more decreasing noodle's elasticity. It was due to that sorghum flour did not contain gluten and finally it caused the more increasing of noodle breaking power. The content of gluten affected to the chemical reactions influencing to the formation of the S-S bond which greatly affected to the degree of solubility and rheological properties such as elongation (elastic) and elasticity (Suhardi, 1988). Another advantage of sorghum was the availability of red sorghum (T1) and white sorghum (T2). They made the color of the products produced also varies. Results of analysis of variance showed that the carbohydrate content was significantly different, in which the more increasing concentrations of sorghum flour, the more increasing the sorghum flour carbohydrates.

The probability or chance was a person's level of confidence against an uncertain event. Probability analysis was performed to determine the probability of each ground state. The ground state of the quality included taste, color, flavor, elasticity, carbohydrates, protein, and fat of sorghum wet noodles. The probability value showed that the level of interest of the ground state, the more value of probability of the ground state, the more essential of the ground state. Regarding flake sorghum product, parameter of taste (17%) was considered as the most important parameter when it was compared with other parameters, i.e., carbohydrates (15%), color, elasticity, fat, protein (14%), and aroma (12%), respectively. The existing alternative process was compared to determine the optimal process. Alternative selection was conducted by calculating the expected value obtained from each of the alternative processes. The expected value of calculation results for each of the alternative processes is presented in Figure 2.

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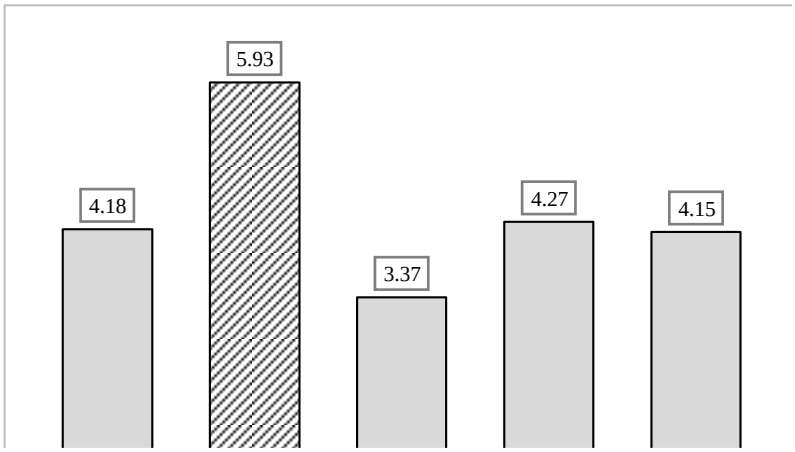

Figure 2. The results of the calculation of the expected value of sorghum wet noodle

Based on the results of the calculation of the expected value, the alternative treatment chosen was the treatment of T2S2 (T2 = white flour / KD4 and concentration of sorghum flour S2 = 50%) with the results of the calculation of the expectation value = 6.18. The second was the treatment T1K2 (T1 = flour red / sorghum bicolor and S2 sorghum flour concentration = 50%) with the results of the calculation of the expected value = 5.93. This means that the treatment was based on the best quality when it was compared with other treatments.

Stage 4: Optimization of Sorghum bran products. Sorghum bran of physical observation results is presented in Table7.

Table 7. Color Test of Sorghum bran

Treatment	Colour
T1	Reddish white
T2	White cloudy

Results of calculation for the percentage of organoleptic parameters of color, flavor, and appearance of sorghum bran with treatment for sorghum flour types (T): T1 = red flour / Sorghum bicolor and T2 = white flour / KD4; the meaning of scores were, 1: dislike, 2: rather like, 3: neutral, 4: like, and 5: really liked. It showed that the highest score for color parameters was in treatment T2 (T2 = white flour / KD4) with a percentage of 36.6% and score 5 (really liked). The highest score for flavor parameter was in treatment T1 (red flour / Sorghum bicolor) with a percentage of 38.4% and score 5 (really liked). The highest score for the appearance parameter was in treatment T1 (Flour red / Sorghum bicolor) with a percentage of 31.6% and score 5 (really liked). Table 7 showed that physically the color of bran was different. It gave an advantage of sorghum bran. Test results of Friedman of sorghum bran products showed that the color parameter (Sig 0.275> 0.05), flavor parameter (Sig 0, 683> 0, 05) and elasticity (Sig 1.000> 0.05). It means that the parameters of color, flavor, and appearance were not significantly different, for these parameters which were resulted from the factors of sorghum flour types. It indicated that all might be accepted by the panelists, though there was a difference for the color of sorghum flour. The color difference was red bran produced from red sorghum / Sorghum bicolor and white bran were produced from white sorghum / KD4. It became the advantages of both types of sorghum bran. Chemical test results showed that the water content (10.9 to 13.60%), carbohydrates (69.56 to 71.53%), protein (10 to 11.52%), fat (1.57 to 2.8 %), ash content (2.56 to 2.76%), crude fiber (11.21 to 12.01%), amylose (from 23.69 to 24.15%), amylopectin (from 42.02 to 42.15 %), starch (from 64.89 to 66.12%), gel strength (1.8 to 1.95%), gelatinization temperature (79,87-830C), and water absorption of sorghum bran (6.78 to 7 , 11%). Results of analysis of variance showed that the water content (Sig 0.847> 0.05), carbohydrates (Sig 0.424> 0.05), protein (Sig 0.653> 0.05), fat (Sig 0.626> 0.05), ash content (Sig 0.471> 0.05), crude fiber (sig 0.082> 0.05), amylose (sig 0.686> 0.05), amylopectin (sig 0.911> 0.05), starch (sig 0.826> 0.05), gel strength (sig 0.895 <0.05), gelatinization temperature (sig 0.352 <0.05), and water absorbing power of sorghum bran (Sig 0.438> 0.05). This means that the water content, carbohydrates, fat, ash and crude fiber, amylose, amylopectin, starch, fat, amylose, amylopectin, starch, gel strength, gelatinization temperature, and water absorbing power were not significantly different. The water content of the bran sorghum <14%, in which this condition was a prerequisite to safe water content, so it was used to prevent the growth of microbes (Winarno, 1974). High content of carbohydrate, protein, and fat became the benefits of sorghum bran, as well as the high fiber content.

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Gelatinization temperature was influenced by the concentration of starch, in which the more viscous solution, the temperature reached was slower, up to the viscosity of certain temperature was not increasing (Winarno 1995), either Gel strength or water absorption of sorghum brand showed that sorghum bran had the ability to absorb water maximally. It was caused by the balance amount of protein in the bran. The carbohydrate and protein of sorghum bran when they were compared with the products of rice bran and corn (Table 8), so sorghum could be aligned. While, the low fat content would be the advantage of sorghum bran as well as the high crude fiber content.

Table 8. Comparison of the nutritional content of rice bran, corn, and sorghum

Nutritions	Rice Bran	Corn Bran	Red Sorghum Bran	White Sorghum Bran
Carbohydrate	54,6 g	64,5 g	70,3 g	71 g
Protein	12,6 g	9 g	10,8 g	11,1 g
Fat	14,8 g	8,5 g	1,9 g	2,1 g

5. Conclusion

Conclusions: 1) Rendement of grain was 6 tons / ha, rice was 4.2 tons / ha, flour was 4.2 tons / ha, bran was 0.6 tons / ha, sorghum bran was 1.2 tons / ha; 2) sorghum flour blend consisted of: water content was 10.3 to 13.5%, carbohydrates was 68.9 to 72.1%, protein was 10.6 to 11.7%, fat was 2-3%; 3) The best combination of treatments for wet noodles was: T1K1 (T1 was red flour / Sorghum bicolor (T1) and the concentration K1 was 25%) and T2K2 (white flour / KD4 (T2) and the concentration of K2 was 50%), water content was 2- 3%, carbohydrates was 39-45%, protein was 8-9%, fat was 2-4%, organoleptic parameters of taste, color and elasticity were significantly different while the scent was not significantly different, the parameters of taste, color, aroma, and suppleness had score 3 (neutral) - 5 (really liked); 4) sorghum bran of water content was 10.9 to 13.6%, carbohydrates was 55-62%, protein was 10 to 11.52%, fat was 2-3%.

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Further research: in the second year the reseach will be continued on the optimization of sorghum instant noodles. The aim is to obtain the product of sorghum instant noodles. This research will use Randomized Block Design (RBD) with 2 factors and 3 replications. Factor 1: Flour type (T): sorghum red flour ((*Sorgum bicolor*) and T_2: sorghum white flour (KD4). Factor II: Concentration (K) K_1:10%; K_2:20%; K_3:30%; K_4:40%; K_4:50%. The storage will be for three months. Observation will include noodles quality which is viewed from the physical aspects, chemical aspects, microbiological aspects, organoleptic aspects, and also the certainty of expiry dates. In the end, this research is targeted to be diversification of processed sorghum-based products, to support the program of diversification and food security in Indonesia, and to open up opportunities for sorghum industry.

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EXPLORATION OF PRIMARY COLOR SOURCE FOR NATURAL DYES BATIK

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Abstract: Meanwhile Indonesia is a country that is very rich with a variety of plants that can basically be used as a source of natural dye batik. This study also has a specific purpose such as: getting the concept of the natural dyes. Based on the concept will be produced three basic colors of red, yellow and blue. Furthermore, of mixing basic colors (primary) will be obtained various secondary colors, namely blue and red generated purple, blue and yellow as well as red-green color is produced and the resulting yellow orange. While the mixing of red, yellow and blue is the color of chocolate that leads to black. The concept of natural dyes process of primary secondary and tertiary analogous to synthetic dyes. The primary natural dyes are red, yellow and blue. The wavelength of the primary natural dyes produced is influenced by the method of extraction. Natural dyes secondary wavelength produced is not affected by the extraction method. Tertiary natural dyes can be obtained from the mixing of the three primary colors of red, yellow and blue. Natural dyes secondary and tertiary wavelength produced is not affected by the extraction method.

Keyword: Natural Dyes, Primary Color, Color Secondary and Tertiary Dyes

1. Introduction

Historically, batik originated from a common ancestor, known since the 17th century, written and painted on palm leaves, with the recognition of batik as an Indonesian cultural heritage, the development of batik will be more promising. Awareness of the importance of keeping batik from parties who wish to claim, encourages most people to back to batik and maintain continuity until whenever.

This should be welcomed with equal enthusiasm by the batik craftsmen. Batik will cultivate the habit of noble culture. Besides preserving the art of batik can also increase the revenue that will lead to prosperity. All matters relating to the batik can be correlated as income; ranging from course design motifs, batik, dyeing, sewing clothes up to the sale.

Until now used in batik dyeing is using a synthetic dye that if their use in the long term will have an impact on the natural environment damage. Pollution impact will only be felt after a few decades later, the emergence of health problems such as cancer or digestive disorders due to the accumulation of harmful substances that enter the body through drinking water, contaminate ground water availability and crop damage. Meanwhile Indonesia is a country that is very rich with a variety of plants that can basically be used as a source of natural dye batik. This can make advantage of the Indonesian state as crop plants as sources of natural dye batik can not be grown in other countries.

Batik making with natural dyes produced only by reservation. Batik with natural coloring has not been widely adopted by the batik craftsmen. This is due to the color of batik by using natural dyes do not produce colors that light up and more leads to a brownish color. Also on the market are not yet available natural dyes that can be used instantly. Craftsmen still need to find sources of natural dyes and mengestraknya for temporary needs. Therefore, it is necessary to discover the source of natural dyes by utilizing existing plants in Indonesia. The concept of natural dyes process more focused on the exploration of plants producing the three basic colors of red, yellow and blue. Red cup plant, yellow from saffron and blue of plants glued. Based on the convergence of these three basic colors will be obtained secondary and tertiary colors that will be developed as a natural dye batik.

2. Research Method

This study will be conducted over two (2) years. Implementation of research at the Laboratory of Analysis of Results of Industry, Department of Industrial Technology of Agriculture, Faculty of Engineering, University of Wijaya Kusuma Surabaya.

2.1 Research Year I (First)

In the first year will be carried out research on 'Dig Primary Color Source For Natural Dyes Batik'. The first year of this study will be done in three (3) phases of the study.

2.1.1 Phase I: Extraction of Primary Colors

Extraction of primary colors obtained from plants as a source of red cup, turmeric as a source of yellow and leaves glued as a source of blue. Each of these sources of primary colors will be extracted with different types of materials are wet and dry ingredients and using different extraction method is a method of heat and cold. This study uses a randomized block design (RAK) with two factors and three replications.

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Factor I: Natural Dyes Source Material Type (B1 = Wet Material, B2 = Dry Material)
Factor II: Extraction Method (M1 = Method Heat, M2 = Cold Method)
The aim of research in this first phase to get the concept of primary natural dyes with optimum wavelengths to be used as a basic dye batik.
Flow diagram of the extraction of primary colors with heat method is presented in Figure 1. below,

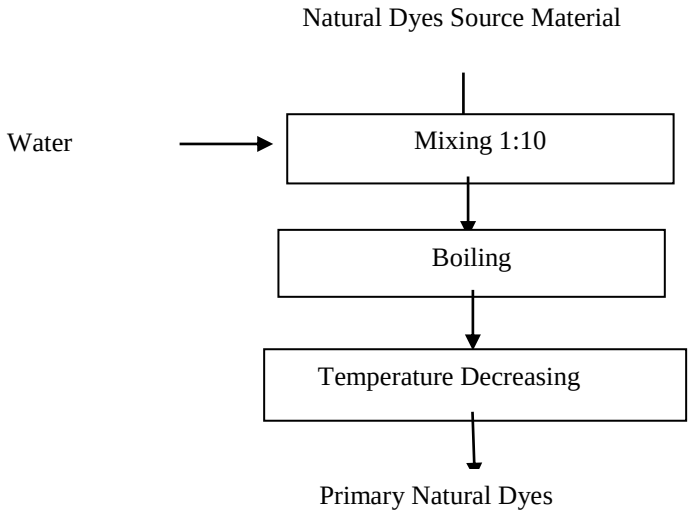

Figure 1. Primary Color Extraction by Heat Method

Flow diagram of the extraction of primary colors with the cold method is presented in Figure 2. below,

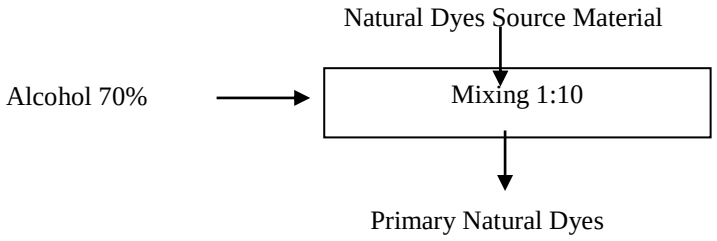

Figure 2. Primary Color Extraction by Cold Method

2.1.2 Phase II: Extraction Secondary Color
Extraction of a secondary color obtained from mixing the primary colors of the previous stages with a ratio of 1: 1, ie between red and yellow, red and blue and yellow and blue. Each of these sources of primary colors will be extracted with different types of materials are wet and dry ingredients and using different extraction method is a method of heat and cold. This study uses a randomized block design (RAK) with two factors and three replications.
Factor I: Natural Dyes Source Material Type (B1 = Wet Material, B2 = Dry Material)
Factor II: Extraction Method (M1 = Heat Method, M2 = Cold Method)
The aim of research in this first phase to get the concept of secondary natural dyes with optimum wavelengths to be used as a basic dye batik.
Secondary color extraction process did not differ between the hot and cold methods. In principle, the process that is required is to mix two primary colors previously extracted by the method of hot or cold. Secondary color extraction flow diagram is presented in Figure 3 below,

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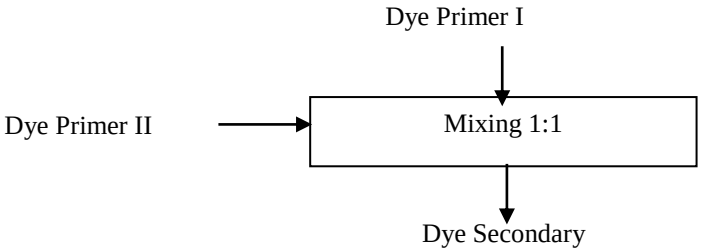

Figure 3. Secondary Color Extraction

2.1.3 Phase III: Extraction Tertiary Colors
Extraction of tertiary colors obtained from mixing three primary colors yatu red, yellow and blue. Each of these sources of primary colors will be extracted with different types of materials are wet and dry ingredients and using different extraction method is a method of heat and cold. This study uses a randomized block design (RAK) with two factors and three replications.
Factor I: Natural Dyes Source Material Type (B1 = Wet Material, B2 = Dry Material)
Factor II: Extraction Method (M1 = Method Heat, M2 = Cold Method)
The aim of research in this first phase to get the concept of natural dyes tertiary optimum wavelength to be used as a basic dye batik.
Tertiary extraction process color the same as the secondary extraction process is not different between hot and cold method. In principle, the process that is required is to mix three primary colors previously extracted by the method of hot or cold.
Tertiary color extraction flow diagram is presented in Figure 4 below,

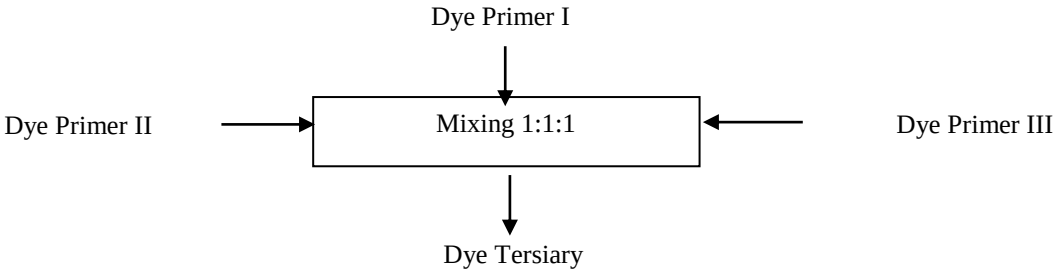

Figure 4. Tertiary Dyes Extraction

Observation and Data Analysis
Observations were carried out by measuring wavelength using a spectrophotometer. The data obtained will be analyzed using analysis of variance. If adaa differences continued with Least Significant Difference test at 5 percent.
Furthermore, primary and secondary color obtained was applied to the batik coloring. Batik is generated which will further be observed visually observed.

3. Discussion
In theory staining with synthetic colors found there are three basic colors are called primary colors are colors that can not be obtained from a mixture of other colors. These are the three basic colors red, blue and yellow. Results of a mixture of primary colors will produce a secondary color. For example, the mixing between the red and yellow colors result is orange, yellow with blue then the result is green, and blue to red will produce a purple color. Orange, green and purple that's called a secondary color. While the mixture of the three primary colors will produce a blackish brown color. Color is called a tertiary color. Illustration of the concept of natural dyes process of primary, secondary and tertiary generated is presented in Figure 5.1 below,

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Figure 5. The concept of Synthetic Dyes Process Primary, Secondary and Tertiary

The concept of the theory of the staining process must be analogous to natural dyes. To reinforce this theory will be proven by the first color extraction are three primary colors. Further blending of two primary colors will naturally generated secondary color naturally. While the mixing of the three primary colors will produce a dark brown-black color.

Based on the analysis of variance showed that the wavelength of the primary colors generated only affected by the extraction method. Natural primary colors extracted by cold method has a wavelength greater than that using the method of heat. This is because the cold method extracts power stronger than the heat method. However, when considered from staining results on the primary color cloth natural method of heat more stable. While the cold method using alcohol as a solvent agent is less stable because the color is volatile.

Based on the analysis of variance wavelengths of natural secondary and tertiary colors naturally not affected by the extraction method and the type of source natural dyes. When observed from staining results on the cloth secondary and tertiary colors produced by the hot method resembles the theory of synthetic dyes process. As for the cold method tends to produce a brown color everything. This is due to the cold method using alcohol which is volatile.

4. Conclusion

Based on the research results achieved it can be concluded that:

1. The concept of natural dyes process of primary secondary and tertiary analogous to synthetic dyes.
2. The primary natural dyes are red, yellow and blue. The wavelength of the primary natural dyes produced is influenced by the method of extraction.
3. The secondary natural dyes can be obtained from mixing two primary colors. Orange natural color obtained from mixing the primary colors red and yellow. Green natural color of mixing primary colors of yellow and blue, while purple is obtained from mixing the primary colors red and blue. Natural dyes secondary wavelength produced is not affected by the extraction method.
4. Natural dyes can be obtained from the tertiary mixing three primary colors red, yellow and blue. The resulting color is dark brown. Natural dyes secondary wavelength produced is not affected by the extraction method.

7.2 Suggestions

Based on the research results achieved it can be suggested that the need to do further research on the concept of a natural coloring process until the stage of fixation

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SIWALAN SUGAR PROCESSING WITH TEA EXTRACT ADDITION TO REDUCE GLYCEMIC INDEX VALUE

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Abstract: Application of siwalan sugar as a sweeteners in community requires testing in terms of health. It is necessary for the testing of siwalan sugar Glycemic Index value. Glycemic Index (GI) value of siwalan sugar is lower than cane sugar but higher than diet sugar. However, GI value of siwalan sugar is still relatively high. One of the process engineering that can be done to reduce GI value is the addition of tea extract. Therefore, it is necessary to process engineering of siwalan sugar processing with the addition of tea extract to reduce GI value of siwalan sugar. This study aims to: (1) determine the process engineering to reduce GI value of siwalan sugar through the process of adding tea extract, and (2) determine tannins content and GI value of siwalan sugar process engineered. Study design is Randomized Block Design with two factors, namely: First Factor is tea type, with 2 levels are Green Tea and Black Tea, as well as the Second Factor is concentration of tea extract with three levels are 1%, 2%, and 3%. For comparison used siwalan sugar without tea extract addition. Based on the study revealed that the tannin content of siwalan sugar given green tea extract higher when compared with black tea extract. The tannin content is expected to affect the GI value of siwalan sugar. Glycemic Index measurement used glucose as a standard with GI value is 100. The measurement result showed that the higher tannin content affect GI value tends to lower.

Keywords: Siwalan Sugar, Tea Extract, Tannin, Glycemic Index

1. Introduction

Siwalan sap have potential as a source of sweetener other than cane, because it has a relatively high sugar content of around 10-15% (Lutony, 1993), which can be either liquid sugar (Wedowati, Rejeki, & Puspitasari, 2012), solid sugar ((Rejeki, Wedowati, & Puspitasari 2010), and crystal sugar (Wedowati & Puspitasari, 2008; Wedowati & Rahayuningsih, 2006). The use of siwalan sugar as a sweetener in society requires a test in terms of health. It is necessary for testing on glycemic index of siwalan sugar.

Glycemic Index (GI) is one of the parameters in the food sector which is closely related to the metabolism of carbohydrates. Glycemic index of food is a food index according to their effect on blood glucose level. Determining of food glycemic index using the glycemic index of pure glucose as the comparison, which glycemic index of pure glucose is 100 (Rimbawan & Siagian, 2004).

Glycemic index value of siwalan sugar are generally still lower than sugar cane but above diet sugar glycemic index. Among three types of siwalan sugar, solid siwalan sugar has a lowest glycemic index value. However, the three types of siwalan sugar glycemic index value is still relatively high (Wedowati, Puspitasari, & Kadir, 2014). It is based on the classification of GI values, foods with low GI (GI<55), moderate GI (GI: 55–70), and high GI (GI>70). It is necessary for efforts to reduce the siwalan sugar glycemic index value in order to become a sweetener which has low GI. One of the engineering process that can be done to reduce GI value is by adding tea extracts. Therefore, it is necessary to process engineering processing of siwalan sugar with the addition of tea extract to reduce the GI value.

This research aims to: (1) Determine the engineering process to reduce siwalan sugar glycemic index value through a process of adding tea extracts, (2) Determine the tannin content of siwalan sugar process engineered, and (3) Determine the glycemic index value of siwalan sugar process engineered.

2. Literature Review

Theoretical Review

Siwalan plant (*Borassus flabellifer* Linn) is a palmae species plant in Indonesia were not handled addressed optimally. Utilization of siwalan plant is still very limited, views of parts of the plant used, the type of product produced, and the technology applied. Various studies indicate that there is still quite a lot of possibilities to develop the parts of the plant palm as industrial raw materials both for domestic needs and for export. Siwalan sap potential as a source of sweetener other than cane, because it has a relatively high sugar content is about 10-15% (Lutony, 1993). The use of siwalan sugar

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as a sweetener in society requires a test in terms of health. It is necessary for testing on the siwalan sugar glycemic index.

Glycemic index is first developed in 1981 by Dr. David Jenkins (Professor of Nutrition at Toronto University, Canada) to help determine the best food for diabetics. This concept assumes that all carbohydrates food with the same quantity will yield the same influence on blood glucose levels (Rimbawan & Siagian, 2004).

Based on glycemic index response, foods are classified into three groups, namely foods with low GI (GI < 55), moderate GI (GI: 55-70), and high GI (GI >70). The foods that have high GI when consumed will increased blood glucose levels quickly and high. Conversely, people who consume low GI food then an increase in blood glucose levels has been slow and glucose content peak is low.

Food with a low GI are digested and changed gradually and slowly, so that blood glucose levels peak will also be low, so fluctuations in sugar levels will also be low. It is very important for diabetes to control blood glucose levels. Conversely, athletes who want to compete require a high GI food that food consumed immediately converted into energy (Anonymous, 2014).

Information about IG various types of siwalan sugar can help people with the disease Diabetes Mellitus (DM) in choosing a sweetener that does not increase blood glucose levels dramatically, so that blood glucose levels can be controlled at a safe level. Food with a low GI helping people to control hunger, appetite and blood glucose levels, then food with low GI can help reduce excess weight.

One treatment to reduce the GI value is with the addition of tea extract. Leaves of tea plant contains flavonoids which is polyphenol compounds. The type of tea consists of black tea (perfect fermented tea), green tea (unfermented tea) and oolong (semi-fermented tea). But in general there are two types of tea based on the presence or absence of fermentation in the processing process, namely black tea and green tea (Wijaya, Wardani, Meutia, Hermawan, & Begum, 2012).

The main compounds contained in tea are catechism, which is a derivative of condensed tannins, also known as polyphenol compounds. Polyphenol compounds is often referred to as tannin. Antigenic substances can reduce the protein and starch digestibility so that the glycemic response is decreases. Therefore, in this study will be used tea leaf extract to reduce the GI value of siwalan sugar.

Several studies have linked GI has been done, including the Glycemic Index of rice with high and low amylose (Widowati, Santosa, & Budiyanto, 2007), where the results can be used as a reference for determining the appropriate rice varieties for diabetics and obese. Glycemic Index value of some types of sweet corn processing has also been reviewed by Amalia, Rimbawan & Dewi (2011), the research concluded that the roasted sweet corn has a medium GI value, while the boiled sweet corn that has a low GI value. Rakhmawati, Rimbawan & Amalia (2011), has conducted a study on the GI value of variety of processed breadfruit and concluded that of the various refined breadfruit (fried, steamed, boiled) have high GI value. Arif, Budiyanto, & Hoerudin (2013) has conducted research on the factors that influence the glycemic index of food products. Research results states that factors that affect the GI value include the fiber content of food, amylose and amylopectin content, fat and protein content, digestibility of starch, and the way of processing.

Hypotheses

- The addition of tea extracts on the processing of siwalan sugar can reduce the glycemic index value of siwalan sugar.
- The higher the concentration of tea extract were added can produce siwalan sugar with GI value that is lower.

3. Research Method

This research was conducted in the laboratory of Analysis Product Industry, Department of Agriculture Industrial Technology, Faculty of Engineering UWKS and Laboratory of *Hewan Coba*, Faculty of Medical, UWKS. Manufacture of siwalan sugar products carried in the palm sugar artisans in the Sumur Gayam Village, Lamongan District.

Stages of research Engineering Process to Reduce Glycemic Index Value of Siwalan Sugar Through the Adding Tea Extracts Process are as follows: (1) Engineering processing of siwalan sugar with the addition of tea extract, (2)

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Determination of tannin content of siwalan sugar process engineered, and (3) Measurement glycemic index of siwalan sugar process engineered in experimental animals (mice).

Engineering processing of siwalan sugar with the addition of tea extracts using a randomized block design with two (2) factors , namely: Factor 1 (Type of Tea), with 2 levels are Green Tea (T1) and Black Tea (T2) , while Factor 2 (Concentration of Tea Extract), with 3 levels are 1% (K1), 2% (K2), and 3% (K3). Thus there are six combinations of treatments, where each treatment was repeated 3 times, so there are 18 attempts. For comparison is used siwalan sugar without the addition tea extract.

Data processing was performed by descriptive analysis and analysis of variance, if there is a difference followed Duncan test with 95% confidence level.

4. Discussion

Tannin Content

Based on the results of the chemical tests for parameters tannin content in the product of siwalan sugar process engineered, average results of tannin content obtained for each treatment is shown in Figure 1.

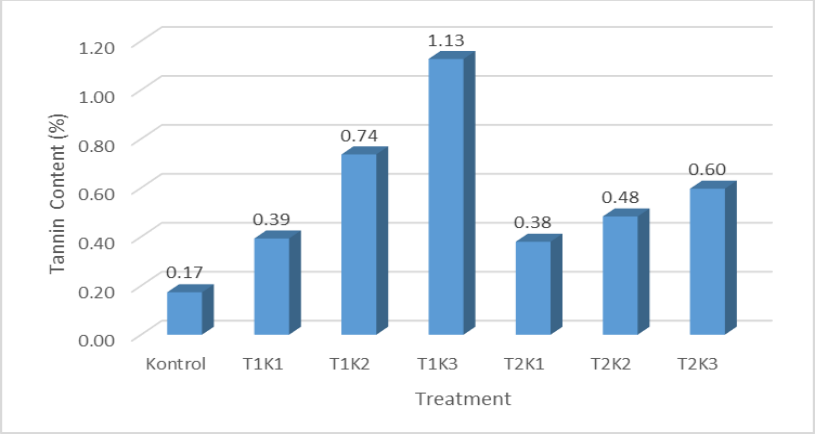

Figure 1. Tannin Content of Siwalan Sugar in Each Treatment

Based on Figure 1 can be seen that the higher the concentration of the tea extract is added to the processing of siwalan sugar, the tannin content of sugar products also be higher as well. Tannin content of siwalan sugar with the addition of green tea extract tends to be higher when compared with black tea. The highest content of tannins found in siwalan sugar products with T1K3 treatment, i.e. at 1.13%.

Based on the results of analysis of variance is known that there is interaction between the factor treatment of siwalan sugar tannin content, it's based on the value of F = 17.898 > F table = 3,885 with sig = 0.00 < α = 0:05. Therefore, continued with Duncan test and the results are as shown in Table 1. The tannin content of siwalan sugar with the addition of green tea extract higher when compared with black tea at a concentration of 2% and 3% (tannin content T1K2 > T2K2 ; and T1K3 > T2K3). However, the addition of tea extract at a concentration of 1%, siwalan sugar tannin content not different significantly. This shows that the addition of green tea extract would produce siwalan sugar products with higher tannin content when compared to black tea.

Table 1. Average Content of Tannin (%)

Treatment	Tannin Content	Notation
Control	0.1733	e
T1K1	0.3933	d
T1K2	0.7367	b
T1K3	1.1267	a
T2K1	0.3800	d
T2K2	0.4833	cd
T2K3	0.5967	c

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Glycemic Index Value

Calculation of the glycemic index (GI) value is based on an increase in blood glucose of experimental animals for observation. Observation of blood glucose content is done in minutes 0, 15, 30, 45, 60, 90, and 120 after the product samples given at experimental animals. The observation of an increase in blood glucose for each treatment of sugar is shown in Figure 2.

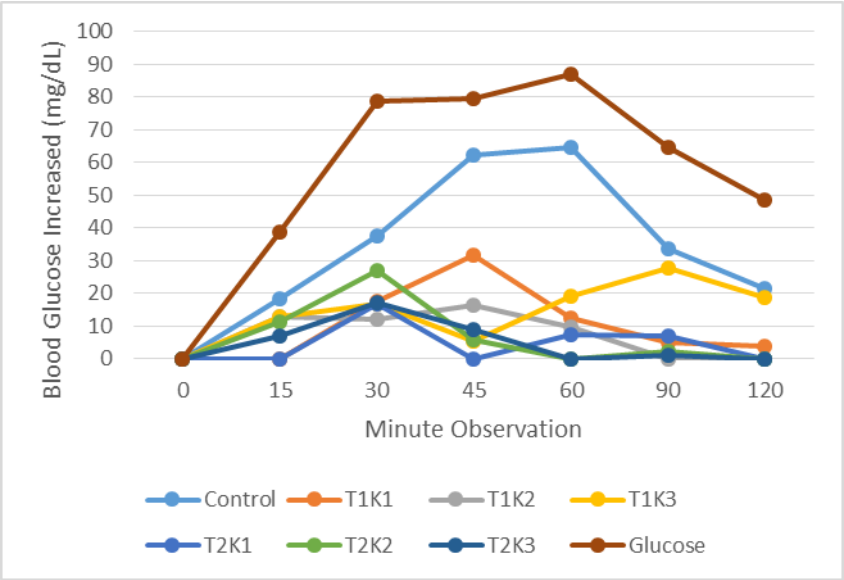

Figure 2. Blood Glucose Increased of Experimental Animal

Based on the observations of an increase in the blood glucose content in minutes 0, 15, 30, 45, 60, 90, and 120 made quadratic regression curve. Quadratic regression equation is then made integral to explore the extent of the area under the curve. To calculate the value of the GI, the extent of area under the curve of each treatment of sugar compared with the extent of the area under the curve for glucose as a standard. Glycemic Index value of glucose is 100. The curve equations for each treatment of sugar is shown in Table 2. The curves for each treatment of sugar shown in Figure 3.

Table 2. Siwalan Sugar Curve Equations for Each Treatment

Treatment	Curve Equation
Control	$Y1 = -1{,}171 + 1{,}814\ X - 0{,}014\ X^2$
T1K1	$Y2 = -0{,}452 + 0{,}647\ X - 0{,}005\ X^2$
T1K2	$Y3 = 4{,}822 + 0{,}293\ X - 0{,}003\ X^2$
T1K3	$Y4 = 2{,}537 + 0{,}388\ X - 0{,}002\ X^2$
T2K1	$Y5 = 0{,}442 + 0{,}246\ X - 0{,}002\ X^2$
T2K2	$Y6 = 7{,}542 + 0{,}125\ X - 0{,}002\ X^2$
T2K3	$Y7 = 4{,}661 + 0{,}126\ X - 0{,}002\ X^2$
Glucose	$Y6 = 7{,}601 + 2{,}375\ X - 0{,}017\ X^2$

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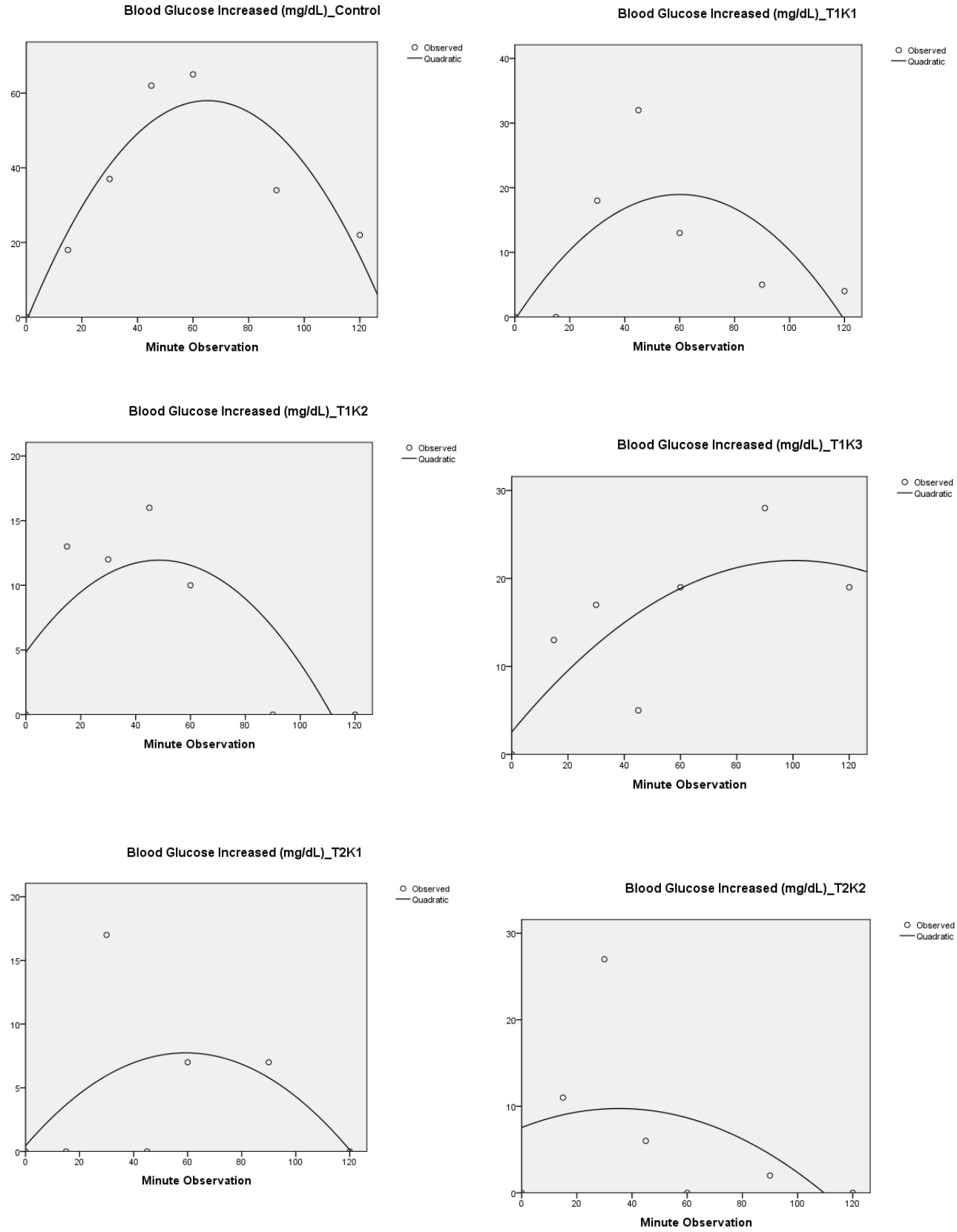

Figure 3. Blood Glucose Increased Curve in Each Treatment

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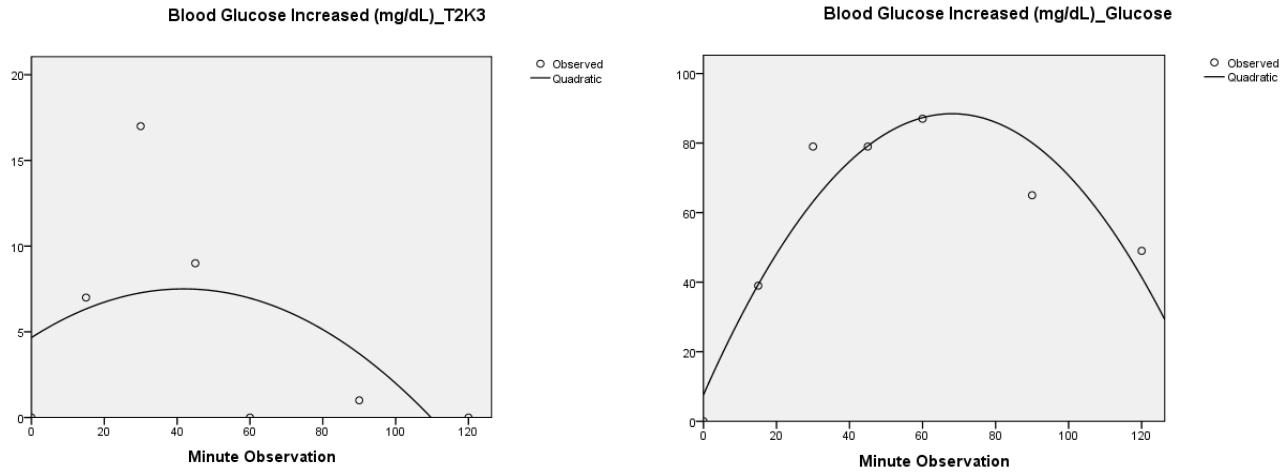

Figure 3. Blood Glucose Increased Curve in Each Treatment (Continued)

Calculation results of area under the curve and glycemic index values for each treatment of sugar can be seen in Table 3.

Table 3. Curves Area and Glycemic Index Value in Each Treatment

No.	Treatment	Curve Area	GI Value
1	Control	20984,28	75,47
2	T1K1	7484,16	26,92
3	T1K2	4416,24	15,88
4	T1K3	4250,04	15,29
5	T2K1	2976,24	10,70
6	T2K2	2957,04	10,64
7	T2K3	2690,52	9,68
8	Glucose	28617,24	100,00

Based on the calculation results of the glycemic index (GI) value, then the GI value of siwalan sugar process engineered is included in the low GI group (IG < 55). Between of the various treatments available, treatment produce siwalan sugar with the lowest IG is T2K3 treatment with IG value is 9.68. The use of black tea extract is able to lower the siwalan sugar GI value than green tea extract. And the higher the concentration of tea extract were added, then the resulting siwalan sugar has a GI value that the lower too. Therefore it can be concluded that the use of tea extracts on the processing of siwalan sugar can decrease the GI value of siwalan sugar products.

5. Conclusion

Based on the results of this study concluded that:

- The tannin content of siwalan sugar with the addition of green tea extract tends to be higher when compared with black tea.
- There was an interaction between treatment factors for siwalan sugar tannin content.
- The siwalan sugar glycemic index (GI) value with the addition of black tea extract is lower when compared with green tea.
- The lowest siwalan sugar GI value obtained at T2K3 treatment with GI value is 9.68.

Suggestions

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Further research is needed to determine the GI value with human respondent, so that siwalan sugar can be used as a natural sweetener and healthy.

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"*TUTUP*' FLOWERS" (MACARANGA TANARIUS (L.) MULL.ARG) AS A FRESH FISH PRESERVATIVES

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Abstract: Flowers lid (name Lamongan) included in the family Euphorbiaceae. Palm sap as a preservative, print the resulting sugar product has better quality than the yangg lime preservative. Closed flower extract can inhibit the growth of microbes Staphylococcus aureus, Pseudomonas fluorescens and Saccharomyces cereviceae, thus potentially to be used as a natural preservative. The purpose of this study was to determine the shelf life of fish by using a closed flower extract as a preservative.
This research was conducted by randomized block design (RBD) with a single factor of soaking (L) with 4 levels: L1: soaking time of 0 minutes (without preservatives), L2: 10 minutes soaking time, L3: 20 minutes soaking time, and L4: soaking time of 30 minutes, and repeated three times. Storage is done for 5 days at a temperature of 100 C and observations were made every day. The parameters measured were: pH, moisture content, protein content, fat content, and total microbial. Chemical test data processing performed by analysis of variance, where a different Least Significant Difference test (LSD) with a 95% confidence level.
The results showed that at the same storage time, long soaking in a solution of interest cap ((Macaranga tanarius) will cause water levels tend to be lower milk fish, protein content tends to remain, pH values tend to be higher and the number of spots microbes tend to be lower.

Keywords*: *flower cap (Macaranga tanarius), *a natural preservative*, *fish*

1. Introduction

The addition of preservatives in foods is one way that can be used to prevent or reduce damage to or deterioration of food. Damage to food is generally caused by microorganisms through enzimates and oxidation processes, especially those containing protein and fat while carbohydrates decompose
Some preservatives used are formaldehyde, benzoic acid and antioxidants BHT, BHA, TBHQ and sourced from petroleum or synthetic materials (Deiana M, 2003; Freidon Shahidi, 2003 and Anonymous, 2008). The use of synthetic preservatives and antioxidants are not currently recommended by the Ministry of Health for allegedly can cause cancer (carcinogenic Agent) (Hernani; Mono Rahardjo, 2005), so it is necessary to look for alternative natural preservative.
Flowers close (Macaranga tanarius (L.) Mull. Arg) included in the family Euphorbiaceae, used by farmers palm (Borassus flabellifer Linn) to prevent damage during harvesting sap
The results of the study fortune, FS. et al., (2009) showed, that the use of caps as a preservative flower sap of sugar palm will produce prints with quality nd a better yield than the use of lime juice as a preservative. Furthermore fortune, FS. et al., (2013) showed that the use of caps as a preservative flower plant sap will produce quality palm sap better and fewer number of microorganisms.
The results of the study Rejeki, FS. et al., (2013) showed that the use of flower extract plant cover with a concentration of at least 20% can inhibit the growth of Staphylococcus aureus, Pseudomonas fluorescens, and Saccharomyces cereviceae. From these results, allegedly closed plant flower extract has potential as a natural preservative, so we need to try to apply to food that is fresh fish.

2. Literature Review

Preservative

The addition of preservatives in food is one way that can be used to prevent or reduce damage to or deterioration of food. Damage to food is generally caused by microorganisms through a process enzimates and oxidation, particularly those that contain protein and fat while carbohydrates to decompose. In order to inhibit the food deterioration process, by some employers use preservatives and synthetic antioxidants such as formaldehyde, benzoic acid, BHA (Butilated Hydroxyanisol), BHT (Butylated Hidroxytoluene) and TBHQ (Tertiary Butylated hydroxyanisole), especially for semi wet food such as tofu, noodles , meatballs, fish, meat and oil / fat.
Some preservatives used for this is formaldehyde, benzoic acid and the antioxidants are BHT, BHA, TBHQ and other materials derived from petroleum or synthetic (Deiana M, 2003; Freidon Shahidi, 2003). The use of synthetic

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preservatives and antioxidants are not currently recommended by the Health Department for allegedly may cause cancer (carcinogenic Agent) (Hernani; Mono Raharjo, 2005).
Preservative to prevent biological damage caused by microorganisms called antibacterials. Some preservatives or antibacterial component has been used since long (Hardy, 2007). The use of synthetic preservatives in many foods quite disturbing, examples of synthetic preservatives used in the food industry is formalin, borax and others. The fact is of course a very disturbing people who always want to live a healthy life. Therefore, the search for natural preservatives are needed (Anonymous, 2008).
Preservatives to prevent bacterial activity and development biakannya. In other words, preservatives have a direct influence on preserved foods. Some experts argued that the substance is not hazardous as long as does not exceed the limit. While others, found it was still regarded as a trigger cancer growth. Preservatives such as benzoic acid and its salts are the most dangerous is the sodium benzoate, ascorbic acid and its salts methanol, sulfuric acid and its salts. Although these substances are considered toxic to small creatures like bacteria, but can be considered as toxic to humans if consumed in excess (As-Sayyid, 2006).
Foods preserved with chemicals such as borax and formaldehyde in various foodstuffs on the market, such as meatballs, tofu and various dried fish products has been troubling us since some time ago to the present. The addition of preservatives in food products so as to make it more supple and durable (Anonymous, 2008). The development of science and technology people should be more selective in choosing food. Because according to a study much food is mixed with chemicals that cause human health, one of which is the addition of synthetic antibacterial or chemically curing. Use antibacterial synthetic or synthetic preservatives in foods such as addition of formalin to preserve food, if taken continuously will cause disease. The above phenomenon encourage people to seek the best solution and is not beneficial to health. Solutions made a movement back to nature and back to nature to find an alternative to synthetic antibacterial. One source is a natural antibacterial tea plant.

Antibacterial Test

Antibacterial test can be conducted to determine the extent to which the activity of bacteria to antibacterial According to Brock and Madigan (1991) There are 3 methods commonly used in antibacterial test, the method of broth dilution, agar dilution method, and disc diffusion method. The principle of disc diffusion method is antibacterial compounds into saturated filter paper (paper disc). Paper discs containing certain antibacterial compounds grown on solid agar media seeding mixed with bacteria tested, and then incubated at a specific time. Furthermore, the observed area (zone) around the disk clear paper showed no bacterial growth.
Several factors can affect the size of the zone of inhibition and should be controlled is (Greenwood, 1995 in Pratt, 2005):
1. The concentration of microbes on the surface of the medium. The higher the concentration of microbial inhibition zones will be smaller.
2. The depth of the medium in a petri dish. The thicker the medium in a petri dish, the zone of inhibition will be smaller.
3. The pH of the medium. Some antibiotics work well in acidic and alkaline conditions / language.
4. The aerobic / anaerobic. Some of his best work antibacterial and other aerobic conditions in aerobic conditions.Research Method

The experiment was conducted in the laboratory of Microbiology and Laboratory Analysis of Industrial, Agricultural Industry Technology Studies Program, Faculty of Engineering, Universitas Wijaya Kusuma Surabaya.
Materials used consist of plants flower cap, milkfish (Chanos Chanos sp.) And materials for chemical analysis. The tools used are glassware, analytical balance, vortex, spectrophotometers, pH meters, oven, desiccator, muffle furnace, Kjedahl device, Soxhlet, Laminair Air Flow, shakers, incubators and measuring tools.
This study used a randomized block design (RBD) with a single factor, namely the treatment of soaking (L) with 4 levels respectively, namely L1: soaking time of 0 minutes (without preservatives), L2: 10 minutes soaking time, L3: soaking time 20 minutes, and L4: soaking time of 30 minutes, and the treatment was repeated three times.
Storage of fish conducted for 5 days at a temperature of 100 C and observations were made every day. Parameters observed were chemical properties (pH, moisture content, protein content, and fat content), and microbiological properties (number of microbes).
Organoleptic test result data is ordinal data using the Friedman test. While the data and the results of chemical testing microbiological tests performed by analysis of variance, where a different Least Significant Difference test (LSD) with a 95% confidence level.
The parameters measured were the chemical, microbiological and organoleptic properties of nature. Chemical properties consisting of pH using pH meters, moisture content oven method (AOAC, 1996), protein content Kjedahl method (Sudarmadji et al, 1997), fat content Soxhlet method (Sudarmadji et al, 1997). Microbiological nature consists of the total microbial. Organoleptic properties of fish include odor and texture (SNI 01-2346-2006)

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3. Discussion

Test the shelf life of fish is done to determine the effect of flower extract plant close to the shelf life of fresh milkfish (Chanos Chanos). Applications close plants flower preservative is done by immersion in a solution of milk fish plant flower cap. Storage is done for 5 days at a temperature of 100C, and the test is done every day.

1. Water Content

Tests were conducted to determine the water content of milkfish during storage at a temperature of 100C and observed for 5 days. The results of measurements of water content can be seen in Table 1.

Table 1 Average Measurement of Water Content (%) milkfish

Soaking time	observation					
	day 0	day 1	day 2	day 3	day 4	day 5
0 minutes	76,07 a	76,83 b	77,21 b	76,11 a	76,20 ab	76,29 b
10 minutes	77,19 b	77,24 b	77,20 b	76,84 b	76,66 b	75,00 a
20 minutes	76,74 b	77,05 b	76,38 a	76,65 ab	75,71 a	76,29 b
30 minutes	78,10 c	76,25 a	77,08 b	76,36 ab	75,51 a	74,65 a

Note: Different letters in the same column indicate significant differences

Results of statistical analysis showed that the same storage time, the longer the soaking process will cause the water content tends to decrease. Without the use of preservatives, water levels are likely to remain, while soaking treatment causes fish water content tends to decrease.
This is likely due to the pressure difference between the solution Osmose marinade and fish, causing the displacement of water molecules, so that the water from the fish will come out to balance the moisture content. Dehydration occurs because the partial pressure of fish larger than the environment so that the water in the fish attracted to the environment (Winarno, 1988).

2. Protein Levels

Tests performed to determine the protein content of milk fish protein content during storage at a temperature of 100C and observed for 5 days. The results of measurements of protein levels can be seen in Table 2.

Table 2 Average Measurement of protein content (%) milkfish

Soaking time	Pengamatan					
	Hari ke-0	Hari ke-1	Hari ke-2	Hari ke-3	Hari ke-4	Hari ke-5
0 minutes	18,15 ab	18,80 a	17,43 b	18,19 a	15,72 b	16,71 b
10 minutes	18,79 a	17,25 b	17,60 b	18,76 a	17,63 a	17,01 a
20 minutes	17,28 b	17,02 b	19,07 a	16,86 b	16,81 a	16,37 b
30 minutes	17,73 ab	18,63 a	16,57 c	16,92 b	16,88 a	17,71 a

Note: Different letters in the same column indicate significant differences

Results of statistical analysis showed that the longer the soaking, the protein content of the fish tend to not mngalami decline. This is presumably due to the use of the interest cap can prevent protein degradation during storage

3. pH

PH test is performed to determine the pH of milk fish during storage at a temperature of 100C, with floral preservative treatment plant and a cap of 20% was observed for 5 days. PH measurement results are shown in Table 3.

Table 3 Average Measurements of pH Value milkfish

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Soaking time	Pengamatan					
	Hari ke-0	Hari ke-1	Hari ke-2	Hari ke-3	Hari ke-4	Hari ke-5
0 minutes	6,35	6,22 ab	6,09	6,12	6,13	5,99 b
10 minutes	6,42	6,19 b	6,18	6,15	6,14	6,07 ab
20 minutes	6,43	6,28 ab	6,22	6,24	6,23	6,23 a
30 minutes	6,40	6,32 a	6,26	6,24	6,23	6,24 a

Note: Different letters in the same column indicate significant differences

Results of statistical analysis showed that at the same storage time, the faster the time of immersion showed pH values tend to be lower. The decline in pH value is also indicated by the appearance of a sour smell in the fish along with the duration of storage. This is probably due to the decomposition of organic matter by microbes. Microbes can remodel carbohydrates, especially sugars into acetic acid and lactic acid (Buckle, et al, 2007).

4. Total Microbes

Measurements performed to determine the number of microbes microbial number milkfish during storage at 100C and observed for 5 days. The measurement results mkrobia number is shown in Table 4

Table 4 Calculation of Average Number of Microbes (CFU / g) milkfish

Waktu Perendaman	**Pengamatan**					
	Hari ke-0	**Hari ke-1**	**Hari ke-2**	**Hari ke-3**	**Hari ke-4**	**Hari ke-5**
0 menit	$7,6 \times 10^6$ d	$1,2 \times 10^9$ d	$2,4 \times 10^9$ b	$4,6 \times 10^9$ c	$8,6 \times 10^9$ d	$8,0 \times 10^9$ d
10 menit	$3,6 \times 10^6$ c	$1,9 \times 10^8$ c	$3,4\ 10^8$ a	$2,6 \times 10^9$ b	$5,2 \times 10^9$ c	$6,7 \times 10^9$ c
20 menit	$4,5 \times 10^6$ b	$9,8 \times 10^7$ b	$1,1 \times 10^8$ a	$2,0 \times 10^8$ a	$6,8 \times 10^8$ b	$9,1 \times 10^8$ b
30 menit	$1,8 \times 10^6$ a	$9,2 \times 10^6$ a	$2,0 \times 10^7$ a	$1,0 \times 10^8$ a	$1,6 \times 10^8$ a	$1,5 \times 10^8$ a

Note: Different letters in the same column indicate significant differences

Results of statistical analysis showed that the same storage time, the longer the immersion in the closed flower extract, mirobia number tends to decrease. It is proved that the closed flower extract could inhibit microbial growth during storage.

Research shows that the interest cap terddahulu contains diterpenoids, flavonoids, and tannins. Phommart, S., et al (2005) have isolated tanarifuranonol, tanariflavonona C, and D tanariflavonona of plant leaves close. Furthermore, Kawakami, A., et al (2008) have isolated seven compounds are prenylated flavonones macaflavonones A - G. Compounds alkaloids, saponins, phenolics, flavonoids, triterpenoids are compounds that can inhibit microbial activity

You can also see that the longer the storage, the number of microbes increases, the intensity of the increase varies depending on the length of storage time. This is likely due in fish available nutrients that can be used by microbes to grow and develop, so that the number is increasing.

Microbes present in food have heterofilik nature, which requires carbohydrates, proteins, fats and other components as a source of carbon and energy (Fardiaz, S. 1992).

4. Conclusion

1. The water content of milk tend to be lower in line with the length of a long process of soaking in the same storage
2. The protein content of the fish tend to mngalami not decrease during storage
3. The pH value of milk fish tend to be higher due to the long length of time of immersion in the same storage
4. The number of microbes tend to be lower due to the long length of time of immersion in the same storage

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PLAN OF SURABAYA TRANSPORTATION SYSTEM BY UTILIZING INTELLIGENT TRANSPORTATION

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Abstract: To promote economic growth in Surabaya, East Java Province in particular and in general need to be supported by an integrated transportion system between the port, land, air and the world so that the industry can accelerate the transportation path to increase economic growth in general. Economic growth could be increased if accompanied by the management of traffic management as well as an adequate infrastructure of the need to apply intelligent transportation systems that can combine several related aspects including economic, business, industrial, maritime, education, tourism, social and others. Based on the systematic problems that need to be done in-depth research for intelligent transport methodology with the decision relating to the public interest in the hope of increasing the overall economic growth and can be expected to interest the general public.

Keywords: Intelligent transportation, Economic growth

1. Introduction

Transport interpreted as an attempt to move, transport, or transfer an object from one place to another, which in other places such objects can be more helpful or useful for certain purposes. (Miro, 2012). Transport is defined as the transfer of goods and people from place of origin to point of destination (Nasution, 1996). From that sense it is understandable that transport is an activity that requires the work of roads and means of transport that is both public and private that could benefit both themselves and others.
As one of the basic infrastructure in the region, transport facilities and infrastructure is expected to be a driving force will be the development of an area. But there are times when the development of a city to be faster than the transport facilities. The fact that is causing transportation problems. Or can be down between the increase of the length of road infrastructure with the growing number of vehicles that are not balanced is what makes the root causes of transport. Thus causing the flow area of the city frequent traffic jams.
Surabaya city as a metropolitan city with more and more activities are activities in the city of Surabaya, including; Commerce, Industry, Education, Tourism, and Maritime observed all the activity that almost all activities related to the transportation process.

1.1 Problems

From the foregoing it appears some of the problems related to transportation in the city of Surabaya, among others:
1. The solid transportation in the city of Surabaya
2. The increasing number of vehicle growth
3. No berimbangnya growing number of road vehicles.
4. Less interesting your number of road users to use public transport.

1.2 Limitations of Variables
To make planning the transport system is more realized there should be restrictions on variables that are planned include:
Overcoming the transportation congestion in the city of Surabaya.
1 Identify activities rush hour in the city of Surabaya.
2 Optimizing the empowerment of public transport.
3 Ease of access to the latest information regarding transfortasi.
4. Objectives Planning
Intelligent transportation system planning with a view:
1 Give convenience to the people who will carry out activities in the city of Surabaya.
2 Provide solosi let no congestion transport.
3 To integrate information activities in the city of Surabaya in rush hours.
4. Reader Review

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2. Literature Review

Intelligent Transportation Systems (Intelligent trasportation System), better known by the acronym ITS. is an advanced technology in the field of electronics, informatics and telekominikasi to realize the infrastructure and means of transportation that is more informative, smooth, safe and comfortable. The technology is built to reduce the risk of traffic accidents. ITS application is composed of an information network system and modern navigation, traffic management systems, crash management systems, electronic transportation payment collection system, and a system for driving assistance. (O'Ryan M:2005). Towards the achievement of intelligent transport systems is necessary ancillary equipment including:

1 Advanced Traveller Information System is an information system that serves as a guide for motorists to obtain the effective way in his journey. The form of digital map-based geographic information system or in the present form of output monitoring GPS (Global Position System) which can be brought on the application of computers, notebooks to smartphones such as the Blackberry and mobile phones that use the Android operating system. (Kompasiana, 2013).
2 Incident Management System is an information system used in case of emergencies that may affect traffic conditions such as traffic accidents or natural disasters. In the event of a traffic accident, for example, based on input information from the field, it can be determined accident fatality rate, the number of victims and medical powers necessary, coordinate with the nearest hospital and if needed the support of other related agencies such as the fire department or power company. This information can also be an additional material coordination with nearby hospitals as the reference so it can be prepared adequate medical equipment. (Kompasiana, 2013).
3 Assistance for Safe Driving that ITS applications are installed in the vehicle as a tool for the driver to steer the vehicle safely. This is an early version of ITS applications and over the times, has experienced functional improvement. The shape of the sensor device connected to a computer device that has been installed in the vehicle itself. This sensor is automatic and will be a tool that can alert the driver in the event of potentially dangerous conditions such as:

Application of intelligent transport systems (intelligent transport system), hereinafter abbreviated as ITS, are features applied information technology in the transport sector, in this context is the ground transportation. In the early decades of the 2000s, has been recognized by policy makers in the transport sector that the traffic situation more complicated and complex would be very difficult if still rely on conventional management, then began to implement information technology applications with the primary objective to help control traffic .
If we trace the historical background to the ITS itself, the goal was originally designed to reduce the risk of traffic accidents. (Kompasiana, 2013).

In addition there are several studies related to this study include:

1 The use of GPS technology standard (Sandor Dornbush and Anupam Joshi, 2007) to choose a route that they believe will be the fastest but traffic congestion can significantly change the duration of the trip.
2 GPS-GSM as a vehicle tracking (Mohammad A. Al-Khedher, 2011) regarding the GPS-GSM system is integrated to track vehicles using the Google-Earth. With the GPS mechanism mounted on a moving vehicle to identify the current position, and the data is transferred to the receiving station by GSM with the parameters obtained.
3 The system of monitoring and control of urban traffic (James Marson Budiman, et al, 2012) regarding the monitoring and control system to integrate traffic information traffic density and traffic light damage through road location map displayed on the user side, and identify pathways occurrence traffic congestion.
4 GPS Tracking Path Simulation by replaying (G. Rajendra, et al, 2011), this research is to establish a database of GPS data that can be used and test the GPS application and the model approach: Collecting data from each path moving car once in the log file: log file repair : and play a few examples of multiple log files simultaneously after replacing some of the old values with the new values to simulate GPS tracking.

3. Research Method

In the process of designing intelligent transport systems in the city of Surabaya is necessary to process them by identifying the hours Sibut is often the case based on the observation of identification hours Sibut in Surabaya can diidentfikasi in accordance with the following table:

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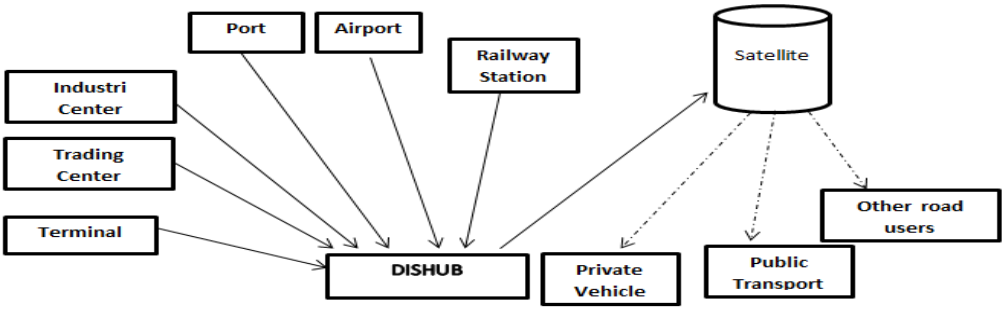
Table Identification Rush Hour in Surabaya

No	Time	Use	Information
1	02.00 – 05.30	Tranding	Necessity (vegetables, fish)
2	06.00 – 07.00	Education	Kids Kindergarten - High School
3	07.00 – 08.30	Workers and Education	Education college student
4	08.30 – 15.30	Commerce, Industry, Tourism	Cargo truck production plant, agriculture etc.
5	15.30 – 19.00	Work return, Trading	
6	19.00 – 22.00	Shopping, Culinary, Entertainment	

By knowing the identification rush hour that occurs so that it can inform the condition of traffic flow that occurred in the city of Surabaya with management in an integrated way by the Department of Transportation (Transportation Agency) to convey information timbalik between DISHUB with road users and the parties associated with the use road traffic flows to its activities are carried out every day.

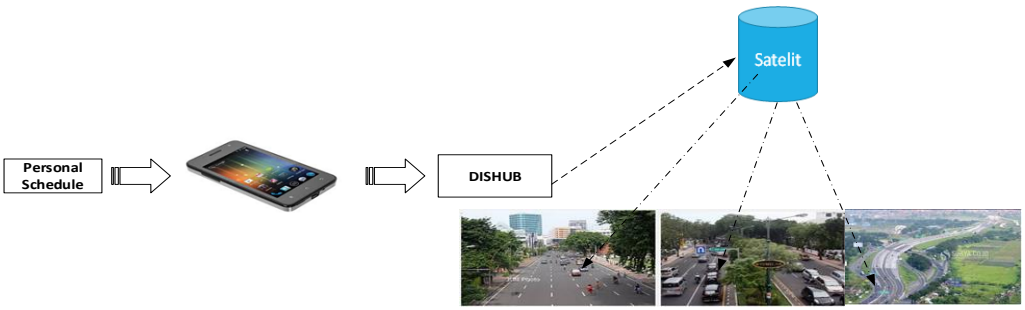
4. Discussion

System Design
The design of intelligent transport systems in the hope of getting the maximum output, by utilizing coordinate data and vehicle speed from the GPS Trackers. The device is attached to the city bus or public transport managed by the private sector of the data obtained will be processed into traffic data in real time. This data will be processed again into the traffic information is combined with maps geogle fire, then spread to the web-based internet media. With the hope is that obtained an information system that is easily understood by the public where traffic information is displayed in a visual format and can be accessed via the Internet.



Picture Intelligent Transportation Plan

Planning intelligent transportation systems that describe how to integrate the rush hour or solid from each center activities including: Center industry, Terminal, Trade, Ports, Airports, Stations for mengimformasikan activities solid to DISHUB then from DISHUB processed and informed to the user who wants to use road transport by using means of telecommunication via satellite.



Picture the delivery plan or search for personal information from other users

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From the picture above illustrates the plan is to deliver information or search information from individual to determine the condition of the traffic flow eg road users with private vehicles can deliver traffic flow conditions occurring during or want to know the current condition of the road traffic that will be passed.

Analysis Research
From this research motorists either private vehicles or public transport should be prepared to monitor the activities of road conditions by:
1 Monitor the activity of the highway with up to date smart phonenya if would be traveling to perform its activities.
2 Inform about the condition of the flow of traffic when there is congestion in the public interest
3 By utilizing Smart phone immediately seek alternative paths when doing activities on the highway.

5. Conclusion

From these results will be obtained several conclusions including:
1 Can untangle traffic jams that occur at any time.
2 Can determine the level of traffic density and the growing amount of vehicles that are on the highway.
3 Can be directed to make use of public transport.
4 You can inform the traffic conditions at any time.

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SOIL POROSITY MODELING FOR PRIMARY TILLAGE SERIOUS GAME

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Abstract: This paper introduces modeling of soil porosity from primary tillage, it is a part of the serious game. Primary tillage is mainly operation of cutting, inverting and pulverizing the soil which typically use moldboard plow. The general purpose for plowing to increased soil frzx iability. The result from soil tillage using moldboard plows is easy to seen directly is the chunks of soil. Chunks of soil shows cavity between the soil, called a pores. The smaller chunks of soil showed greater the soil pores. A porous soil a made from coarse particles that leave large gaps known as pores. The spaces between the particles of soil that make up the structure of soil, hold air and water. These pores also facilitating of movement of air and water through the soil. The size and number of pores in your soil affects how much water it can hold and how quickly water drains out of the soil. Changes in soil porosity can influenced by the speed and plow vertical angle. The effect of plowing speed, cutting vertical angle and porosity have a proportional relationship. The sooner of plowing by cutting fixed angle, a resulted porosity is higher. If the speed of plowing is constant and increasing a cutting angle, a result is porosity is higher. This paper shows the effect of changing speeds and cutting vertical angle on the soil porosity with computationally model. The porosity modeling can used for serious game, those generate outputs based on the real circumstances. With the real circumstances in serious game can to improve as learning media and simulation for soil tillage.

Keywords: Serious Game, Porosity, Moldboard Plow, Plowing, Primary Tillage.

1. Introduction

A serious game is a game designed for a primary purpose other than pure entertainment. The "serious" adjective is generally prepended to refer to products used by industries like defense, education, scientific exploration, health care, emergency management, city planning, engineering, and politics. Serious game implemented to education for training tools or learning facilities, thus requiring a data models that correspond to the real circumstances. In this case study on primary soil tillage by using the moldboard plows, thus requiring facts to approach the real. This study was to decide the effect of forward speed and cutting angle on the soil porosity, to produce a model computation of soil porosity after primary tillage. Some research has been done on the effect of plowing and porosity, H. S. Abdel-Galil. (2017), the purpose of this investigation was to study the effect of rotary plow on the soil physical properties and barely production under Libyan rainfall condition, were applied with different forward speeds. Latiefuddin.H, Lutfi.M (2013) research on the effects of various types of plowing speed for mediteran soil with case study in Malang. Other studies on the effect of the cutting vertical angle of plowing and forward speed by Santosa, Andasuryani, Azrifirwan (2008), which greater vertical cut angle resulted in forward speed is higher, experiments carried out on the ground box (soil bin) in Padang. In a study to conducted to decide the effect of forward speed, cutting vertical angle to porosity the soil, which formula in a model of porosity. This porosity models as a reference in computing for create of serious games.

2. Literature Review

Theoretical Review

Serious Game: The first definition of the “Serious Game” by Clark Abt (1970). Abt gives a clear definition of serious game, games may be played seriously or casually. The sense of games have an explicit and carefully thought-out educational purpose and are not intended to be played primarily for amusement. This does not mean that serious games are not, or should not be, entertaining. Michael Zyda, who participated in the development of America’s Army, proposed a similar definition. Zyda (2005) , A mental contest, played with a computer in accordance with specific rules, that uses entertainment, to further government or corporate training, education, health, public policy, and strategic communication objectives. Sawyer (2007) give definition of Serious Games to any meaningful use of computerized game/game industry resources whose chief mission is not entertaiment. Which the definition a game is not purely for amusement , but involves learning or for training tools. For example, a virtual experiment system platform for agriculture was set up during 2010, Zhang (2010). Farming serious game and game experience has been

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presented by various formats and implement a 3D virtual collaborative space for agriculture training using multi-user on-line game framework, Hwan-Soo (2014).

Primary Tillage:
Primary tillage implements displace and shatter soil to reduce soil strength and to bury or mix plant materials, pesticides, and fertilizers in the tillage layer. Primary tillage is more aggressive, deeper, and leaves a rougher soil surface relative to secondary tillage, ASAE (2009). A primary tillage implement which cuts, partially or completely inverts a layer of soil to bury surface materials, and pulverizing the soil. The part of the plow that cuts the soil is called the bottom or base. The moldboard is the curved plate above the bottom which receives the slice of soil and inverts it. Moldboard plows are equipped with one or more bottoms of various cutting widths. Bottoms are commonly right-hand that turn all slices to the right. Two-way moldboard plows are equipped with right-hand and left-hand bottoms that are alternately used to turn all slices in the same direction as the plow is operated back and forth across the field, AESC (2014). The increasing forward speed of plowing will be increase the amount of tensile force, against to reaction of force ground to the processing of land, increasing force of tensile is use to overcome the destruction, reversal and throw of soil primary tillage, Smith dan Wilkes (1977)

Soil Porosity:
The pore system of a soil is very complex. Individual pores vary in shape, lateral dimensions, length, tortuosity, continuity, and other characteristics. However, describing the pore system in such terms as porosity, volumetric porosity, areal porosity, and pore-size distribution is relatively straight forward. The porosity of a soil sample, usually reported as a percentage, is directly proportional to the volume of the pore or void spaces and indirectly proportional to the volume of the total sample. In this procedure, the soil is taken from the saturated zone; it is assumed that the pore spaces are filled with water and that the volume of the water is equal to the volume of the pore spaces. In this manner, the procedure is similar to the tension-table method described by Vomocil (1965). The derivation of a simple mathematical relationship used to estimate the porosity of a saturated soil sample follows:

$$Pt = \frac{Vp}{Vt}\ x100 \qquad (1)$$

Where :
Pt = total porosity (percent).
Vp = volume of the pore spaces (cm^3)
Vt = total sample volume (cm^3)
If Vt=Vp+Vs , where Vs = Volume of soil particles (cm^3)

$$Pt = \frac{Vp}{(Vt + Vs)}\ x100 \qquad (2)$$

On the basis of the definition of total porosity, a soil sample could be evaluated for total porosity by directly measuring the pore volume (Vp) and the total volume (Vt). The total volume is easily obtained by measuring the total volume of the sample. The pore volume can, in principle, be evaluated directly by measuring the volume of water needed to completely saturate the sample. In practice, however, it is always difficult to saturate the soil sample exactly and completely and, therefore, the total porosity of the sample is rarely evaluated by a direct method. Usually, the total porosity is evaluated indirectly by using the following expression , Danielson and Sutherland (1986) :

$$Pt = 1 - \frac{Vs}{Vt} \qquad (3)$$

Hypotheses
- Primary tillage implements displace and shatter soil to reduce soil strength be affected by the forward speed of the plowing or pull of plowing affected on the soil porosity , the greater the forward speed will be even greater the soil porosity.

- The forward speed of plowing is also affected by the cut vertical angle, the greater of cutting vertical angle resulting the surfaces normal force will be smaller, so the forward speed is faster.

- The relationship between the cutting vertical angle , plowing forward speed and porosity are directly proportional. If the cut angle is greater, the forward speed of the plow are also getting bigger and the higher porosity.

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- The porosity models will be use as a variable to create the serious game, because it to generated a value corresponding to the real circumstances.

3. Research Method

Research Plan:
This research begins with a study of literature related to primary soil tillage use of the plow and serious gaming. The hypothesis from study literature will show the relationship / correlation between the forward speed of plowing, cutting angle and porosity of the soil. Results for linking these factors into a model porosity can used in create the poros variabel of serious games, figure 1.1.

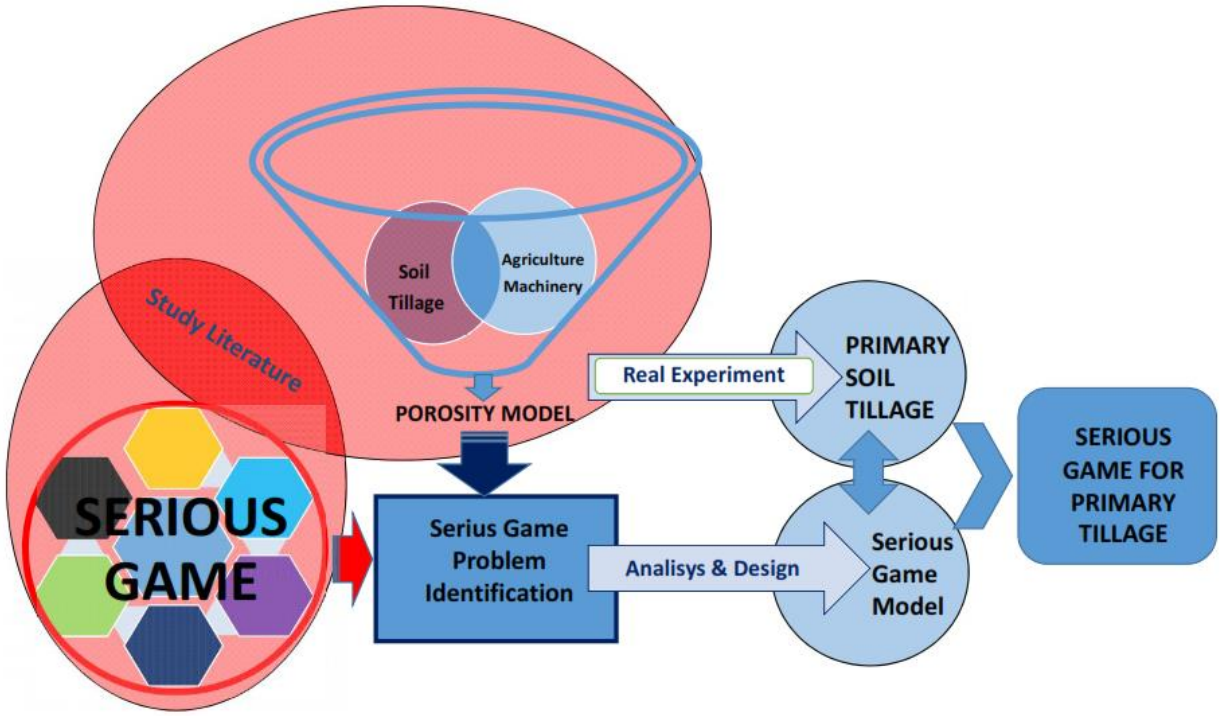

Figure 1.1. Research Flow

Porosity modeling results is one of the serious problems for design system, then will do direct experiments and laboratory testing. The accuracy from porosity model can used as part of the analysis and preliminary to design of the serious game about the primary soil tillage.

4. Discussion

The correlation and relation of forward speed of plowing, cutting vertical and porosity :

- The porosity is directly proportional with cutting angle, follow :

$$\boldsymbol{P = (a1 + b1S)} \qquad (4)$$

- The porosity is directly proportional with foward speed of plowing, follow :

$$\boldsymbol{P = (a2 + b2K)} \qquad (5)$$

From the equations (1,2):

$$P = (a1 + b1S)(a2 + b2K)$$
$$P = (a1a2 + a1b2K + a2b1S + b1Sb2K)$$

$$\boldsymbol{P = A + BK + CS + DSK} \qquad (6)$$

If constanta B and C is zerro :

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$$P = A + DSK \quad (7)$$

Where :
P= Porosity (%)
K= Forward speed (m/s)
S= Cutting angle (derajat)
A,B,C and D= Constanta.

If the forward speed is constant and the greater of cutting angle larger will affect the higher the porosity of the soil, if the constant of cutting angle and the greater of forward speed will also make the higher porosity.

5. Conclusion

The conclusion is the result of the influence hypothesis forward speed of plowing, cutting vertical angle is directly proportional to the porosity, the following:

- If the forward speed is constant and the greater of cutting angle larger will affect the higher the porosity of the soil.
- If the constant of cutting angle and the greater of forward speed will also make the higher porosity.
- The porosity models which is influenced by the forward speed and the angle of vertical cut is:

$$P = A + BK + CS + DSK$$

6. Recommendations

For Practitioners: The future research in real with various types of soil in Indonesia, so the modeling approach the real circumstances and can used as a training media for plowing.

For Government: Government support for the development and dissemination is necessary to successes this reasearch, so that can to increase the society awareness to agriculture, especially for soil tillage, with supported a serious game that can used as a learning media.

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APPLICATION OF KINSHIP VERIFICATION BASED ON FACIAL GEOMETRY USING NEURAL NETWORK

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Abstract: Face detection and recognition is one of the most important problems in computer vision. Facial images are important feature for human beings. From this facial images we can acquire lots of information about an individual person such as sex, age, and race. Furthermore, human face is one of physical characteristics that can be used as a biometric identity of a person besides fingerprint, retina and voices. One of key characteristics that can be identified from somebody facial images that whether there is kinship between parents and children. This research propose a framework for verification of relationship between parents and children, that can be done automatically. This verification performed by using feature vector on a pair of parents-children facial images. These features are extracted based on facial geometry. Facial geometry technique is to detect face image by using relatives positions and sizes of the important component of face. Then, feature selection is done to select appropriate feature to verify the kinship of parents-children from the feature vector on experiment data. Thereafter calculation of similarity are performed from this selected feature. The experiment data using 30 facial image pair of parents and children. Based on the experiment, the accuracy of kinship verification result is obtained 67% by using neural network.

Keywords: Face Recognition, Feature Extraction, Kinship Verification, Neural Network, Similarity

1. Introduction

Face detection and recognition, becoming an important research topic in the domain of computer vision and pattern recognition. Research on automatic face recognition has been developed. This research topic involves multidisciplinary. The latest computer applications involving this topic is face detection, identification, recognition and facial expression analysis (Rajpathaka, et.al., 2009). Some automatic face recognition application is face recognition from a variety of different poses, facial recognition on face image with accessories (like hats, sunglasses, slayer), age prediction based on face image and facial expression recognition.

Face recognition automatically done by using specific features of the face and the distance between features. Specific features which are the main features of the face are eyebrows, eyes, nose and mouth. While the distance between facial features such as distance between the eyes, distance between nose to mouth, and width of the face (Li, et.al., 2011).

Face image is important part of human identity. In addition, the face is one of the physical characteristics, which can be used as a biometric identity of a person, besides fingerprints, iris, retina, voice (Jafri, et.al., 2009). From the face image, a lot of information about a person can be obtained such as gender, age and ethnicity or race (Martello, et.al., 2010).

Rathi (2012) declares that everyone has similar facial structures geometrically. And visually, everyone has minor differences in facial characteristics. However, one of the important characteristics that can be identified from the face image manually is whether there is a family relationship between parent and child. Research on the identification of kinship between one person and another has done Laurence (2006). Laurence says that the visual similarity of facial characteristics, is one sign of the presence of a genetic relationship, which is not influenced by age and gender. The similarity of facial characteristics genetically located on the upper face especially the eyes. Whereas, according to Siyu, et.al. (2012), genetically, facial resemblance lies in the eyes, nose, and mouth. In addition, the process of kinship verification using learning transfer that is applying a face image of parents at the same age as his son.

The big challenge in the face image analysis is verifying kinship between two different people. Therefore, this study conducted automatic identification of a parent-child facial images to determine the presence or absence of kinship between the two people is based on the geometry of the face.

2. Literature Review

Facial Geometry

Everyone has similar facial structures geometrically. Therefore, Rathi, et al (2012), declares that the simple initial

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method which is used to recognize faces is based on the position of facial geometry as shown in Figure 1. This method is suitable to the face image in a frontal position, the face image such as the photographs on identity cards, ID cards or certificates. Face image with a minor rotation, orientation and illumination variations can still be identified with this method. The precision of this method is greatly influenced by the quality of the image is used.

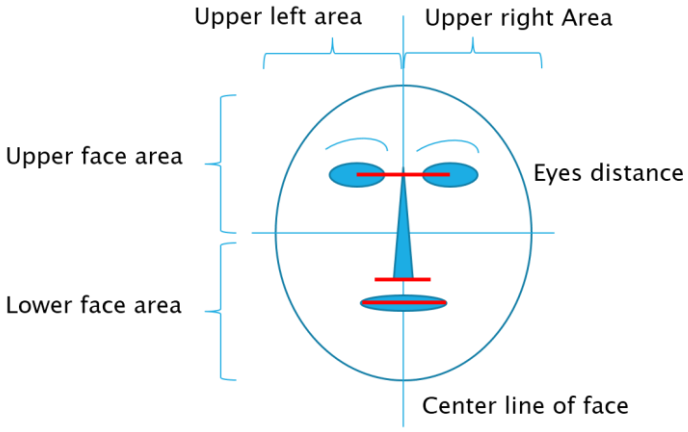

Figure 1. Facial geometry for feature extraction

Facial Features for Kinship Verification

Facial resemblance depends on several factors, including age and gender. The visual similarity of facial characteristics, is one sign of the presence of a genetic relationship, which is not influenced by age and gender. The similarity of facial characteristics genetically located on the upper face especially the eyes. Whereas, genetically, facial resemblance lies in the eyes, nose, and mouth. Some facial features are used to kinship verification between the child's parents in the study conducted by Fang, et.al (2010) include eye color, skin color, mouth area, distance of the two eyes, nose to eye distance, eye to mouth distance.

Research Method

Research Plan: The research was planned by using some stages as shown in the Figure 2.

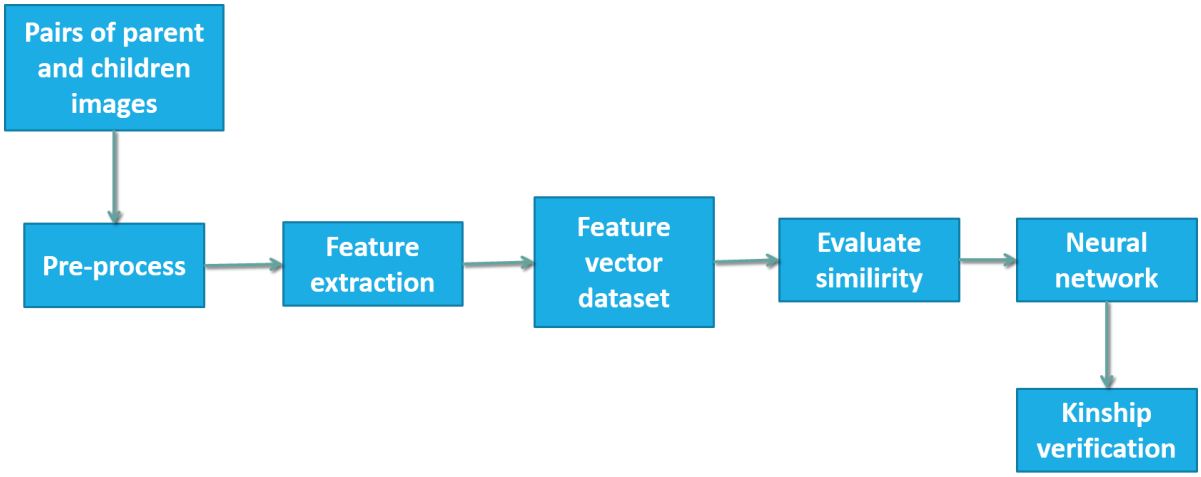

Figure 2. Research method

Data Preprocessing

Pre-stage of this process, the preparation of image data which includes the conversion of color images into grayscale image and edge detection using Sobel. Converting color image into grayscale image is done to simplify image processing and calculation. Edge detection is performed to obtain the location of the position of the face part geometry. This facial geometry, describing the features that exist on the face image, such as eyebrows, eyes, mouth and nose. The position of facial features that will be used as the data within the classification. Results of using Sobel edge detection is shown in Figure 3.

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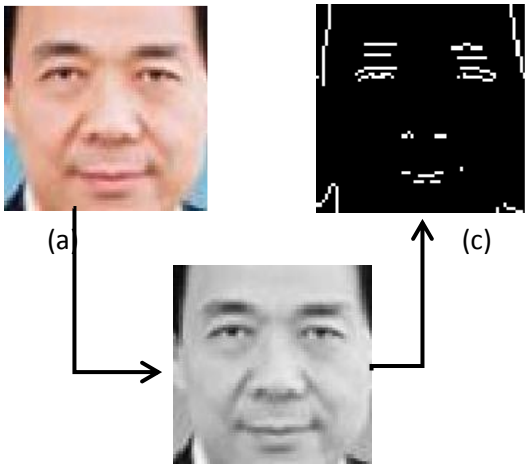

Figure 3. (a) Data image (b) Grayscale image (c) The results of edge detection using Sobel

Facial Feature Extraction

This feature extraction is done to get the important features of the image that will be used in verifying kinship. Manually, two people who have relatives relationship, can be identified through the face. It is done by looking at the similarity of the facial part such as the shape of the eyebrows, eyes, nose, mouth, eye distance, etc. This feature extraction process is carried out to obtain these features based on the facial geometry in order to obtain the position of facial parts as shown in Figure 4.

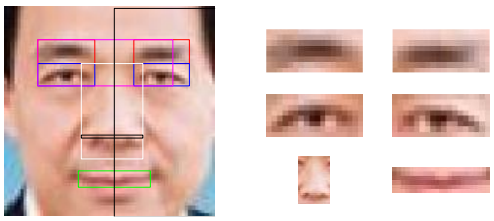

Figure 4. The results of feature extraction and facial part based on the facial geometry.

Table 1. Feature vector data.

Feature data	Description of feature
Feature 1	Center line of face
Feature 2	Eyes distance
Feature 3	Nose-mouth distance
Feature 4	Eye-nose distance
Feature 5-7	Skin color (RGB value)
Feature 8	Skin color (grayscale value)
Feature 9-12	Left eye color (RGB value)
Feature 13-16	Right eye color (RGB value)
Feature 17-24	Mean and standard deviation of left eyebrow
Feature 25-32	Mean and standard deviation of right eyebrow
Feature 33-40	Mean and standard deviation of left eye
Feature 41-48	Mean and standard deviation of right eye
Feature 49-56	Mean and standard deviation of nose
Feature 57-64	Mean and standard deviation of mouth

Feature Vector Dataset

Furthermore, the features obtained will be stored as data in the form of a feature vector. This feature vector data contains the features of each face image that has been processed. For each face image will be transformed into a feature vector. Each feature vector contains the data of facial distances, facial colors and facial parts. The number of features that are stored is 64 features, with the details as shown in Table 1.

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Calculating The Similarities

Similarity is a basic concept that is commonly used to measure the degree of similarity of features, from two logically different image. Similarity measure used to calculate similarity image of a parent-child feature is *eucledian distance*. In the space of n-dimensional, where n is the number of features possessed by the image, the eucledian distance (d) of the image features X (x1, x2, ..., xn) and Y (y1, y2, ..., yn) is calculated using the Equation 1.

$$d(X,Y) = \sqrt{\sum_{i=1}^{n}(x_i - y_i)^2} \quad (1)$$

Neural Network

The next step is to verify whether there is a kinship between parent and child using neural network. The neural networks will perform classification on the image feature data that has been obtained in the previous stage. Some of the parameters required by the neural network model to perform classification. Data input is a feature vector data from the previous stage. Weight initialization used in the network is random. The neural network used is multilayer, which consists of 3 layers namely the input layer, one hidden layer and output layer. The number of neurons in the hidden layer is 10 neurons. Activation function used in each neuron is logsig (log sigmoid) with a range of 0 to 1 according to the equation 2.

$$f(x) = \frac{1}{1 + e^{-x}}, \quad (2)$$

where e is euler numbers and x is the input data on the neuron. The learning process, which is used in the neural network is backpropagation. During the learning process, weights will be updated until the expected solution found (convergence). While the threshold value that is used to get the output is 0.5.

Population and Sample: Image data used in this study is the public image dataset kinfaceW-I downloaded from the web page https://sites.google.com/site/elujiwen/kinfacew. Dataset KinfaceW-I is a face image dataset parent-child pairs were grouped into four. The first group is a pair image of a father and son (father-son / FS), the second group is a couple image of a father and daughter (father-daughter / FD), a third group is a pair image of the mother and son (mother-son / MS) and a fourth group is a couple image of the mother and daughter (mother-daughter / MD). The number of images in each group are shown in Table 2.

Table 2. Number of image datasets used.

Group of images	Number of images
Father-Son (FS)	129
Father-Daughter (FD)	129
Mother-Son (MS)	116
Mother-Daughter (MD)	127

The image data that is used in this research are 501 pairs of image. The face image data has a size of 64 x 64 pixels. Some examples of image data shown in Figure 5.

Furthermore, from the image data will be made the feature vector. This feature vector is obtained from the face image feature extraction process. This feature vector data will be used in the classification process using neural network. The feature vector data is divided into two, namely the training data and the testing data as shown in Table 3.

Data image pairs, which are used in the classification process, divided into two classes. Positive class is the image of a parent-child pairs who have a true family relationship between them. Whereas the negative class is the image of a parent-child pairs who have no family relationship between them. The number of datasets based on its class as shown in Table 4.

The Experiment

The experiment conducted to obtain the accuracy of kinship verification process. It is done using three scenarios. The first scenario uses all the features obtained from the feature extraction. The second scenario uses the difference between the features of the parent-child image. And the third scenario uses features of the manual perception that indicate facial resemblance parents with their children.

The first scenario using 127 kind of features, which consists of 63 features from the parent image, 63 features from the child image, and one feature which is the similarity value of features parent-child image. The second using 63 features, and the third using 13 features of manual perception that shown facial resemblance such as the eyes of parents have in common with the eyes of a child. This similarity is calculated based on the calculation of facial part image features, which was obtained in the feature extraction. The other features is the ratio of the distance (eye, nose to eyes, mouth to

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nose) and similarity value of skin color, eyebrows, eyes, nose and mouth. The number of features used in each scenario are shown in Table 5.

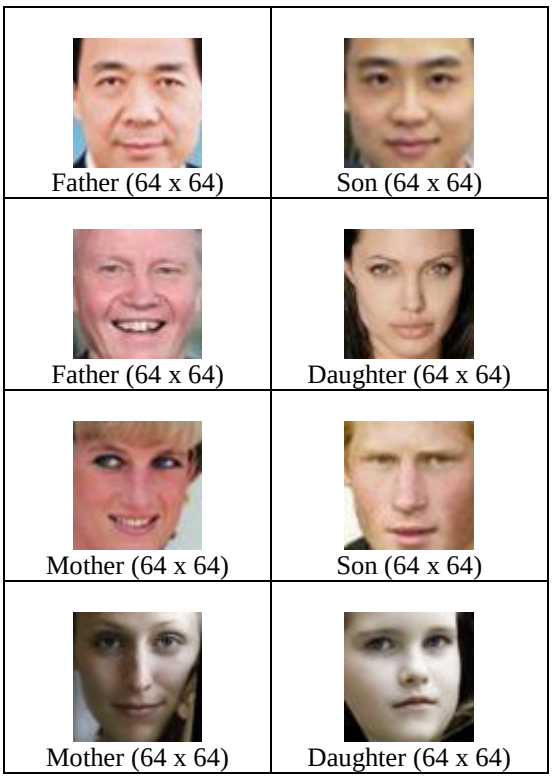

Figure 5. Face image data parent-child pairs, namely father-son (FS), father-daughter (FD, mother-son (MS) and mother-daughter (MD)

Table 3. The amount of image feature vector for classification

Dataset	Training Data	Testing Data
FS	200	58
FD	200	58
MS	200	32
MD	200	54
Total	**800**	**202**

Table 4. The number of datasets based on its class

	Class	
	Positive	**Negative**
Training data	400	400
Testing data	101	101

Table 5. The Number of features used in the experiment.

Experiment	Number of features
1	127
2	63
3	13

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For each scenario, the classification using neural network is executed 30 times. The learning algorithm used on neural network is backpropagation with one hidden layer, which consists of 10 neurons. The accuracy of the test results for all scenarios are shown in Figure 6.

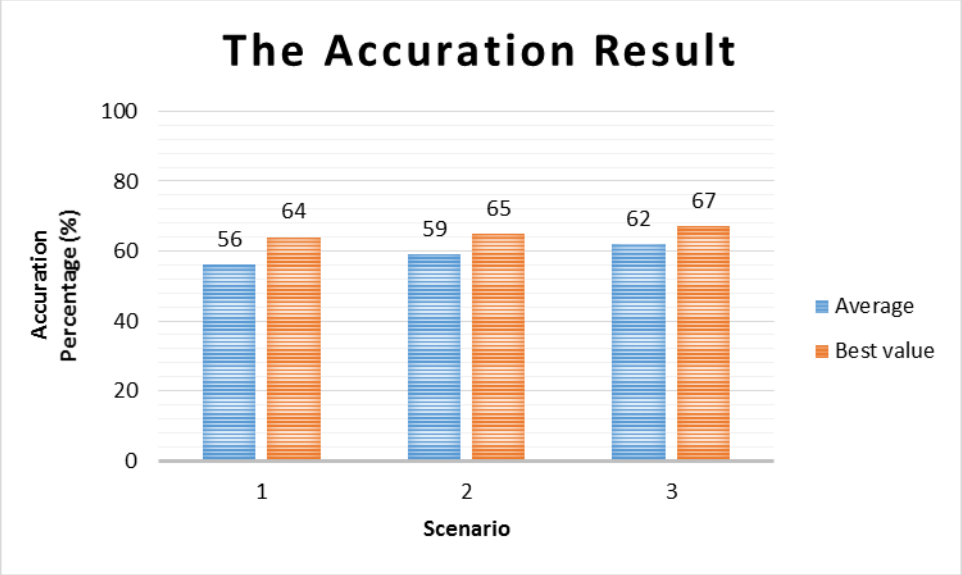

Figure 6. The accuration result of each scenario.

3. Discussion

From the observation of the test results on the classification of the first scenario has the lowest accuracy value. While testing in the third scenario has the highest accuracy value. The experiment result is shown in Figure 6. Based on Figure 6, the average accuracy results from the first test was 56%. While the best accuracy value obtained was 64%. For the second test, the average accuracy result was 59%. While the best accuracy value obtained was 65%. The last tests, showed the average accuracy result was 62% and the best accuracy value obtained was 67%.

To get a better accuracy, it is necessary to do some of the following step, such as using better images quality. In addition, to evaluate the methods used to perform feature extraction to get facial part more accurate. And feature selection need to get appropriate feature for better kinship verification accuracy. Then, using specific feature for each facial part like entropy, shape, etc

.

4. Conclusion

Some of the conclusions obtained from this study, among others :

- Kinship verification automatically can be obtained with feature extraction from facial geometry
- The use of these specific features produce better accuracy compared to the use of all the features extracted.
- Number of feature didn't improve the accuration result, but specific feature (appropriate feature) for kinship verification will does.
- The feature selection to verify family relationships more effectively by using a visual perspective.
- Maximum accuracy of kinship verification is 67 %

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A COMPREHENSIVE MODEL MANAGEMENT FOR THE COMMUNITY-BASED ZERO WASTE

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Abstract: As a sub-district, Lamongan does have a hindrance in managing its waste problem. The restrictive impact of the current waste-management system has not yet to reach a desireable comprehensive approachment from the upperstream since the waste-potential product has not yet to be procuded to the downstream that the result is. Lamongan consists of 20 villages. From the 20, 4 locations are chosen for the research sites; taken from a group of best-winning villages ranking 1 to 5 in a compettition named Lamongan Green and Clean (LGC), volume 4 and 5 Year 2014, categorized in Independent Area. A method used in this research is "qualitative-descriptive" method that aimed to describe phenomenons in the management of the waste of the domestic household/area that occur in Lamongan sub-district, Lamongan residence. A model that is deemed as suitable and has been applied in many sub-district of Lamongan is selective model. A waste is being sorted into three categories: organic waste, non-organic waste, and B3. A model named "Bank Sampah" (Waste Bank) is used to use this classifications. Bank Sampah can add up to household income and make the trashes organized. Meanwhile, a model management for non-organic trashes is via recyclable method, and organic trashes are used for compost. Made Mulyo RT 02 RW V, Made has acquired a plastic-dissolver machine, and Beringin Jaya RT 03 RW V has acquired a plastic-burner machine, so that a management for a non-organic trashes has reached a step closer to a perfect Zero-Waste.

Keywords: comprehensive, waste, zero waste, society-based, green and clean.

1. Introduction

According to a research conducted by Enviromental Agency, the average of the cause of the waste coming from TPA Tambak Rigadung in 2007 reaches 103 m³/day and, by 2010, increased to 105,4 m³/day. Meanwhile, the amount of citizens in Lamongan circa 2010 has reached 1.568.153 people, so it is safe to assume that the cause of the trashes in Lamongan has reached 982.291,04 m3/year (Nur Azizah Affandy, 2011). This can be the strong cause that the waste problem in Lamongan must be solved immediately.

In order to implement the aforementioned policy, the government has made an event called Semarak Lamongan Green and Clean (LGC) until volume III, themed Zero Waste, in order to create a waste-free environment in the near future. The implementation of LGC had just being conducted in Lamongan sub-district untul volume II so this research is taking location in Lamongan sub-district. This paper, which is entitled "A Comprehensive Model Management for a Community-Based Zero Waste" is aimed to conclude a suitable management and waste recycling model for Lamongan. Lamongan consists of 20 villages. From the 20, 4 locations are chosen for the research sites; taken from a group of best-winning villages ranking 1 to 5 in a compettition named Lamongan Green and Clean (LGC), volume 4 and 5 Year 2014, categorized in Independent Area. Those four groups are: (1) Demangan Tengah RT 02 RW II, Kelurahan Sidoarjo, sub-district of Lamongan. (2) Beringin Jaya RT 03 RW V Kelurahan Tumenggungan, sub-district of Lamongan, (3) Made Mulyo RT 02 RW V, Desa Made, sub-district of Lamongan, and (4) Rangge RT 04 RW I, Kelurahan Sukomulyo, sub-district of Lamongan. The taking of the groups for the sample is following a consideration that the aforementioned areas have succeeded at enhancing the role of society at constructing a clean, green, and healthy living environment; especially in term of independent waste management.

A research about the waste management that has been experimented will be a very strategic and interesting topic, as an effort to undertake the main waste problem in Lamongan sub-district to the community-based Zero Waste.

2. Literature Review

Theoretical Review

Rubbish as waste which is solid consist of organic substance and inorganic substance which are assumed useless and it must be managed so that not to endanger the environment and protect the investment development (SNI 19 . 2454 .2002).

According to UU No 18 Tahun 2008 about waste management, it is mentioned that waste is rest of human daily activities or natural processes in solid form or semi-solid of organic substance and inorganic are biodegradable or not biodegradable which are assumed useless and it discarded to the environment (Fizah, 2008).

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In management to *zero waste*, selection process and management should be done in waste source, either simultaneously or sequentially with lug waste. Waste management is begun from midden location or waste producer. Waste is separated between organic and inorganic, and it is put on the different places. Organic waste is processed to be compost, while inorganic waste usually used for recycling or reused.

2.1 Rate of Waste Generation

Rate of waste generation both for now and future are the basis of planning, design and potential assessment of waste processing towards Zero Waste. If field observation is not available yet, then for calculating amount system can be used waste generation figures as follows (E. Damanhuri, 2004):

a. Waste generation units of big city = 2. 2,5 liter/people.day or 0,4 . 0,5 kg/people.day
b. Waste generation units of small city/medium city = 1,5-2 liter/people.day or 0,3-0,4 kg/people.day

Based on the criteria of SNI 19-3964-2002 for small city less than 500.000 inhabitants so Sub-district of Lamongan is included a small city.

2.2 Density

Waste density is the weight of waste which is measured in kilogram units compared with waste volume which is measured before (kg/m3). Waste density is very important in determining the amount of waste. Determining waste density is done by the way of weight waste which sampling is from the waste source (E. Pandebesie, 2005).

2.3 Potential of Waste Management towards *Zero Waste* in Urban Waste Management

Zero waste begins from production until the end of production system which can be avoided in waste production or minimized the occurrence of waste (Urip Santoso, 2009).

One of the concept of Zero Waste is applied 3 R Principle (Reduce, Reuse, Recycle). The idea of zero waste concepts is an approach and applying system and urban waste management technology in individual scale and regional scale in an integrated manner with the target to reduce waste volume as little as possible. **3R concept is the basic from various efforts to reduce waste bins and optimize waste production process,** (Ari Suryanto, dkk, 2005). The design of waste management operational with 3R concepts are as follows:

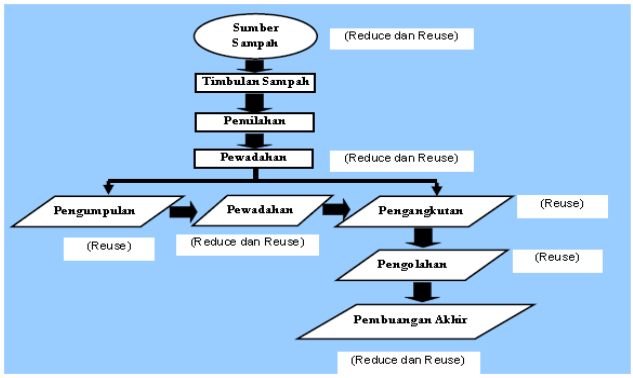

Figure 1. Design of waste management operational with concept 3R
(Source : Sriliani Surbakti : 2009)

2.4 Community Based Solid Waste Management

Community Based Solid Waste Management (Community Based Solid Waste Management / CBSWM) is **an approach of waste processing that based on the needs and community demand, planned, done, controlled, and evaluated together with community, (Environmental Service Program (ESP) DKI, 2006).** Based on community because main producer is community so, community must take responsibility on the waste which is produced by the community. CBSWM aims for community independence in depending environmental cleanliness through waste management that friendly environment.

3. Research Method

3.1. Research Plan: A method used in this research is "qualitative-descriptive" method that aimed to describe phenomenons in the management of the waste of the domestic household/area that occur in Lamongan sub-district, Lamongan residence. A model that is deemed as suitable and has been applied in many sub-district of Lamongan is selective model.

3.2. Population and Sample: To determine the number of sorting waste respondents using *Slovin Formula* (Sevilla, et. al., 1993), as follows:

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$$n = \frac{N}{1+(Ne^2)} \quad \text{.....} \quad (1)$$

n = Sample
N = population (N=235)
e = *sample error* (10 %)

$$n = \frac{235}{1+(235x(0.1)^2)} = 70{,}1 \text{ people} = 80 \text{ people}$$

c. Research Location

Research location is located in Sub-district of Lamongan, Lamongan regency. Sub-district of Lamongan has total area 39,65 Km2 = 3.965,3Ha, from that total area, 2.545,99 Ha for rice field, 502,00 Ha for dry ground, 680,00 Ha for building and yard and rest of them for moor and etc. Sub-district of Lamongan consists of 10 Villages. Geographically sub-district of Lamongan is directly adjacent with sub-district of Turi at north, sub-district of Tikung and sub-district of Kembangbahu at south, sub-district of Sukodadi at west and sub-district of Deket at east.

Determination of location for the researcher is based on the consideration that:

a. 10 villages in sub-district of Lamongan have done Green and Clean program three times consecutively so that waste election program has taken places well.
b. Sub-district of Lamongan often gets appreciation in environment.

3.4. Flowchart

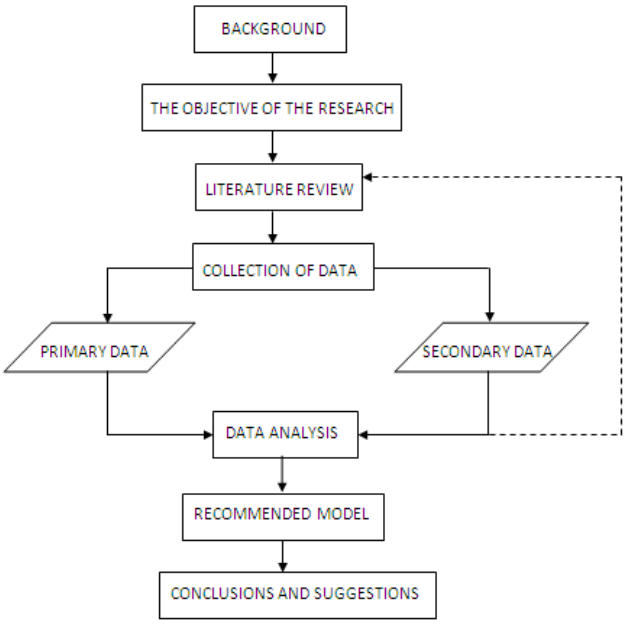

Figure 2. Flowchart Research

4. Discussion

The Lamongan sub-district is one of the area of Lamongan, Jawa Timur province, ranged 39,65 Km^2 (3.965,3 Ha). From that number, 2.545,99 Ha are mainly used for rice field, 502,00 Ha for dry soil, 680,00 Ha for building and yards and the rest is for peripherals.

Borderline of Lamongan sub-district:
– North side : Kecamatan Turi
– East side : Kecamatan Deket
– South side : Kecamatan Tikung dan Kembangbahu
– West side : Kecamatan Sukodadi.

Lamongan Sub-district consists of 20 villages. From the 20, 4 locations are chosen for the research sites; taken from a group of best-winning villages ranking 1 to 5 in a compettition named Lamongan Green and Clean (LGC), volume 4 and 5 Year 2014, categorized in Independent Area. Those four groups are: (1) Demangan Tengah RT 02 RW II, Kelurahan Sidoarjo, sub-district of Lamongan. (2) Beringin Jaya RT 03 RW V Kelurahan Tumenggungan, sub-district of Lamongan, (3) Made Mulyo RT 02 RW V, Desa Made, sub-district of Lamongan, and (4) Rangge RT 04 RW I, Kelurahan Sukomulyo, sub-district of Lamongan. The taking of the groups for the sample is following a consideration

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that the aforementioned areas have succeeded at enhancing the role of society at constructing a clean, green, and healthy living environment; especially in term of independent waste management.

A. Data of the Cause of the Waste

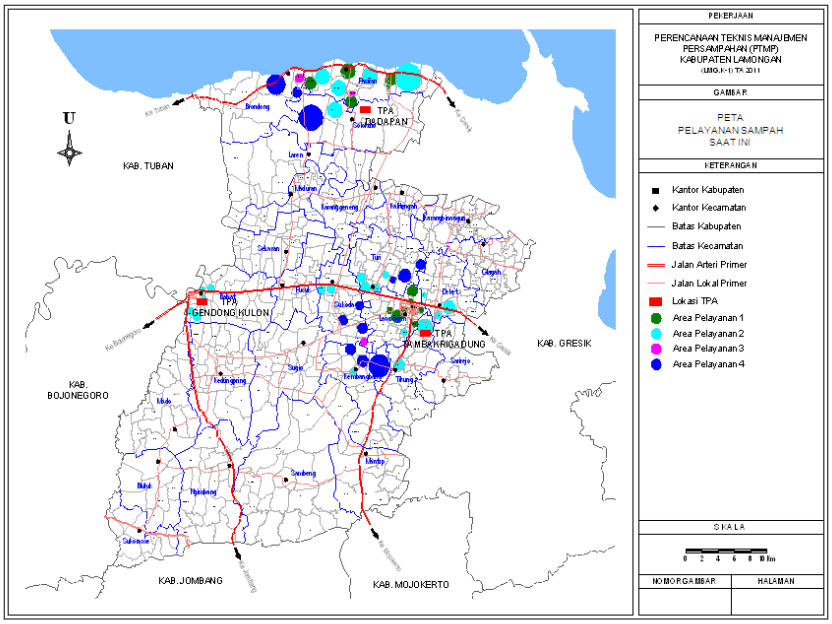

Figure 3. Waste services existing Map

Trashes that are measured from 2 areas are waste from household/domestic waste. From the data of the research obtained that the average amount of the waste from the 4 locations is about (0.4+ 0.2 + 0.2 + 0.2) / 4 = 0,25 kg/day. This amount of the number is in mutual record with the data from SNI S 04-1993-03 about Spesification Standard of the Waste Cause in Small Town and Big Town/City in Indonesia, that mentions that the amount of the waste caused by household.domestic (permanent, semi, or non-permanent) is about 0,25 - 0,4 kg/head/day.

From the field observation, it is obtained an amount of: 0,25 kg/head/day. Because of the cause of the waste of the city is mainly taken from domestic household, then its unit number could already be counted as a whole waste caused by everyone, in term of any activity and any location, be it in a house, public streets, market, hotel, parks, offices, etc. Meanwhile, the amount of citizen of Lamongan sub-district (Data Monograf Kecamatan Lamongan 2012) = 65.884 people. If the unit number of the waste = 0,25 kg/head/day, then the amount of trashes in Lamongan sub-district is (2,5 kg/head/day x 65.884 people = 164710 kg/day or approximately 165 ton/day.

B. Analysis of the Composition of the Waste

The next agglomeration that is also often being conducted according to its composition, for example, stated in a % of weight (usually a wet weight) from paper, wood, leather, plastic, metal, glasses, fabric, foods, et cetera. Tabel 4.10 shows a typical composition of waste in 4 observation areas in Lamongan. This composition and characteristics of the waste describes the variety of people's activity in Lamongan.**Table 1.**

Table 1. A typical composition of household waste in Lamongan (% wet weight)

No	Type of Waste		Composition (%)
1	Wet Waste/Organic		65
2	Dry waste	Plastic	14
3		Paper	10
4		Metal	3,3
5		Glass	1
6		Wood	2,3
7		Latex	1
8		Fabric	2,3
9		Et cetera	0,3
Total Number			100

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Source: Calculation Results

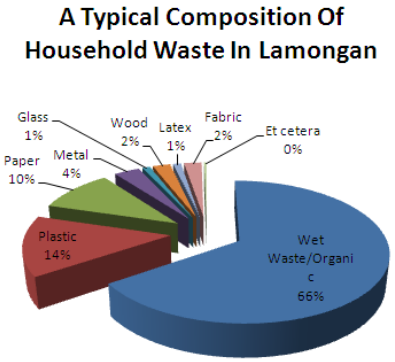

Figure 4. A Typical Composition Of Household Waste In Lamongan (% Wet Weight)

From the table above it is safe to assume that waste in Lamongan consists of wet trash 65%, plastic 14 %, paper 10%, metal 3,3 %, glass 1%, latex 1%, wood 2,3 %, fabric 2,3%, and the rest is 0,3%

Based on the analysed data, its is obtained that the density value of household/domestic waste in Lamongan sub-district is 153 kg/m³, so the volume of the source of household/domestic waste in Lamongan sub-district is 1076 m³/day.

The amount of recovery factor in Lamongan sub-district is 80% for organic trash, 77 % for paper, 77 % for plastic, 100 & for metal, 33 % for glass, 33% for latex/rubber, 79% for wood, 71 % for fabric, and 0% for etc.

The counting of the mass balance is based on an average measurement of recovery factor in household waste in Lamongan can be seen in this picture:

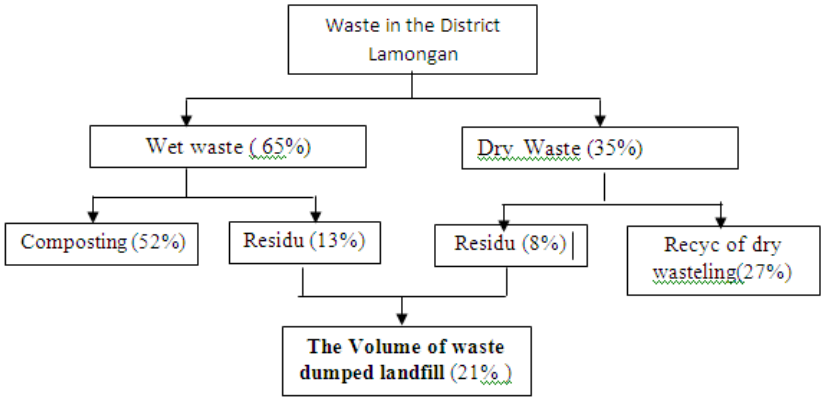

Figure 5. Analysis of of the Balance Mass in Lamongam

C. A Modelization of Comprehensive Waste-Management based on Society

A program of trashes sorting in Lamongan turns out to be giving many benefits, positive impacts for everyone in Lamongan, especially in term of cleanliness and everlasting environment. This implies that there is a willingness to develop and to expand their range of implementation from the waste-sorting program, with the principle of 3R. Thus why, it is necessarily to give a proposal of a management as to make the community-based trashes sorting with 3R principle better. Although the proposal for this given model is still far from perfect, but the most important aspect here is that however method of the programs will be applied, implemented,controlled, watched, and evaluated. It is also elucidated on how the roles of everyone being involved in every stage.

Although this model is still far from perfect, the most important aspect here is to see how the program is being conducted, implemented, controlled, watched, and evaluated. Furthermore, it is also elucidating the roles of every aspect in every step.

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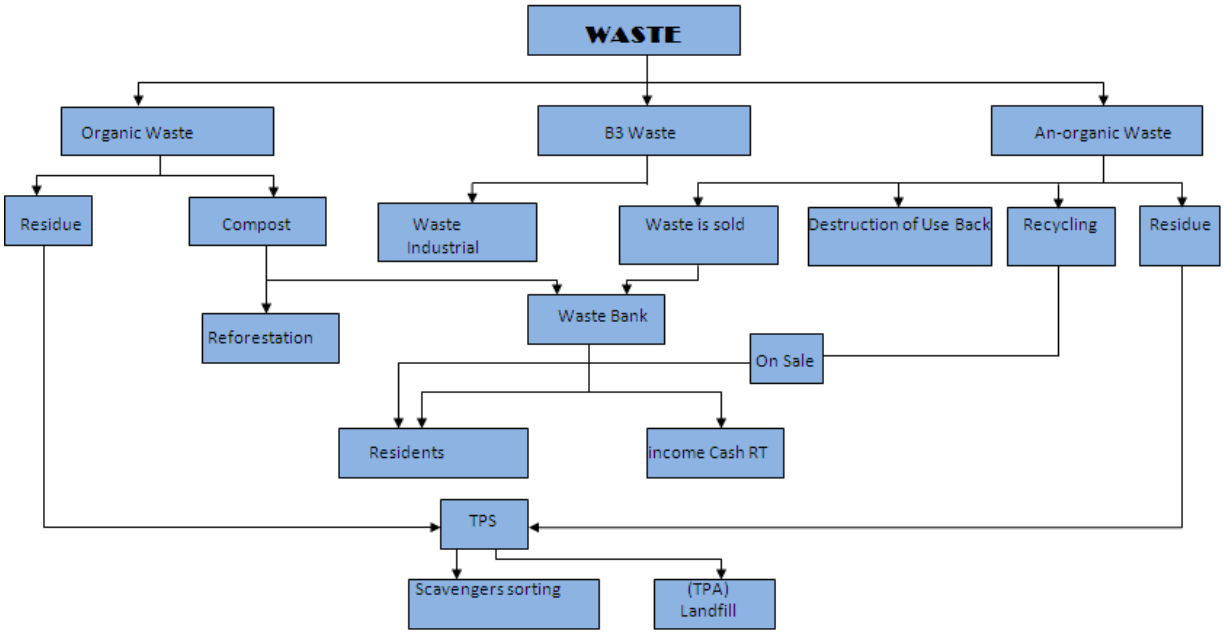

Figure 6. Model Management For The Community-Based Zero Waste for Applied in the District Lamongan

A waste is being sorted into three categories: organic waste, non-or ganic waste, and B3. A model named "Bank Sampah" (Waste Bank) is used to use this classifications. Bank Sampah can add up to household income and make the trashes organized. Meanwhile, a model management for non-organic trashes is via recyclable method, and organic trashes are used for compost. Made Mulyo RT 02 RW V, Made has acquired a plastic-dissolver machine, and Beringin Jaya RT 03 RW V has acquired a plastic-burner machine, so that a management for a non-organic trashes has reached a step closer to a perfect Zero-Waste.

5. Conclusion

From the data acquired, we can pretty much conclude our result from the research ("A Comprehensive Model Management to a Zero-Waste based on Society) as such:

2. From the obtained data, it is shown that the "wet waste", or "organic waste" is about 65% of the biggest source of the domestic waste. With such condition, in addition to high humidity of the trashes, it is safe to predict that the trashes will decompose quite quickly. From the field observation, it is obtained an amount of: 0,25 kg/head/day. Because of the cause of the waste of the city is mainly taken from domestic household, then its unit number could already be counted as a whole waste caused by everyone, in term of any activity and any location, be it in a house, public streets, market, hotel, parks, offices, etc. Meanwhile, the amount of citizen of Lamongan sub-district (Data Monograf Kecamatan Lamongan 2012) = 65.884 people. If the unit number of the waste = 0,25 kg/head/day, then the amount of trashes in Lamongan sub-district is (2,5 kg/head/day x 65.884 people = 164710 kg/day or approximately 165 ton/day.
3. A model that is deemed as suitable and has been applied in many sub-district of Lamongan is selective model. A waste is being sorted into three categories: organic waste, non-organic waste, and B3. A model named "Bank Sampah" (Waste Bank) is used to use this classifications. Bank Sampah can add up to household income and make the trashes organized. Meanwhile, a model management for non-organic trashes is via recyclable method, and organic trashes are used for compost. Made Mulyo RT 02 RW V, Made has acquired a plastic-dissolver machine, and Beringin Jaya RT 03 RW V has acquired a plastic-burner machine, so that a management for a non-organic trashes has reached a step closer to a perfect Zero-Waste.

6. Recommendations

From the research that has been conducted, we can get these suggestions by far:
Developers along with the councils of RT/RW make strategy to select people who are to be expected to develop the environments; they must be having a capability and integrity. A proper model applicated as a development model of choice in domestic household and city wastes with the principle of 3R. The mechanism of implementation must follow the steps of planning, implementation, controlling, watching, and evaluation

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SEA WAVE HEIGHT PREDICTION USING ARTIFICIAL NEURAL NETWORK (ANN) BACKPROPAGATION

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Abstract: High sea waves very important role in world shipping. Because the ocean waves are also a nuisance that must be understood by all marine users be it fishing, shipping transportation and navy as users of the oceans. If you do not understand the condition of the sea waves as well as the sinking may threaten the safety of fishing vessels, transportation vessels and others. Based on the above needs high predictive models of sea waves, so the condition of the sea waves somewhere can be predicted and analyzed in a safe condition or not to marine activities. Waves caused by the force of nature force working in the sea such as pressure and tension of the atmosphere (especially through the wind), earthquakes, gravity and space objects (moon and sun), the Coriolis force (due to the rotation of the earth) and surface tension. Waves in the ocean waves that occur mainly due to the influence of wind pe. In designing this wave height prediction system, using artificial neural network that is backpropagation method that uses input data of wind speed and wave height of the sea at the previous hour (h-1) and high ocean waves on the clock this time (h) as an output value.

***Keywords*:** Artificial neural networks, sea wave height, back propagation (Backpropagation), wind speed

1. Introduction

Waves occur due to style natural style that worked at sea as pressure and tension of the atmosphere (especially through the wind), earthquakes, gravity and objects space (moon and sun), the Coriolis force (due to the rotation of the earth) and the surface tension. Waves in the ocean waves that occur mainly due to the wind garuh pe. According to Sverdrup and Munk to a wave caused by the stress of wind acting on the surface of the sea. So, if a large wind strength, the waves that occur too large.

The wave height is very important in the world of shipping. Because the waves are a nuisance that must be understood by all marine users be it fishing, transportation, shipping, and naval as the ocean. If you do not understand the condition of the sea waves is good can threaten the safety of such shipwreck etc.

Based on the above required altitude forecast ocean wave that can inform the user of all sea lanes, so that the condition of the sea waves somewhere predictable and analyzed on the condition of safety for marine activities. In predictive modeling ocean wave height on the clock currently used methods Neural Network with winds of hours of current and ocean wave heights hours earlier as input values, and the wave heights hours today as the output value.

Neural network using back propagation algorithm is able to conduct a minimum level of acceptable error by the data.

2. Literature Review

2.1. Artificial Neural Networks

Artificial Neural network (ANN), as one of the branches of study of artificial intelligence, at this time became one of the many areas that become the objects of research. The scientists found that the neural network turns can be applied to various kinds of fields, not limited to the field of computer course.

Because the model processing with computer conventionally known cannot be used to overcome these problems, then developed a new model of processing with computer based on the workings of the human brain. The technology is called Artificial Neural Network (ANN) or can be called neural networks.

Such is the case of the human brain, ANN has the ability to learn, adapt to the changes of the information received, as well as learn from the characteristics of the input signal. ANN can synthesize an associative memory that can produce an output that is appropriate when given the signal input and the input signal is given when the generalize new.

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ANN has been developed using a mathematical model to simulate the workings of the nervous tissue biology, with assumptions based on assumptions:

1. Processing of information consists of a simple element elements called neurons.
2. The signal is passed from one neuron to another neuron through a particular relationship.
3. Every relationship has a certain size called weights.
4. Each neuron activation function uses against the input received to determine the output signal.

The neural networks are distinguished based on the pattern of relationship with neurons neuron architecture or in other words, the method for determining the value of the weight of each link connecting or in other words the algorithm of the trining process or her learning and activation functions

2.2. Neural Network Structure

The structure of the ANN refers to biological tissue structure in particular human tissues. Like the human nervous tissue, THEY are also composed of neurons and the connections between neurons the neurons. In value terms to replace ANN relationships are weighted. Information in the form of an electrical signal is simulated as a specific price on weights. By way of change – change the price weights meaning we also vary the structure of connections between neurons.

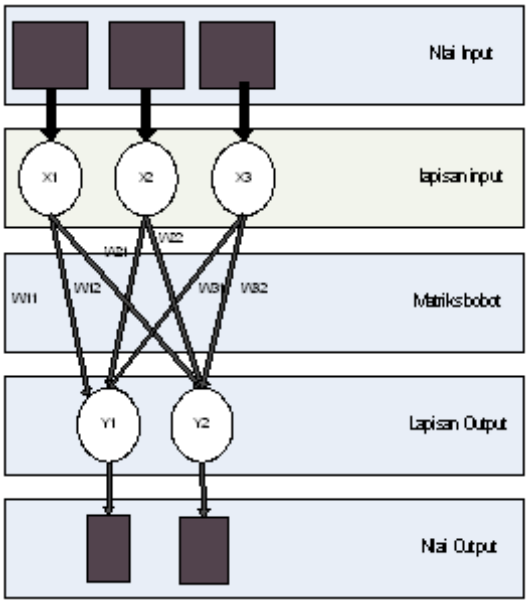

Figure 2.1 : Single layer net

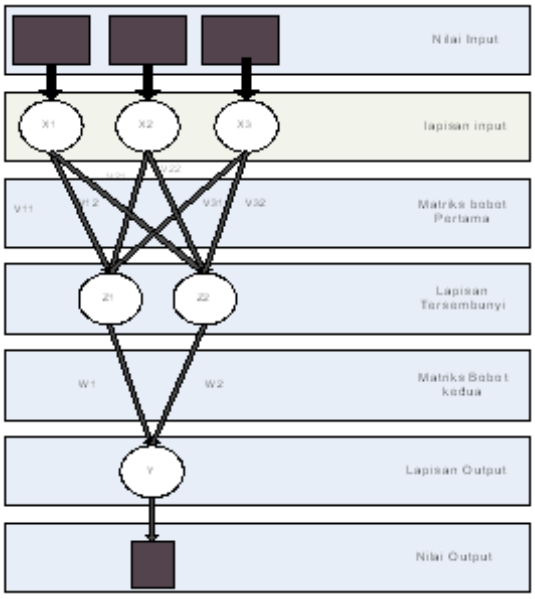

Figure 2.2 : Multi layer net

In principle was given a series of input data (input) that each describe the output (output) to other neurons. Each input multiplied by a weight value (weighted) certain analog voltage with synaptic and then all the data input weighted it summed up to determine the level of activity of a neuron.

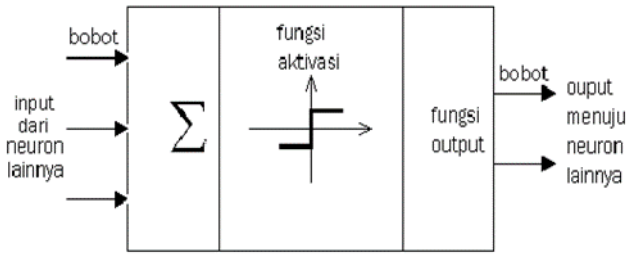

Figure 2.3: the structure of neurons neural networks

Neural network architectures have the same structure, i.e. one layer of the input (input layer), single layer output (output layer), and zero or more layers of hidden (hidden layer). This is based on the number of layers, then the neural network can be divided into several types, among others, single-layer network (sigle layer net), network layer much/plural (multilayer net), and the network layer competitive (competitive layer net).

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Plural layers with ANN (multi layer) is more complicated than with a single layer of the architecture with the ANN. Generally more complex network will have higher ability. ANN a plural layer with

It has also been proven to have better ability than ANN a single layer. Can be described in simple terms that a plural layer made with ANN compiled a bunch of single layer, and a layer of the output will be the input for the next layer.

As the illustration above neural network similar to the original neuron, and works the same way. Information (input) entered into with the input neuron weights matrix. On the input neurons, the values above are processed in a way summed up. The information forwarded by the neurons will continue up to the output of the neuron. Neurons are grouped in layers, with each layer can consist of one or more neurons (depending on the desired architecture), in each neural network architecture consists of a minimum of two layers (input and output) can also be coupled with a hidden layer/layer is hidden. Hidden layer itself may also be more than one in a neural network architecture.

2.3. The learning process

The main target of the learning process is to determine the weight value derived based on a given input. At the time of learning is given a different input data, then the value of the weights will change dynamically to accomplish a balanced enough value. These values indicate that each input has been connected with the output neurons, as expected.

2.3.1 Backpropagation Algorithm

A network of trained with Backpropagation training methods of supervision (supervised learning) where network trained with input patterns pair (Xi) and exodus (Y_k), information entered through input layer will flow towards the output layer of the result is the response of the network against the incoming information. If there is still a difference between the output of the network when it with the desired output connection weights will be adjusted ranging from coating the exodus towards the input layer to the minimal possible differences in accordance with the desired error targets are met or the maximum of epoch was reached. So backpropagation algorithm using error output to change the values of the weights does it weigh-in the direction of retrograde (backward). To get this error, the propagation of phase forward (forward propagation) should be done in advance.

Network architecture backpropagation as shown in Figure 2.4. In Figure 2.4, the network consists of 3 units (neurons) in the input layer, i.e., x_1, x_2 and X_3. 1 hidden layers with two neurons, i.e. Z_1 and Z_2, and 1 unit on the output layer i.e. y. Weights connecting x_1, x_2 and X_3 with the first hidden layer neurons is V_{21} V_{11}, danV_{31}. The V_{12} was the weighting that connect neurons to layer-2 on input to neurons to-1pada layer is hidden. The weighting that connect the Z_1 and Z_2 with neurons in the output layer is W_1 and W_2. Weight bias hidden layer connects with b_2 layers output.

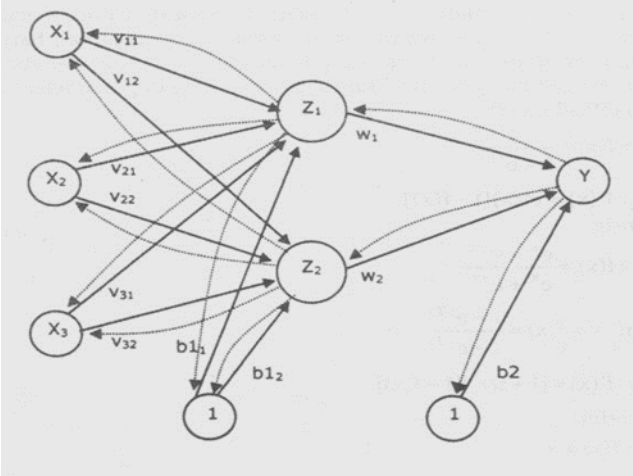

Figure 2.4: Network architecture backpropagation

Backpropagation is also capable of handling the weight value training on hidden layers. The learning algorithm is as follows:

1. Forward Propagation

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Each unit is hidden (Z_j, j = 1, ..., p) summing the weights of the input signal. The NET input to the unit is hidden to j is

$$z\_in_j = b1_j + \sum_{i=1}^{n} x_i v_{ij} \quad \text{……..(2.1)}$$

Suppose that the activation of the signal is the same as the NET input, then the output of the signal is $z_j = f(z\_in_j)$. This signal is sent to the output layer units in all. Each unit of output (Y_k, k = 1, ..., m) summing input signal does it weigh. Output the signal being: $y_k = f(y\_in_k)$.

$$y\_in_k = b2_k + \sum_{i=1}^{p} z_j w_{jk} \quad \text{…….....…..……(2.2)}$$

2. Back Propagation

Back propagation stage begins by comparing the overall network response with the desired output. Each unit of output (Y_k, k = 1, ..., m) receive correspondence patterns pattern to target training input.

Error information is calculated by:

$$\delta_k = (t_k - y_k)\, f'(y_{ink}) \quad \text{……..(2.3)}$$

Correction weights are calculated for updating w_{jk} :

$$\Delta w_{jk} = \alpha \delta_k z_j \quad \text{…….....…….....…...(2.4)}$$

Refractive correction was calculated to update $b2_k$:

$$\Delta b2_k = \alpha \delta_k \quad \text{…….....…….....…..(2.5)}$$

2.3.2. Updating the weights and bias

Each unit of output ($Y_{k,\ k=1,\ldots,m}$) and weight bias update (j =0,…,p) by the equation :

$$w_{jk}(new) = w_{jk}(old) + \Delta w_{jk} \quad \text{……(2.6)}$$

Each unit is hidden (Zj, j = 1, ..., p) updating bias and weight (i = 0, ..., n) by the equation:

$$v_{ij}(new) = v_{ij}(old) + \Delta v_{ij} \quad \text{……(2.20)}$$

Back propagation algorithm is divided into two parts:

(i) Training algorithm

Consists of three phases: Phase feed forward on training inputs, phase error propagation, and phase weighting settings. Here is a training algorithm :

0. Initialize weights
   Determine the number of learning (α) and the error tolerance or threshold values or set the maximum epoch (as a stop condition).
1. While the stop condition is not met, do step 2 to 9.
2. For each pair of training patterns, go to step 3 to step 8
   Phase feed forward
3. Each unit of input xi (from unit to unit-1 to the n-th in the input layer) sends the input signal to all units in the upper layer (hidden layer)
4. At each hidden layer unit Zi (from unit 1 through unit all p; i = 1, ..., n; j = 1, ..., p) output signal is calculated by applying the hidden layer activation function of the sum xi weighted signal input signal.

Stages propagation / retreat begins by comparing the response of the entire network with the desired output. Each unit outpu ($Y_{k,}$ k=1,…,m) received correspondence target pattern to input training patterns.
Error information is calculated by :

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$\delta_k = (t_k - y_k)\, f'(y_{ink})$ ……………………………………………………………………..(2.7)

Correction weights are calculated to update w_{jk} :

$\Delta w_{jk} = \alpha \delta_k z_j$ ……………………………………………………………………..(2.8)

Bias correction is calculated for updating $b2_k$:

$\Delta b2_k = \alpha \delta_k$ ……………………………………………………………………..(2.9)

3. Research Method

Before designing the system required the data collection process in order to determine the variables that will be used for predicting high sea waves. As in this study variables to be used to predict the height of sea waves is the wind speed.

Here is the flow of the process of designing the system in this study on the image below

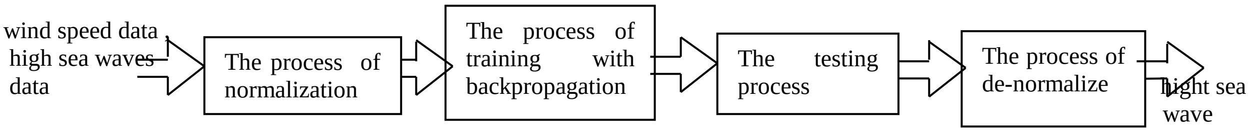

Figure .3.1: Block Diagram System Design

3.1. Step High Step Tidal Predictions

In predicting sea wave height based on the wind data, wind data must first be analyzed to obtain the dominant wind direction and the direction of fetch. Fetch length and wind speed becomes input to the wave height. But the wind speed data obtained can not be directly used. Wind speed data obtained from the land closest to the location of forecasting must be transformed first into the middle of the ocean wind data. The relationship between wind over the sea and the wind above the nearest land given by $RL = Uw / U_L$. Some formulas and graphs to predict the wave is based on wind speeds measured at y = 10 m. If the wind is not measured at an elevation of 10 m. then the wind speed must be converted on the elevation, by the equation:

$$U(10) = U(y)(10/y)^{1/7}$$

Wind speed that has been modified with a duration of wind events is an effective wind speed, with wind speeds effectively used for the calculation of wind stress factor that is then used in the forecasting equation of wave height. In the calculation for determining wind stress factor used equation

$$U_A = 0{,}71\, U^{1{,}23}$$

3.2. Data collection

As the material for training and testing on this system, we used data from a survey conducted in BMKG silver Surabaya, collect data per day wind speed and wave height per day during the period October 2014 - February 2014. From these data we divide into training data for which the data of October 2013 - January 2014, and data for testing is data in February 2014. On these data is the data daily wind speed and sea wave height data is obtained from BMKG Perak Surabaya.

3.3. Network Architecture

Network architecture of high-wave forecasting system is shown in Figure 3.1. From the above network architecture can be seen that there is an input layer, one hidden layer and output layer. For the last 2 input layer neurons that wind speed data today, sea wave height of data earlier in the day and plus one neuron input bias. On the input layer weights are symbolized by "v". While in the hidden layer neurons are coupled bias for n, where n is inputted by the user. In the hidden layer weights are symbolized by "w". Then on the last layer output neuron 1 is the wave height on this day.

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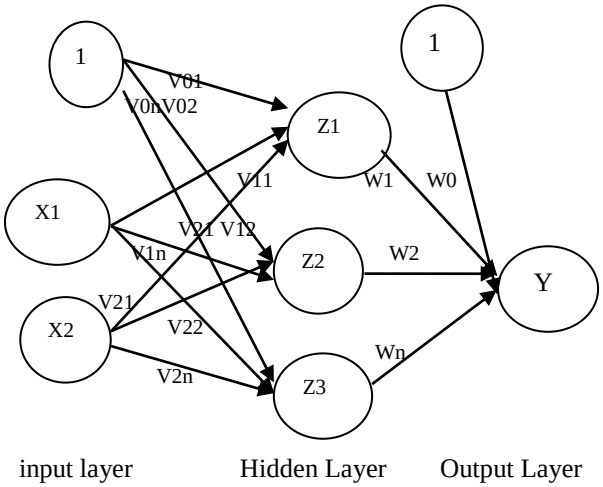

Figure. 3.2. : Artificial Neural Network Architecture

3.4. Activation Function

In backpropagation, a function that is used must meet several requirements, namely: continuous, terdeferensial easily and is a function that does not go down. One function that satisfies these three conditions, and is often used is a binary sigmoid function which has the range [0, 1]

$Y = f(x) = \frac{1}{1+e^{-x}}$ while for the derivative function is

f'(x) = f(x)(1-f(x))

3.5. System Planning

Before making an application program that is capable of predicting sea wave height is done first then the system design process. It is intended that the results of the program application to be made later as expected.
Here's an explanation of each phase of the block diagram in Figure 3.1 above

3.5.1. Phase Input Data

In this phase the data input is done wind speed and sea wave height is then processed by the normalization function

3.5.2. Phase normalization function

This phase is to normalize the input data into the interval of values [0,1 0,9] so that data can be easily applied at the time of training using back propagation algorithm.

In Figure 3.4 is a flowchart of the phase image activation function (normalization process) is a groove that describes the process of changing the input data into output data values that have interval [0,1 0,9].

3.5.3. Phase Learning process

Phase of the learning process is the activity of a program to recognize the pattern of input and output patterns are given by programmers, so expect a learning program that has been given is able to demonstrate that optimal outcomes or in accordance with the results of the previous study.

Phase Backpropagation Learning

In this phase the process of learning of the input data that has been normalized at the normalization function to get the final weight by using backpropagation. To phase learning required, learning data used as input to the neural network
. The data is then inserted into Neural Networks continuously until mse is smaller than the specified error or a predetermined user epoch has been reached to obtain the expected weights of neurons.

Steps in the process of learning are as follows:

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1. Initialize the value of learning rate parameter α, hidden units, the maximum error, the maximum epoch, the target and the number of inputs.
2. Provide inputs (x_i)
3. Normalization of data input
4. Multiple input (x_i) and weighs as much as the number of input and added to the input bias (V_{0J}). Obtained input prices to hidden layer (z_{inj}).
5. Output hidden layer multiplied by the weight as much input hidden layer (Z_J), and added with a layer of hidden bias (w_{0k}).
6. Obtained input prices in the output layer (yink), In backpropagation error (δ_k) is calculated by subtracting the target output (yk) and multiplied by the input function on layeroutput (y_{ink}).
7. Obtained the prices of inputs to the hidden layer (z_{inj}).
8. Output hidden layer multiplied by the weight as much input hidden layer (Z_J), and added with a layer of hidden bias (w0k).
9. Obtained input prices in the output layer (y_{ink}), In backpropagation error (δ_k) is calculated by subtracting the target output (y_k) and multiplied by the input function in the output layer (y_{ink}).
10. Calculate the correction weights to update w_{0k}.
11. Me-update weights and weight w_{jk} v_{ij}.
12. Counting error output, if iteration ≤ maximum iterasi or error ≤ maximum error.

3.5.4. Phase Testing

The testing phase is the process of looking for a high value of ocean waves at the specified time according to the data input is desired. In this book described the testing process flow as illustrated in Figure 3.6.

Testing with backpropagation steps:
1. Entering data is normalized and parameter input.
2. Take the weights and biases w_{jk} v_{jk} of the training process.
3. Calculate all the value of the output in the hidden layer and output layer y_j Z_J.
4. Count all the value of the output in the output layer y_j. The results of this testing process will then be used as input data for the process of de-normalize

3.5.5. Phase denormalization function

In this phase, a process denormalize output data. Data output is still within the range [0.1 0.9] result of the normalization function was not based on real data. Therefore we need normalize the data to restore the data becomes real data.

Denormalize the process steps are as follows
1. Enter the data.
2. Find the maximum data and data minimum`
3. Calculate the value-normalize by the formula:

$$\mathbf{X'} = \frac{(b-a)(x-0.3)}{0.8} + \boldsymbol{\alpha}$$

4. Store the result of a process of denormalize

3.5.6. Phase Output (High Sea Waves)

This phase is the final phase after phase phase of the process above. This phase will contain the results of the testing that has been done before. The final result of this phase is the height of sea waves on the desired day.

4. Discussion

Login page

The first time the program is run, the user will see a login form, where the user is asked to enter a user name and password to be able to start using the application.

Home page

On the home page, there are several menu options include the data, learning and testing. If you select a menu of data, it will show all the data of wind speed and wave height stored in the database. If the process of learning, learning then select the menu, and select the menu testing to make the process of testing.

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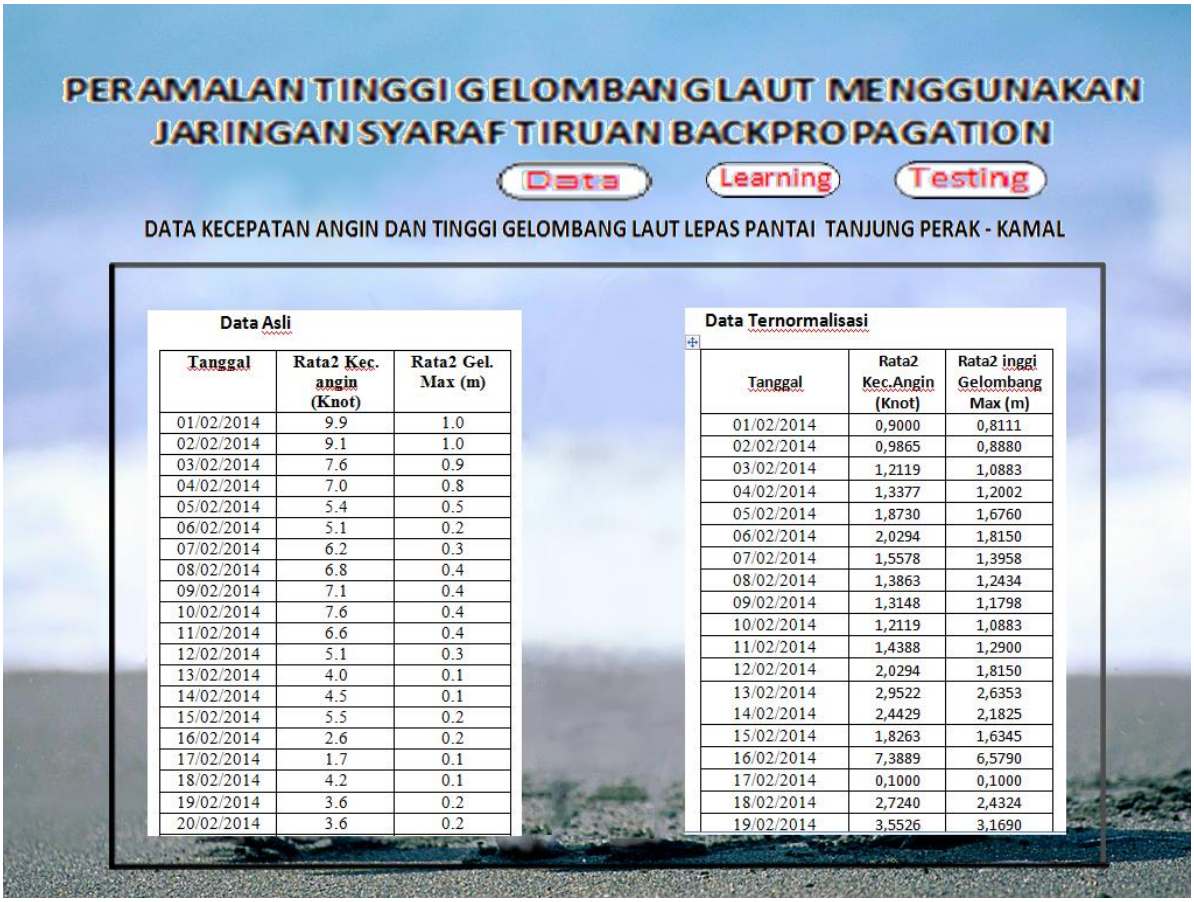
Data page.

On this page, the user can view the data of wind speed and wave height of the sea in the form of original data on the left and the list of data normalization in the list to the right that will be used for the training process (learning). Form data is shown in Figure 4.3 below.



Tanggal	Rata2 Kec. angin (Knot)	Rata2 Gel. Max (m)
01/02/2014	9.9	1.0
02/02/2014	9.1	1.0
03/02/2014	7.6	0.9
04/02/2014	7.0	0.8
05/02/2014	5.4	0.5
06/02/2014	5.1	0.2
07/02/2014	6.2	0.3
08/02/2014	6.8	0.4
09/02/2014	7.1	0.4
10/02/2014	7.6	0.4
11/02/2014	6.6	0.4
12/02/2014	5.1	0.3
13/02/2014	4.0	0.1
14/02/2014	4.5	0.1
15/02/2014	5.5	0.2
16/02/2014	2.6	0.2
17/02/2014	1.7	0.1
18/02/2014	4.2	0.1
19/02/2014	3.6	0.2
20/02/2014	3.6	0.2

Tanggal	Rata2 Kec.Angin (Knot)	Rata2 inggi Gelombang Max (m)
01/02/2014	0,9000	0,8111
02/02/2014	0,9865	0,8880
03/02/2014	1,2119	1,0883
04/02/2014	1,3377	1,2002
05/02/2014	1,8730	1,6760
06/02/2014	2,0294	1,8150
07/02/2014	1,5578	1,3958
08/02/2014	1,3863	1,2434
09/02/2014	1,3148	1,1798
10/02/2014	1,2119	1,0883
11/02/2014	1,4388	1,2900
12/02/2014	2,0294	1,8150
13/02/2014	2,9522	2,6353
14/02/2014	2,4429	2,1825
15/02/2014	1,8263	1,6345
16/02/2014	7,3889	6,5790
17/02/2014	0,1000	0,1000
18/02/2014	2,7240	2,4324
19/02/2014	3,5526	3,1690

Figure 4.1 : Page Data

5. Conclusion

From the results of the simulation and analysis of sea wave height by using back propagation neural network can be concluded that:

1. Application of artificial neural networks for forecasting requires substantial time because the need to do a lot of experiments in determining the number of hidden layer, set the number of neurons in the hidden layer, the determination of the learning rate and applying learning techniques in the planned network.
2. Results of training using back propagation neural network is highly dependent on the initialization process
   that is taken from a random value (random) so that the weight value obtained will be different each time training.
3. Forecasting using Neural Networks using Backpropagation algorithm produces an output that is optimal.

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EDUCATIONAL GAME TO PREVENT DIARRHEA FOR CHILDREN IN AGED 7-8 YEARS

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Abstract: One of the biggest causes of child mortality in Indonesia is diarrhea, which can be prevented with lifestyle clean and healthy as a good habit such as washing hands with soap and brush the teeth. Based on Profile Healthiness in Province of East Java on 2012 shows that 64% of Indonesia children under 12th years get diarrhea, this condition made Indonesia got 13th level cause of death in the world.
Children like to learning with fun. Educational game is on of the learning media to give knowledge to children with fun. This paper discuss about educational game or known as edugame to introduce healthy lifestyle so they could prevent from diarrhea. This game have four scene based on clock. 1st scene is give visualisation daily and has made from children's activity In the morning such as take a bath, toothbrush, having milk and bread to breakfast. 2nd scene is give visualitization children's activity at the school such as wash hand before eating, buy some food at canteen's school, put trash in its place. 3rd scane is based on children's activity after school such as change clothes, wash hand before eating, have lunch. The last scene based on children's activity in the evening such as playing footbal, playing with pet, do housekeeping, having dinner.
There are four awards in this game and they are wash hand, housekeeping, eat healthy food and put trash in its place. Player can get this awards if they finish all scene. Diarrhea edugame made children always do tidy the bedroom, wash hand before eating, eat healthy food and put trash in its place so they can spared from diarrhea.

Keywords: diarrhea, child, game.

1. Introduction

Diarrheal diseases are leading cause of preventable death, especially among children under five in developing countries. Diarrhea is defined as a child with loose or watery stool for three or more times during a 24-hour's period. The frequency and severity of diarrhea is aggravated by lack of access to sufficient clean water and sanitary disposal of human waste, inadequate feeding practices and hand washing; poor housing conditions and lack of access to adequate and affordable health care [2]. Studies have been conducted in the past to establish risk factors of diarrhea. Study conducted in Egypt showed that some socio-demographic characteristics like maternal age and child's age are some determinant factors for the occurrence of episode of diarrheal disease [3].Similarly, study in Ghana showed that water availability, sanitary facilities, hygienic practices, flies infestations and regular consumption of street food are also some predicting factors for the occurrence of diarrheal disease [4]. In Ethiopia, Yohannes and his colleagues found the incidence of diarrhea to be higher in the second half of the infant's life when inborn immunity is weak and exposure to contaminated weaning foods increases [5]. Diarrheal diseases account for 1 in 9 child deaths worldwide, making diarrhea the second leading cause of death among children under the age of 5. For children with HIV, diarrhea is even more deadly; the death rate for these children is 11 times higher than the rate for children without HIV. Despite these sobering statistics, strides made over the last 20 years have shown that, in addition to rotavirus vaccination and breastfeeding, diarrhea prevention focused on safe water and improved hygiene and sanitation is not only possible, but cost effective: every $1 invested yields an average return of $25.50 [1].
One of the biggest causes of child mortality in Indonesia is diarrhea, which can be prevented with lifestyle clean and healthy as washing hands with soap and brush your teeth. Based on Profile Healthiness in Province of East Java on 2012 shows that 64% of Indonesia children under 12th years get diarrhea, this condition made Indonesia got 13th level cause of death in the world [7].
Educational games are developed for many domains, such as social sciences, math, language arts, physics, biology, and logic [10]. The question of how effective educational games (including electronic educational games) are has led to many discussions regarding whether and how these games can assist traditional classroom instruction in order to help kids learn while they play in their leisure time. However, only few educational game designers claim that their games are really effective in education, and even fewer support these claims with results from formal empirical studies [10]. Children like learning with fun. Educational game is one of the way to give education to children. However their no study to made educational games to give visualization for children how to prevent children have healthy lifestyle so they are spared from diarrhea. This research is to made educational game and focused to give knowledge about diarrhea to children in the form of educational game.

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2. Literature Review

2.1 Diarrhea

There are two (2) general types of diarrhea: infectious and non-infectious. Infectious Diarrhea is caused by a virus, parasite, or bacterium. It can spread quickly from person-to person, especially in daycare centers. Some of the causes of infectious diarrhea, such as Campylobacteriosis, shiga-toxin producing E. coli, giardiasis, salmonellosis and shigellosis, are discussed in their own fact sheets found in this document. There are other agents that can also cause infectious diarrhea in children. These include parasites (e.g., cryptosporidiosis, amoeba) other bacterial (e.g., yersinia) and other viruses (e.g., Rotavirus). Although these other disease-causing organisms are not discussed in detail, the general principles outlined in this section are applicable to prevent the spread of any of these germs. Non-infectious Diarrhea can be caused by toxins (e.g., certain types of food poisoning), chronic diseases (e.g., cystic fibrosis) or antibiotics (e.g., ampicillin).

Diarrhea is a common symptom of gastrointestinal infections caused by a wide range of pathogens, including bacteria, viruses and protozoa. However, just a handful of organisms are responsible for most acute cases of childhood diarrhoea.8 Rotavirus is the leading cause of acute diarrhea, and is responsible for about 40 per cent of all hospital admissions due to diarrhea among children under five worldwide.9 Other major bacterial pathogens include E. coli, Shigella, Campylobacter and Salmonella, along with V. cholerae during epidemics. Most pathogens that cause diarrhoea share a similar mode of transmission – from the stool of one person to the mouth of another. This is known as faecal-oral transmission. There may be differences, however, in the number of organisms needed to cause clinical illness, or in the route the pathogen takes while travelling between individuals (for example, from the stool to food or water, which is then ingested).

There are three main forms of acute childhood diarrhea, all of which are potentially life-threatening and require different treatment courses:

Acute watery diarrhea includes cholera and is associated with significant fluid loss and rapid dehydration in an infected individual. It usually lasts for several hours or days. The pathogens that generally cause acute watery diarrhea include V. cholerae or E. coli bacteria, as well as rotavirus.

Bloody diarrhea, often referred to as dysentery, is marked by visible blood in the stools. It is associated with intestinal damage and nutrient losses in an infected individual. The most common cause of bloody diarrhea is Shigella, a bacterial agent that is also the most common cause of severe cases.

Persistent diarrhea is an episode of diarrhea, with or without blood that lasts at least 14 days. Undernourished children and those with other illnesses, such as AIDS, are more likely to develop persistent diarrhea. Diarrhea in turn, tends to worsen their condition.

Children with poor nutritional status and overall health, as well as those exposed to poor environmental conditions, are more susceptible to severe diarrhea and dehydration than healthy children (Figure 1). Children are also at greater risk than adults of life-threatening dehydration since water constitutes a greater proportion of children's bodyweight. Young children use more water over the course of a day given their higher metabolic rates, and their kidneys are less able to conserve water compared to older children and adults.

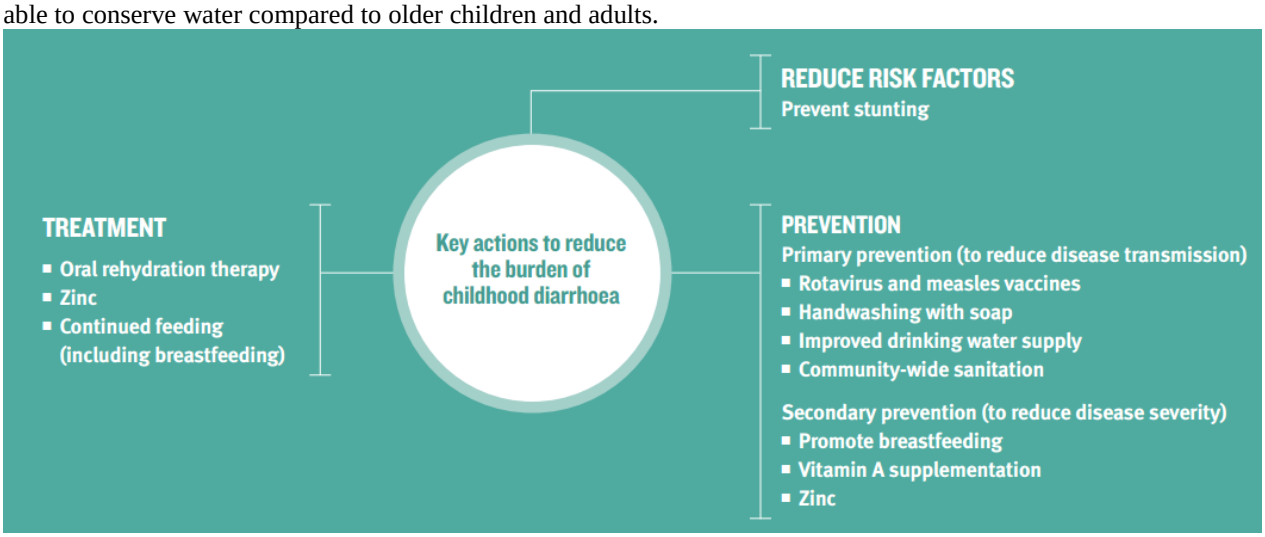

Figure 1. Nutrition, health and environmental factors all play a role in preventing and treating childhood diarrhea (Source: WHO, 2014)

2.2 Education Game (eduGame)

Games are competitive interactions bound by rules to achieve specified goals that depend on skill, and often involve chance and an imaginary setting [9]. Because of the highly motivating nature of games, researchers started to

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investigate whether these games could be utilized to assist learning, especially for those kids who lost interest in math or other 3 science courses at school [10][11]. Thus, educational games try to take advantage of games' motivation for educational purposes rather than simply for entertainment [12]. Electronic educational games here, refer to computer and video educational games. This research focuses on computer educational games. Educational games are developed for many domains, such as social sciences, math, language arts, physics, biology, and logic [10]. The question of how effective educational games (including electronic educational games) are has led to many discussions regarding whether and how these games can assist traditional classroom instruction in order to help kids learn while they play in their leisure time. However, only few educational game designers claim that their games are really effective in education, and even fewer support these claims with results from formal empirical studies [10]. [13] shows that educational games can be effective, but only if the interaction is monitored and led by teachers, or if the games are integrated with other more traditional activities, such as pencil and paper exercises. There exist some factors that influence the effectiveness of educational games. Among these, the major factors are those that relate to the personal user's features, preferences and behaviors [12]. "Individualized instruction" is considered to be the most efficient way to deal with personal differences, and ITSs have been heralded as the most promising approach for delivering such individualized instruction with a computer [14]. However, so far no educational games use related techniques from the ITS field to enhance their effectiveness.

3. Research Method

Based on the Annual Report of the Hospital in 2012 (in May 31, 2013) conducted by the Provincial Health Office of East Java, cases of diseases of outpatients in public hospitals in the province of East Java is diarrhea to have (3,301 cases) and ARI (2,541 cases), While cases of Dengue Fever have a number of people (1,905 cases) and Typoid or typhoid number (1,826 cases). Then for the number of children people have Fever (1,673 cases) and Dental Caries number (822 cases), then the patient Mental and Behavior Disorder has (559 cases). For patients with diabetes mellitus have started attacking the children with a number of (510 cases), then for fever of unknown cause has (483 cases), which can be seen in Figure 2.

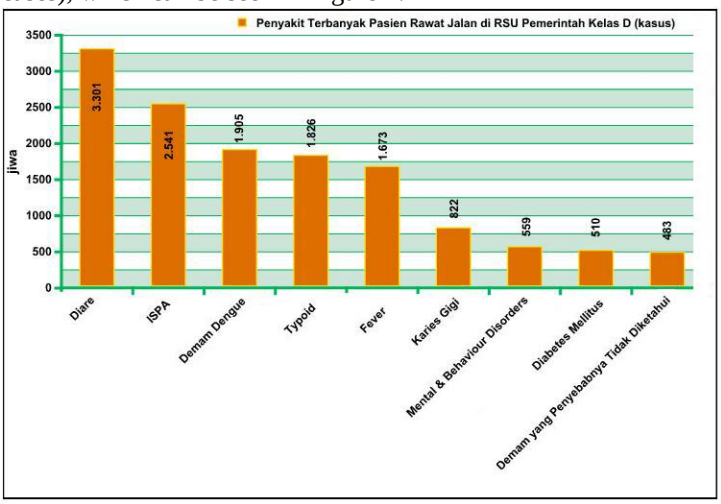

Figure 2. Most Diseases Hospital Outpatient in East Java province in 2012
Source: Annual Report of Hospitals, Health Section and Special Reference, Java Provincial Health Office

Introduce healthy lifestyle to children as a dependent variable include: children's activities either sleep or play or exercise; eat a nutritious drink, hand wash, cleaning habits body, teeth and mouth; habits maintain good environmental hygiene at school, home and the community as a children's playground. This research have three variable to build educational game, which can be seen in Figure 3. The three variable are independent variable, moderator variable and dependent variable. Independent variable is used to presumed cause in an experimental study. All other variables that may impact the dependent variable are controlled. The values of the independent variable are under experimenter control. Independent variable in this research is to identify children's behavior in healthy lifestyle. Moderator variable is used to indicate some variables that influences, or moderates, the relation between two other variables and thus produces an interaction effect, and this research is identify children's level knowledge in diarrhea. Dependent variable is used to presumed effect in an experimental study. The values of the dependent variable depend upon another variable, the independent variable. In this research is to integrate independent and moderator variable.

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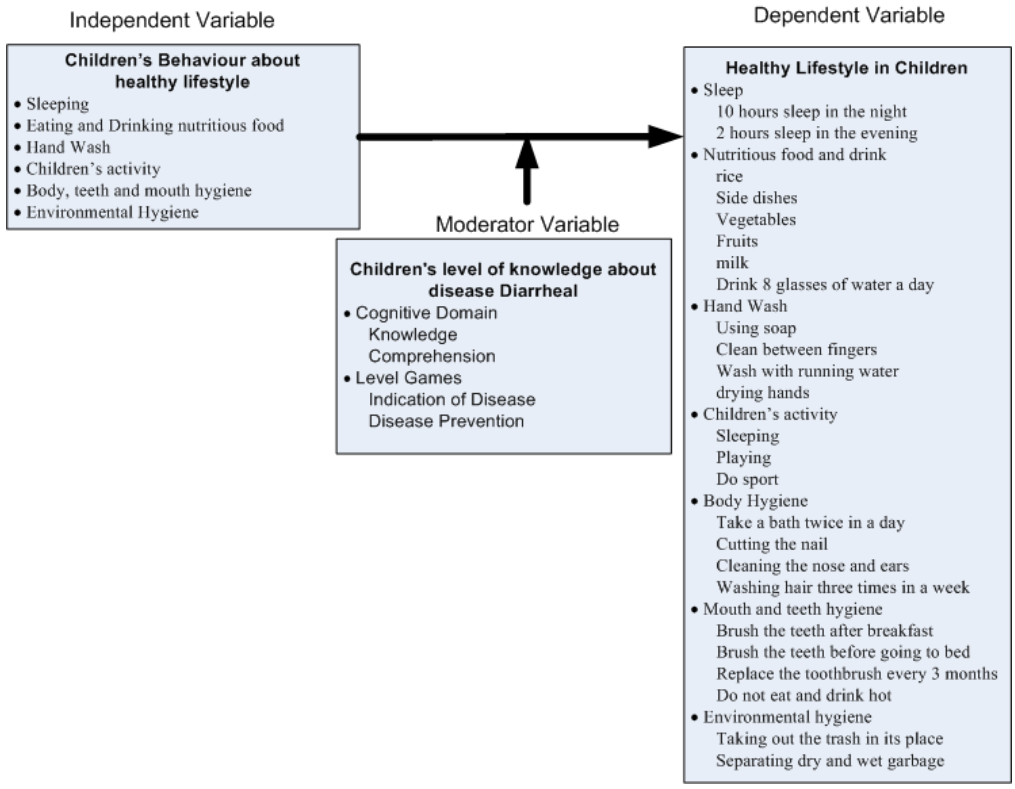

Figure 3. Framework Research

Figure 4 illustrates a flowchart Diarrhea Game and have four scene based on clock. 1st scene is give visualisation daily and has made from children's activity In the morning such as take a bath, toothbrush, having milk and bread to breakfast. 2nd scene is give visualitization children's activity at the school such as wash hand before eating, buy some food at canteen's school, put trash in its place. 3rd scane is based on children's activity after school such as change clothes, wash hand before eating, have lunch. The last scene based on children's activity in the evening such as playing footbal, playing with pet, do housekeeping, having dinner.

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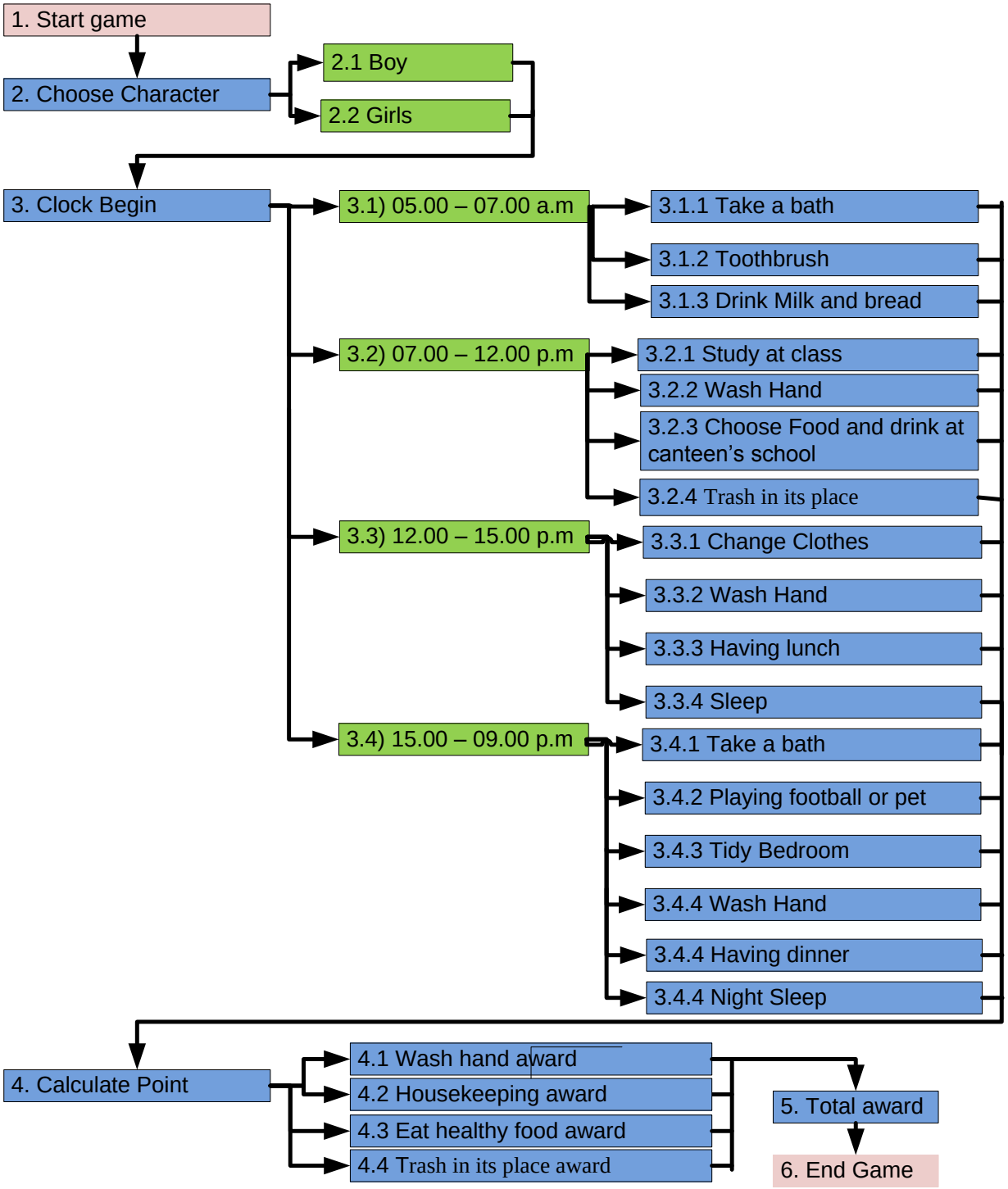

Figure 4. Flowchart Diarrhea Game

4. Discussion

This section discuss the implementation Diarrhea Game. The 1st scene give visualization based children's activity in the morning at 5 a.m until 7 a.m. Daily activities in this scene player must take a bath, tooth brush and having breakfast with milk and bread as seen in Figure 5.

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Figure 5. Having Breakfast

The 2nd level give visualization based on children's activity at the school. Player can choose healthy food and do washing hand before eating. Figure 6 shows player choose any kind of food.

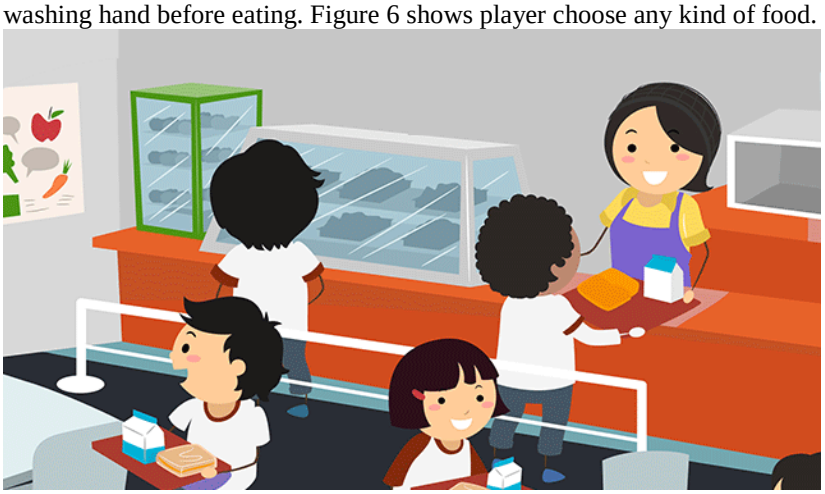

Figure 6. Eat at the canteen's school

The 3rd level give visualization based on children's activity after school. Player can washing hand and change their clothes. They can do housekeeping or clean up their bedroom as seen in Figure 7.

Figure 7. Tidy Bedroom

The 4th level give visualization based on children's activity in the evening. They can chose playing football or playing with pet. After them playing, they must washing hand before having dinner. Playing football have score from 0-15 and made player put the ball to made goal as seen in Figure 8.

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Figure 8. Play Football

Figure 9 shown award to player if they already do all task in Diarrhea Game. Player can get hand wash award if they always click washing hand before they have breakfast, eat at the canteen's school, playing and having dinner. Player can get housekeeping award if they do tidy up their bedroom at the 3rd scene. Player can get healthy food if they choose healthy food at the canteen's school scene. Player can get put trash in its place if they click trash at the canteen's school scene and housekeeping scene.

Figure 9. List of Award in Diarrhea Game

5. Conclusion

This research has conclusion:

Diarrhea Game give visualization based on children's activity in daily life. At the canteen's school player can chose any kind of food and if they choose healthy food then they can get healthy food award.

Diarrhea Game made children as player to always do hygienist in body, hair and their teeth. In this game player can use mouse to washing their hand step by step. First they can use mouse to click the water supply, soap to clean their hand. After them washing their hands, they must dried their hand with cloth.

Some cause of diarrhea is the children forget to wash their hands before eating. This Diarrhea Game teach children to always wash their hands before eating and after their doing the activities. In the play football's scene the player can use mouse to put the ball into goal. If player always click wash hand after they playing football then they get wash hand award from this game.

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DEVELOPMENT OF IT RISK MANAGEMENT FOR ONLINE ACADEMIC INFORMATION SYSTEM OF UNIVERSITAS WIJAYA KUSUMA SURABAYA USING NIST SP800-30 FRAMEWORK

Emmy Wahyuningtyas
University of Wijaya Kusuma Surabaya, Indonesia

Abstract: Academic information system online is quite encouraging for the students at the University of Wijaya Kusuma Surabaya, but the convenience was often abused by students so that they can make entry KRS module without following established procedures. Appearing obstacles for faculty trustee that can not control the results of KRS entry by students because this module does not accommodate the right of access to the faculty trustee. As a result of what happens is some cases the student fails to follow yudicium since taking the course are not well monitored by faculty trustee. Besides frequent some chaos in the system, eg. when the curriculum conversion value and the number of credits taken by students who have become out of sync.
In general, the risk of IT project failure is not recognized by the stakeholders. This is because it has not applied risk management in order to anticipate the IT project failure. One reason is the start of a lack of careful planning, the absence of risk management mapping the risks and risk mitigation planning for academic information system online.
The framework that is used in this study is the SP800-30 NIST Risk Management Guide for Information Technology Systems. Selection of this framework on the basis of several previous studies which suggest IT framework for developing countries. There are two main stages in the study of Risk Assessment and Risk Mitigation. Results from this study is a risk management standard document of academic online information system which can be used as a reference / reference for the institution's efforts to repair and mitigate against risks that may occur in the system.

Keywords: risk management, NIST SP 800-30, risk assessment, risk mitigation

1. Introduction

Online academic information system owned by the University of Wijaya Kusuma Surabaya was built in order to expand the accessibility of the academic system that has existed before. In order to accommodate the needs of students in terms of academic administration, the institution provides convenience by incorporating some of the modules in it, among other online and KHS KRS online.
The presence of such a system is quite encouraging for the students, but the convenience was often abused by students so that they can make entry KRS program without following established procedures. Appearing obstacles for faculty trustee that cannot control the results of KRS entry by students because this module does not accommodate the right of access to the faculty trustee. As a result of what happens is some cases the student fails to follow yudicium since taking the course are not well monitored by faculty trustee.
In general, the risk of IT project failure is not recognized by the stakeholders. This is because it has not applied risk management in order to anticipate the IT project failure. Indrajit (2006) describes the successful implementation of IT especially in the world of education is determined by the level of awareness (awareness) stakeholders (stakeholders) of the IT system itself. One of concern is the practice of IT risk management.
Under these conditions, the authors would like to discuss the development of the IT risk management using a framework that NIST Recommendation SP800-30: Risk Management Guide for Information Technology Systems

2. Literature Review

Importance of Risk Management
According Galorath & Evans (2006), the concept of risk management is built on the basic assumption that the risk management will put the factors that have an impact on a project, therefore, risk management has an important role in an organization
NIST (National Institute of Standard and Technology) SP800-30
NIST (National Institute of Standards and Technology) is a government organization in the United States with the mission of developing and promoting assessments, standards and technology to improve the facilities and quality of life

IT Risk Management

Definition of Risks according to Risk Management Handbook AS / NZ 4360 (Australian / New Zealand Standard 2004) are the chances of something unexpected that can take effect (impact) on the organization's objectives.
According to McManus (2004), the risk is the potential for the occurrence of abnormal activity that can cause harm

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or threat of project success or organizational goals
According Stoneburner et al (2002), the risks referred to in the document SP800-30 NIST risk management is the negative impact that occurs taking into account the probability of the source of threats and system vulnerabilities that could potentially lead to loss of mission

Risk management process according to NIST SP800-30

Information system
Any organized combination of people, hardware, software, communications networks, and data resources that stores, retrieves, transforms, and disseminates information in an organization (O Brien, 2006)
Information systems are components that work together to collect, process, store and disseminate information to support decision making, coordination, control, analysis and visualization problems within an organization (Laudon and Laudon, 2010)
Management information systems as a computer-based system that provides information for multiple users with similar needs. Users establish a formal organizational entity or sub-unit companies below (McLeod, 2001)

Research Method

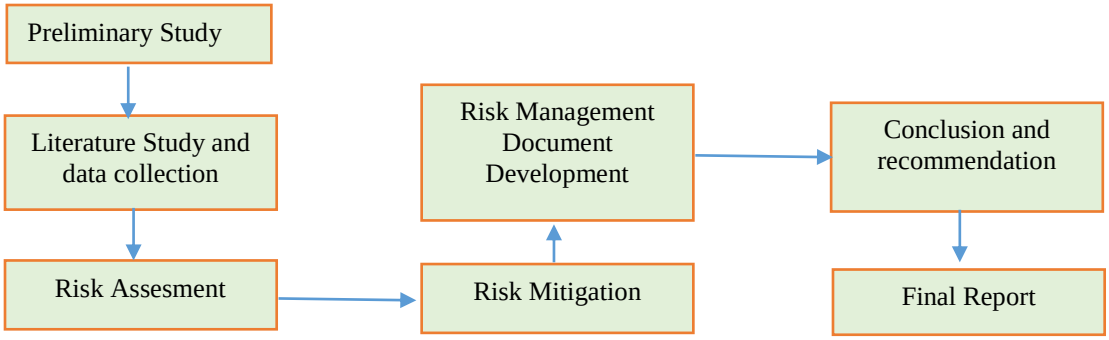

Figure 3.1 Research Flow

3. Discussion

Data Collection
In accordance with the methodology of the study which outlined that a core process begins with the collection of data covering business processes and infrastructure of academic information system online Wijaya Kusuma Surabaya University, which results from this stage becomes the input for the next stage. Data were collected through the study of literature from books, e-books and the internet as well as from interviews with relevant parties. In the implementation of information technology governance, Universitas Wijaya Kusuma Surabaya has a special unit that Unit Information and Communication Technology. In this research, interviewing two staff UPT ICT as a resource that is competent to business processes and information systems at the University of Wijaya Kusuma Surabaya.
The collection of data in the form of the document review was done by requesting various documents related to the profile and business processes online academic information system of the University of Wijaya Kusuma Surabaya, for example: business process flowcharts, system architecture, technical specification documents, document use application. The collection of data in the form of interviews were conducted in person and interview via e-mail / internet messaging. The results of the interview are recorded and / or recorded, then analyzed and recapitulation in the form of a summary of the interview
The Business Process
Academic information system especially online KRS modules built with the aim to provide convenience to students

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in the guardianship process. Students can access this system when the ongoing custody period, which is when the time limit between half or two weeks before the course begins. KRS system here has not fully accommodate the purposes of the trust, but only to the extent any course program, which still required manual procedures that are not accommodated by the system. As for the overall business process guardianship presented in Figure 4.1.

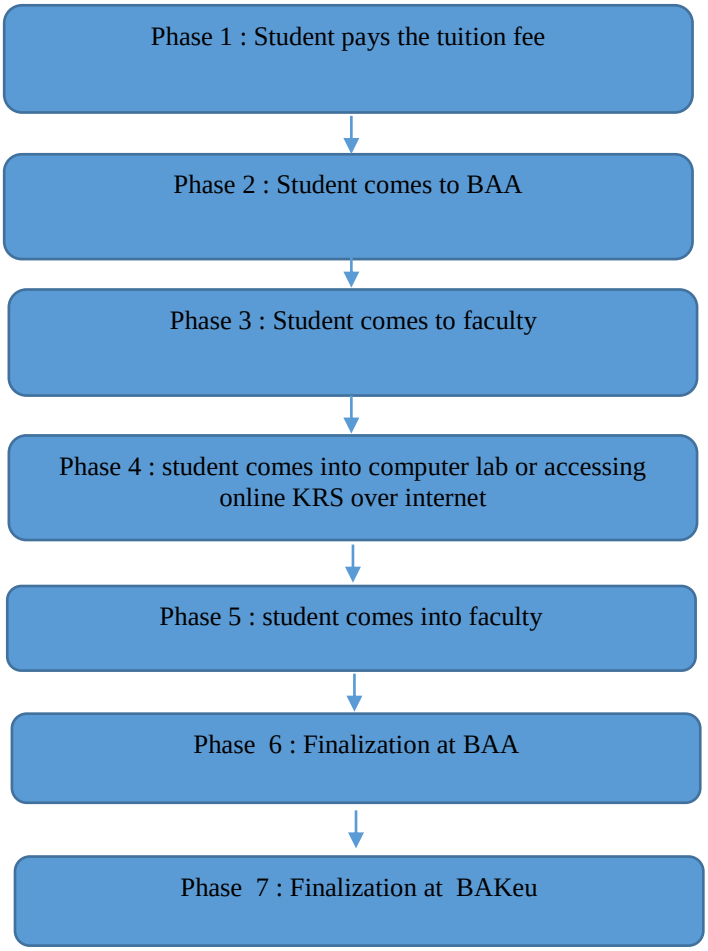

Figure 4.1 Business process

System procedures steps being taken to prepare KRS online by the related parties are presented in Figure 4.2.

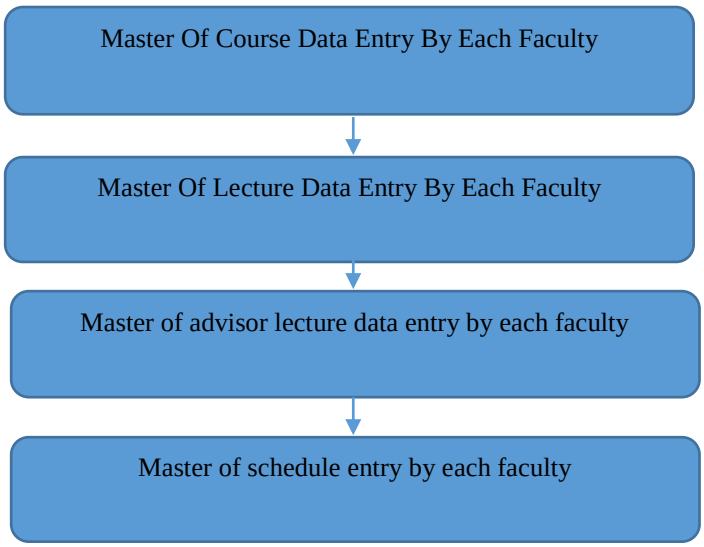

Figure 4.2 Flow of System Preparation

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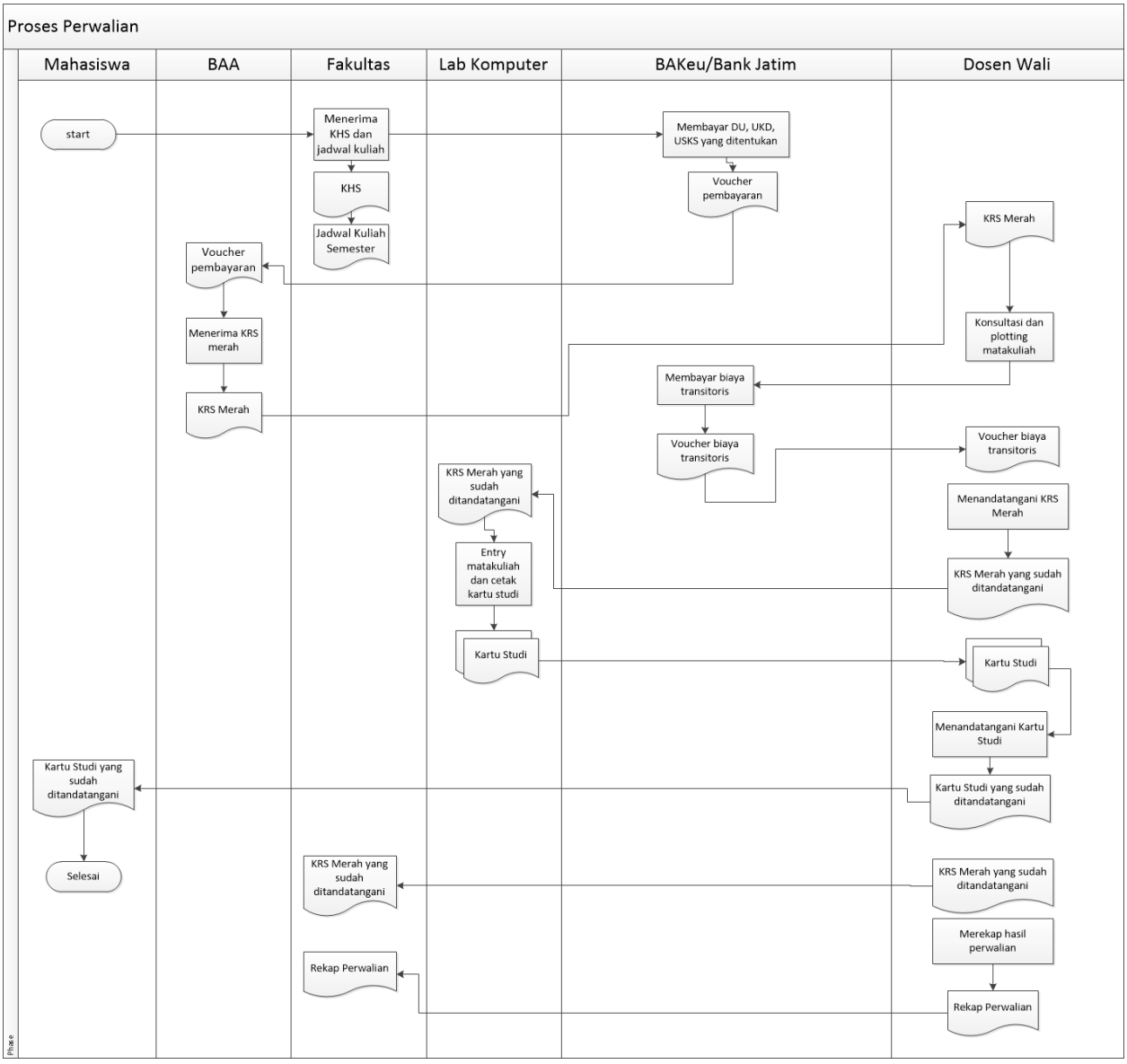
The following is a detailed visualization of business processes using the system KRS online trust by involving related parties.



Infrastructure of Online Academic Information System of University Wijaya Kusuma Surabaya

Today most computers at the University of Wijaya Kusuma Surabaya connected in a single network using Cat5e UTP cable, especially computers used to access the academic system.
There are 2 different physical server function, which is to serve the application and database serving. Hardware for servers using INTEL processor E5507 2x supported with an internal memory with a capacity of 16 GB DDR 3 and 250GB SATA hard drive. As for the average client using a personal computer with an Intel Core i3 550 3:20 Ghz. To monitor the generation most still use LCD with a screen size of 15.6 ".

To use a web server operating system Windows Server 2012, while the average client computers using Windows 7. While the server to serve the academic system using Windows Server 2012. To keep records of transactions based desktop systems use SQL Server 2012, while the application is based web utilizing MySQL database. Internet

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connectivity is concentrated in ICT Unit with a bandwidth of 45 Mbps

Web-based applications built using the language kind of server-side scripting language PHP Hypertext Preprocessor (PHP) and Active Server Pages.NET (ASP.Net). Having a dedicated database replication to a financial interest in this case is for the Bank Jatim Branch as a partner Wijaya Kusuma Wijaya Kusuma Surabaya University who is entrusted with the payment of the student. Network topology of the online KRS system is visualized with a picture 4.2

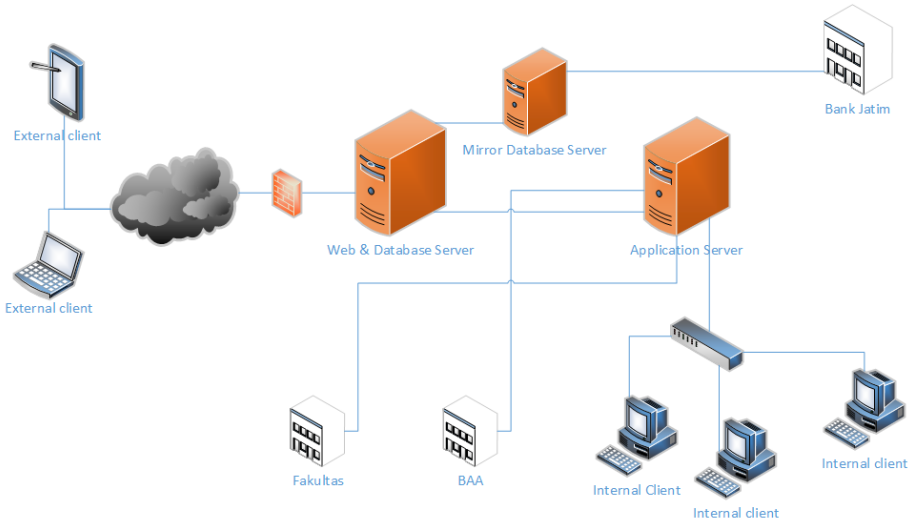

Figure 4.2 Network Topology of online KRS System

Discussion :
In the diagram business processes described above it appears that faculty trustee does not have the authority to access the system. Here the role of guardian lecturers only limited to providing advice / consultation to the students guardian to program any subject that should be taken. If the entry is done in the computer lab, then the role of the officer in the lab to check whether the red KRS had been approved by the faculty trustee, if they have allowed for entry and if not then the officer does not allow students to make entry. But with the web version KRS system that can be accessed from anywhere so allows students to make entry without first facing each faculty trustee. This is because the subject does not require authorization entry of faculty trustee and study cards can be printed directly, so several times occur graduated students can not follow because there are compulsory subjects which have not been taken.

In terms of development of the system, the developer does not use the help of project management software. Data backup strategy conducted every month and every day specifically for financial data. There is a dedicated database replication for the purposes of the Bank Jatim. There has been no disaster management strategy or disaster recovery center.

Specifications of hardware and software used are described in Table 4.1 below

SERVER		APPLICATION SERVER
VIRTUAL SERVER		YES
FUNGSI		MAIN APPLICATION
	CPU/PROCESSOR	INTEL E5507 2X
	RAM	16 GB DDR 3
	HARD DISK	250GB SATA
	VGA / DISPLAY	15.6"
	OS	WINDOWS SERVER 2012
	WEB SERVER	APACHE VER.
	DATABASE SERVER	MYSQL VER.
RESOURCE USAGE :		CPU MAX : 30 % CPU AVERAGE : 20 % RAM MAX : 80 % RAM AVERAGE : 50 %

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Server		Web & Database Server
Virtual server		No
Fungsi		Main database Online Academic Application
	CPU/Processor	INTEL E5507 2x
	RAM	16 GB DDR 3
	Hard disk	250GB SATA
	VGA / Display	15.6"
	OS	Windows Server 2012
	Web Server	Apache Ver.
	Database Server	MySQL Ver.
Resource usage :		CPU Max : 40 % CPU Average : 10 % RAM Max : 60 % RAM Average : 30 %

Difficulty identification Each Entities Involved

The following is a discussion of the difficulties that occur in each of the parties involved in the guardianship system based on business process diagrams.

Stage	Events	Ref#
Master course data entry by system administrator of each faculty	course code does not match the curriculum	R1-01
	incomplete conversion results	R1-02
	curriculum change not covered perfectly	R1-03
	Manual adjustment of illegal course	R1-04
Master lecturer data entry by system administrator of each faculty	Lecturer's code is not updated	R2-01
	Lecturer's name is not updated	R2-02
	Lecturer's code is not well ordered	R2-03
`Plotting academic advisor by system administrator of each faculty	Academic advisor's name is not appears on the form	R3-01
	List of students for each academic advisor is not the same with previous semester	R3-02
	Students already passed still recorded as active student	R3-03
Entry master schedule and class capacity	Class capacity doesn't match with room capacity	R4-01
	Lecturer's name missmatch	R4-02
	Inflexible course schedulling for final project and field study	R4-03
	Minimum number of class participant doesn't defined clearly	R4-04
	Pre requisite course can be violated	R4-05
Threats		
Threats to physical server	Natural factor : earthquakes and lightning strikes	R5-01
	Environmental factors: fire, power failures, and Internet disturbances	R5-02
Threats to data integrity	Intentional factor : hacker/cracker attacks	R5-03
	Operator error	R5-04
Threats to data error	Business rule	R5-05
	Data violation	R5-06

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Analysis of Risk Average

Risk	Risk analysis (Average)								
	FT	FISIP	FE	FP	FBS	FKH	FH	FK	PASCA
R1	7,00	6.17	5.17	2.33	3.33	1.67	1.67	5.33	
R2	2.33	4.67	5.33	4.17	3.50	4.00	4.17	6.00	
R3	3.17	6.00	7.50	4.00	3.50	5.17	4.83	5.00	
R4	2.33	6.67	8.00	4.67	5.67	5.67	3.00	10.33	
R5	3.56	5.89	5.44	5.33	5.78	5.00	5.67	7.44	

4. Conclusion

Based on the risk assessment, it shows that FK has the highest risk on the stage Entry master schedule and class capacity that is 10,33 (High Risk) and FT taking the lowest risk for R2 and R4 that is 2,33 (negligible).

Risk based on stage	Number of events
Master course data entry by system administrator of each faculty	4 events
Master lecturer data entry by system administrator of each faculty	3 events
`Plotting academic advisor by system administrator of each faculty	3 events
Entry master schedule and class capacity	5 events
Risks based on Threats	
Threats to physical server	5 events
Threats to data integrity	2 events
Threats to data error	2 events

5. Recommendation

Risk mitigation must be performed for prioritization, evaluation and implementation of controls that has been recommended from the risk assessment process.

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2 SCIENCE

ACCOUNTABILITY AND ENVIRONMENTAL SUSTAINABILITY: NIGERIAN MARITIME EXPERIENCE

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Abstract: Nigerian maritime industry is one of the biggest administrative agencies in Africa that greatly impacted to the economy of Nigeria and West African region. The industry expectation if managed very well, will significantly improve the economic development of Nigeria. Despite the importance of this sector, government of Nigeria is paying little or no attention on the development of the industry. Several reports in the sector provide evidence of non-performance, low productivity, corruption and non-compliance with the international maritime global best compliance. In addition, the sector is marred with the challenges of political, regional instability and pirating within the coastal region. However, several efforts have been made by the Nigerian government to improve on the sector in order to attract local and global investors in the industry.

Keywords: Accountability, environmental sustainability, coastal area, Nigeria, maritime

1. Introduction

Demand for greater shift in the awareness of the maritime sector and shift for new policy measures in the industry, is a result of environmental changes globally, with the increasing advancement in technology. The maritime industry globally accounts for more than 90 per cent of the transportation requirements. The maritime industry experienced a rapid significant changes in technology and managements for many decades (Managi, 2007). These rapid changes in the sector brought about the attention of the global investors in both the developed and emerging markets. However, the maritime industry in Nigeria is one the biggest administrative agency in Africa, which impacted positively to the Nigerian economy. Policy issue on accountability and environments sustainability is a predominantly been in the discussions. Several reasons have been cited on these two issues and considered to be significantly on the increase particularly in developing countries. Yet the sectors do not provide adequate attraction to the local and global investors (Johnson, 2014).

Even though, maritime industry is a self-governance system in Nigeria, which contributes significantly to the economic development of the nation. Nigerian maritime sector is vast and ever green (Ifeyinwa, 2015). Accordingly, the maritime expert stated that, if the industry is adequately managed it would generate huge revenue to the federation accounts. Alone, in the year 2009 the agency generated over $1.99billion (NGN4.9trillion) on the three percent levy on freight. This revenue generation is reported to have increased over the years of 2013 and 2014. Several experts demonstrated that revenue generation in the sector that is expected to increase with over 300% is neglected by the government (Moses, 2015). The system of accountability and environmental protection in the system highly un-coordinated and receive little attention by the government.

2. Research Methode

The maritime authority of Nigeria is the body responsible for making regulations that is related to the shipping, coastal waters and maritime labour laws. The agency was formerly referred as the National Maritime Authority (NMA) and called The Nigerian Maritime Administration and Safety Agency (NIMASA). The industry among its responsibilities is to provide search and rescue services and undertakes inspections of the maritime. The Nigerian maritime environmental challenge is witnessed from the piracy and armed robbery in the coastal region. This issue has caused a greater neglect of the industry by the multinationals. In order to address some of this issue, the government of Nigeria brought out programmes such as (i) National Seafarers Development Programme (NSDP), NIMASA Science and Technical College, Okoloba, Okrerenkoko, NIMASA Maritime Institute and NIMASA Shipyard and Dockyard, Okerenkoko, Delta State, Nigerian Maritime University (NMU) in the community. This programme has benefited over 2,500 young Nigerian that are mostly in the region.

Nigerian Economic and Business Environment

Nigeria is the most populous black nation in the world, with an estimated population of 170 Million (CIA, 2013). Africa and particularly Nigeria, will be in the leading global population rise over the next century and possibly larger than US by 2050(UN, 2012). Nigerian population is divided into over 250 multi-ethnic and cultural groups. The

population is grouped into kingdoms because of their culture, norms and tribes. There were about five kingdoms before 1960 namely: The Hausa Kingdoms, who are majority Muslims from Northern region. Igbo kingdoms from Southern East part of Nigeria and largely Christians. The Yoruba kingdoms in the South Western region, while the Nupe Kingdoms from Northern region and mostly Muslims. More than two third of the population and three-quarters of land mars of the country is in the Northern region (John, 1971). By 1914 the country was amalgamated into two provinces as Northern and Southern provinces by the British.

On the 1 October, 1960 Nigeria was granted independence from by the British government. Consequently, as the North has the majority of population, election prepared prior to the independence has the Northern party NPC capturing 134 Seats out of 312 seats of the parliament. After the civil war Nigeria has no money for economic development, reconstructions and meeting the demand of government expenditure requirements. Major source of income in the country was from agricultural product before the discovery of oil in 1950. Petroleum industry becomes the boost of economic development as the revenue generation increases with the rise in the global oil prices from $3 to $7 in 1973-1974. The country earnings and revenue generation increases with the increase in oil prices foreign exchange. International communities moved into the country for investments. British, Russia, France and US become great allies for economic development. Nigerian economic strength largely depend gas reserve and oil that make up over 90% percentage of the country's foreign exchange earnings.

Nigerian Maritime Industry.

The location of Nigeria geographically facilitated the establishment and development of maritime industry in the ocean-going or inlands locations. In Nigeria there are two types of inland transportations in the Rivers Niger and Benue with others that are small but provide a significant avenue for maritime activities. The greater part of these maritime activities is within the Atlantic Ocean that has border with the international maritime. This has significantly assisted not only transportations but also contribute to the economic development of the Nigerian economy. The maritime sector of Nigeria is accountable of over 60% of the total seaborne traffic found in the region of West Africa (Comfort, 2015)

As a result of the importance of the industry to the Nigerian economy, the maritime industry was first established through shipping policy decree of 1987 under the supervision of the Federal Ministry of Transport. The National Maritime Authority (NMA), was a predecessor of NIMASA. The major mandate of the sector to the Nigerian government is to ensure protection, orderly development and manpower training of the shipping industry. In addition, the NMA has responsibility of marine pollution monitoring as well as spillage within Nigerian waters (NIMASA, 2014). Furthermore, the environmental sustainability of the region that vulnerably recognised the role of the agency to ensure protection of the region (Mwalimu, 2005).

However, in 2006 NIMASA was created as a result of merger of NMA with Joint maritime Labour Industrial Council. The two agencies were both parastatals from the Ministry of Transportation. The act that established NIMASA in 2006 state that; (i) five per cent of annual income of the agency shall support Maritime Academy of Nigeria (MAC), and (ii) thirty five per cent of the annual income is to be used for the development of maritime infrastructure. Additionally, from the period of December, 2009, the agency set up a

Ray (2015) described the importance of maritime to the Nigerian fund that will cover 40% cost for education system in the delta region (Ogbuokiri, 2010).economy to include;(i) transportation services, (ii) promotion of trade and commerce, (iii) generation of revenue, (iv) job opportunity and employment creation, (v) institutional development, and (vi) tourism promotion.

The main functions of Nigerian maritime sectors are as follows

Pursue the development of shipping and regulatory matters relating to merchant shipping and seafarers.

i. Administration and regulation of shipping licenses.
ii. Administration, Regulation and Certification of Seafarers.
iii. Establishment of Maritime Training and Safety Standards
iv. Regulation of safety of shipping as regards the construction of ships and navigation.
v. Provision of Maritime Search and Rescue Services
vi. Provide direction and ensure compliance with vessels security measures
vii. Carry out Air and Coastal Surveillance
viii. Control and prevent Maritime Pollution
ix. Develop and implement policies and programs, which will facilitate the growth of local capacity in ownership, manning and construction of ships and other maritime infrastructure.
x. Enhance and administer the provision of Cabotage Act. 2003
xi. Perform Port and Flag State duties.
xii. Provide Maritime Security.

xiii. Establish the procedure for the implementation of conventions of the International Maritime Organization (IMO) and the International Labour Organization (ILO), and other international conventions to which the Federal Republic of Nigeria is a party on Maritime Safety and Security, Maritime Labour, Commercial Shipping, and for the implementation of Codes, Resolutions and Circulars arising there from.

Organisational Structure of the Nigerian Maritime Authority

The sector is divided in three Directorates. In each of the directorate there constitutes leadership of Executive Director(ED). From the Directorate there are two or more major units that are headed by a Director. In overall, eight Departments report to the reporting to the EDs while the nine Units report to the Director-General or CEO. Because of the nature of the organisational operations, several offices operate a Zonal structure to improve effective management of its activities in the four significant maritime zones of Nigeria.

The zones and their respective headquarters are: Western Zone – Lagos, (ii) Central Zone –Warri, (iii) Eastern Zone - Port Harcourt, (iv) Northern Zone – Abuja and (v) Head Office in Lagos. The largest distribution are is in Lagos with its principal operations in (a) Apapa (Lagos), followed by Warri, Port Harcourt, Bonny, Calabar, Lokoja, Abuja,Yenagoa, Onne, Sapele, and Eket.

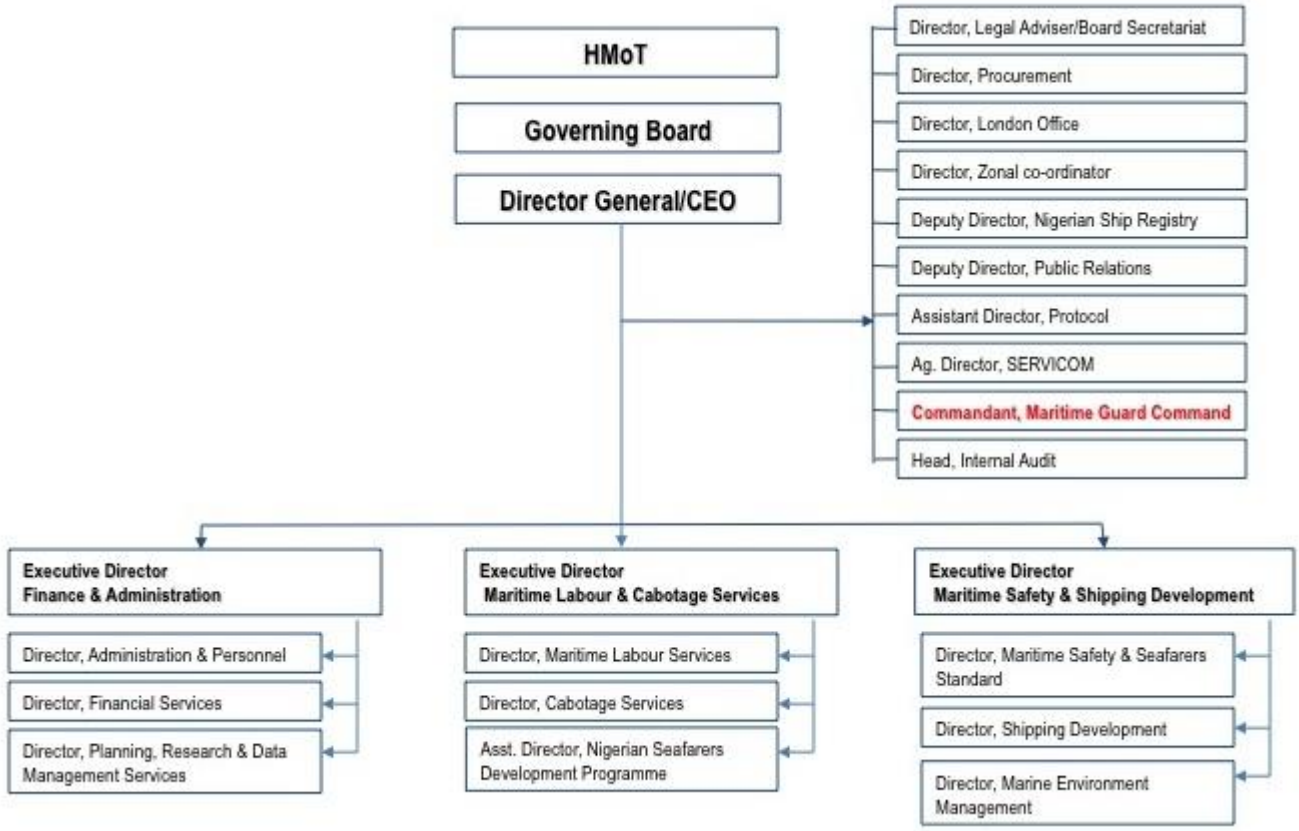

Figure 1.1 Agency Structure

3. Discussion

Accountability in Nigerian Maritime

The general concern of the government of Nigeria is the level of corruption among the maritime and petroleum industry. The memorandum of the Governor of Central of Nigeria to the Present of Nigeria in the 2013 has shown that; "Non-Repatriation to the Federation Account by Nigerian National Petroleum Corporation (NNPC) of N49.8 Billion representing 76% of the value of Crude Oil lifting in 2012 and 2013". But the letter also contains complaints about "Failure of NNPC to pay N22 billion Nigerian Export Supervision Scheme (NESS) Levy", and "Other Related Matters"(Business Day, 2014).

The challenge of maritime industry is the political instability couple with the Global economic turmoil. Recently, in the year 2013 the Nigerian government lost over 300,000 barrels of crude oil on daily basis from the attacks on major export pipelines. Vandalism of the crude oil within the offshore and on-shore of Nigeria has a significant impact to the Nigerian economy (Ejiofor & Okafor, 2014). In the year 2014 the government sought of deregulating the downstream sector in order to improve the transparency and efficiency level of the petroleum and maritime sectors. The result of the enumeration of the consequences of deregulations that was assumed to be demanding in resources, discourage investments with the severe advantage to the rich, prompted the government to abandoned the initiative.

Majority of the challenges identified in the sector includes weak internal ethics infrastructure in the ports(for example, lack of code of conduct), underdeveloped systems and weak enforcement practices for investigating complaints from the bribe demands, payments facilitation. However, the findings on the accountability report by United National Development programme and the maritime Anti-Corruption Network in 2014 were classified into three components as; (i) organisational, (ii) environmental, and (iii) personnel.

Organisational Factor

The accountability measure in the maritime do not provides a good formal channel for insider or complaint systems for whistle-blowing. Also, in the sector, there is limited levels of policies compliance and decisions to strengthens current reforms that are taking place in the industry. Several bureaucratic process of cargo clearance, within the ports, provides avenue for corrupt practices. For example, in the processing of cargo in the port, it required several signatures (142) before clearances. Lastly, the predictability as well as celerity on the decision making process is limited in the sector.

Environmental factor

In this sector, there are limited numbers of operational facilities in the port, which makes the port services a scare resource. This provided undue advantages to the corrupt behaviour of the people in the industry. In addition, the organisation regarded corruption as an acceptable norm in which the industry will be promoted and business interest to be achieved. In the sector majority of the foreign companies comply with the local traditions, rules and expectations in order to sustain their business, including corruption. Furthermore, the laws in the sector have been outdate consisting of sanctions that are no longer a deterrent, un-effective enforcement of sanctions, and provisions remains weak in the industry.

Personnel factor

The maritime organisational sector is reported not to emphasise on integrity in the place of work. There is a broader discretionary power with a limited accountability. The system in the maritime corruption has been expected and widely rationalised in the system. In the industry, no training routine is established to strengthening ethics and competence. The pressure of those in authority to comply with the already established corrupt practices is very high.

Environmental Sustainability

Several reports in Nigeria provide evidence of significant increase on environment from both natural and human disasters, like human activities and drought. For instance, the Nigerian report RIO+20 Summit in 2012 (UNDP) reported that, Nigerian environment has been under threat from both natural and human activities. The challenging aspect of environment is visible in the sense that destruction of natural resource in the revering areas of Nigeria can be noticed easily. The report of UNDP in 2012 stated that Nigerian larger populations are in great danger due to the environmental factors.

The ecological damage in the Delta region is caused by the fossil fuel use, in particular oil and gas exploration. The coastal area of Nigerian marine environment has about 853 km along the coastline and inland for a distance of about 15km in Lagos in the west to about 150km in the Niger Delta region and about 25km east of the Niger Delta. In the study of UNDP in 2012, the Nigerian maritime coastal area is afflicted with significant environmental problems, which have been addressed for sustainable development. The system of industrialisation, oil and gas explorations, urban development and exploitation has invaded on the community as well as their environment. This phenomenon leads to the opening of pristine ecosystem (UNDP, 2012). Natural hazards like loads have clearly caused few of the environmental impacts, industrial events that have aggravated the condition.

The major areas identified in the environmental sustainability include; (i) modification of the ecosystem in the coastal erosion, biodervisty loss, flooding, salt water intrusion and exotic species, (ii) pollution from oil spills, gas flaring industrial and agricultural effluents, solid wastes and sewage,(iii) depletion of fisheries resources(Awosika, 2008)

4. Conclusions

Nigerian maritime industry is the heart of that accounts for a greater percentage of the government revenue. Despite the importance of the sector to the Nigerian economy, a significant neglect of the industry is noticed. Over decades the industry has not acquired attractions of required global and local investors. This challenge has been attributed to the level of accountability and environmental issues. Some professionals and experts in the area have attributed lack of knowledge of the maritime sector, technical competency and understanding the operations of the sector contributed to low investments in the sector. The Nigerian maritime sector is one of the largest industry in African

and the largest in the West African region, but yet do not provide expected economic development in the region. Nevertheless, other challenges like political instability, piracy and corruption have been the major hindering factor to the development of the sector.

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RELATIONSHIP BETWEEN X-RAY INTERPRETATION OF LUNG CHANGES WITH TOTAL LEUKOCYTES IN DOMESTIC CATS IN MANYAR INDUSTRIAL AREA, GRESIK

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Abstract: This study aims to determine the relationship between changes in lung X-ray Interpretation with an increase or decrease in the number of leukocytes that occurs in domestic cats in the industrial area Manyar, Gresik. This research used descriptive analysis with Simple Random Sampling. Used 9 of domestic cats in Manyar Industrial area. The sample was checked using X-ray apparatus thoracic section, where lies the lungs changes then blood taken for checking complete blood tests to determine how the number leukocytes, whether there were a decrease or an increase. The Results showed that 6 of 9 cats there were a change in the pattern of X-ray interpretation of the lungs pulmonary, accompanied by the increased in the number of leukocytes, namely the cat were C, D, E, F, G and I. 1 of 9 cats there changes in the pattern of X-ray interpretation of the lungs - pulmonary Domestic cats but an increased in the number of leukocytes , it was cat B and 2 of 9 cats were found normal circumstances both on the pattern of X-ray interpretation of the lungs - pulmonary and on the number of leukocytes, namely in cats A and I. The conclusion that can be drawn was nearly about 60% a link between changes in the pattern of X-ray interpretation of the lungs by increasing the number of leukocytes Domestic cats in Manyar industrial areas, Gresik due to air pollution that contaminates.

Keywords: X-ray changes, changes in the number of leukocytes, Air Pollution, Lung

1. Introduction

The air is paramount for life , whether human, animal or plant . All activities carried out using air . Benefit from the air there are some things , which is the first to breathe . Air is one of the substances of very high benefits for the survival of living beings . All living things need air to breathe or biological terms is the process of respiration . Generally, the air contains a lot of content substances such as oxygen , carbon dioxide , helium , and others. Both help the process of photosynthesis , for power generation , is used as a source of energy, to help spread the spores of plants (flowers), as conditioning, for processing food, absorbing solar radiation, as communication networks, protect the earth , into intermediate moisture , intermediaries sound waves and sound , and also as a conductor to the light (Ana C , 2015) .

Air Polution will interfere with the process above. Air pollution is a process of mixing hazardous elements into the atmosphere, which causes environmental damage. This will lower the quality of the environment so it will be an interruption in either human or animal health. There are two types of sources of air pollution, which is the first pollution due to natural sources such as volcanic eruptions and then the second one comes from human activities such as that derived from transportation, factory emissions, and others. One of the industrial area adjacent to the city of Surabaya and there are many factories here one of which is industrial Manyar Gresik, where the lives of many animals - wild animals, especially cats. According to the PP 41, 1999, air pollution is the introduction of substances, energy, and other components into the air by human activities, so that the air quality down to a certain level which causes air can not fulfill its function (Ali, 2007). The air that enters the body through respiration process will be associated with pulmonary organs - the lung where air will be bound by the hemoglobin inside the red blood cells (erythrocytes). (Mifbakhuddin et al, 2010). Besides exposure to air by a particular substance can stimulate leukocytes and platelets in terms of increased oxygen demand and production of peroxide (Gunawan L et al, 2013). It also affects the number of leukocytes in the blood, a decrease or an increase.

The one way to diagnose abnormalities of the lungs - pulmonary besides blood sampling also with X- ray examination . The X-ray examination is very helpful in diagnosing a disease both in medicine and in veterinary medicine (Noviana D et al , 2014) .

Therefore, this study will look at the relationship between changes in the results of X - ray interpretation of the lungs with the number of leukocytes in domestic cats in Manyar Industry , Gresik.

2. Literature Review

Theoretical review

Air pollution cause health problems in cats or pulmonary circulation where different levels and types , depending on the kind , size and composition of chemical. The intererence took place mainly in physiological function of organs such as the lungs and blood vessels , irritation to the eyes and skin , Air pollution due to dust particles typically cause

respiratory illnesses such as bronchitis , asthma , lung cancer . Pollutant gases dissolved in the air can go directly into the lungs and then absorbed by the circulatory system (Kemenlh in Ali (2007).

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3. Research Method

Location and Time Research: The research was conducted at domestic cat as a sample in Industrial area Manyar , Gresik then performed blood sampling as well as X - ray at the Animal Clinic Healthy , Sidoarjo on April 6, 2015 to May 6th.

Population and Sample: In this experiment, the domestic cat population amounts to 9 tail . Where the sample must meet the following requirements : weigh approximately 2-3 kg and are or live in and the factory area in Manyar Industry , Gresik . Sampling techniques is the model of Simple Random Sampling , the method is done randomly .

Materials Research

In this research material or tools that are used are the cage to catch the cat samples , 1 cc syringe , cotton , alkhol , EDTA tube , and the shearer .

Data analysis

Knowing how the respiratory system to the state of pulmonary (lung) of each individual cat samples and know abnormalities or disorders of the lungs cat sample by reading the results of X- Ray then compared with the increase or decrease in the number of leukocytes of blood results in the cat . Normal picture of the results of X- ray normal cats are as follows :

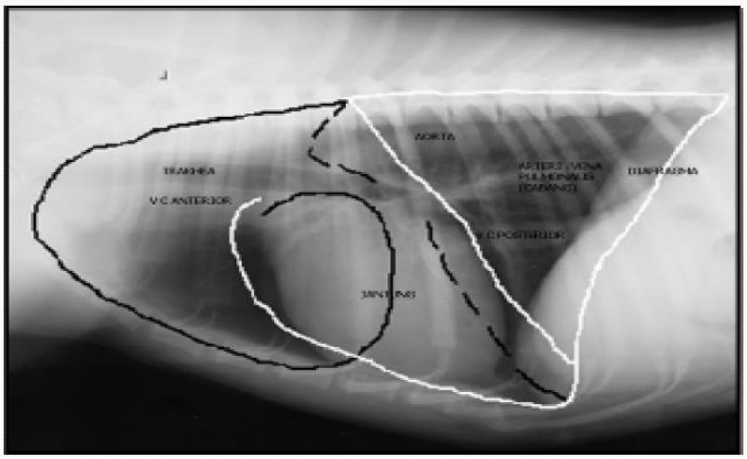

Figure 1. Results of X-ray images Lateral Thorax normal position
(Source : Galijono D , 2013)

4. Discussion

The changes in the picture of the X - ray lungs - pulmonary followed by increased number of leukocytes proved that some gas from air pollution can reach the alveoli and has a direct toxic effect on alveolar macrophages which is to reduce the power of phagocytic and bactericidal activity thereby increasing the chances bacterial infections and influence the levels of white blood cell (WBC) .

The changes in the picture of the X - ray lungs - pulmonary followed by increased number of leukocytes proved that some gas from air pollution can reach the alveoli and has a direct toxic effect on alveolar macrophages which is to reduce the power of phagocytic and bactericidal activity thereby increasing the chances bacterial infections and influence the levels of white blood cell (WBC) .

5. Conclusion

There are linkages between changes in the X - ray interpretation of the lungs – pulmonary the number of leukocytes in domestic cats in areas Manyar Industry , Gresik . In most of the changes in X - ray interpretation of the lungs – pulmonary will be followed by the increase in the number of leukocytes , but there are also changes in the X - ray interpretation of lungs - pulmonary that is not followed by an increase in the number of leukocytes .
In the X - ray picture of the lungs - pulmonary without alteration (normal) , leukocyte count also increased (normal) .

Table 1. Normal Leukocytes (White Blood Cell (WBC)) in Cats and Dogs

Hematology Reference Values Technicon H-1 Hematology Analyzer

	TEST	UNITS	CANINE	FELINE
COMPLETE BLOOD COUNT	WBC	$\times 10^3/\mu l$	6.02–16.02	4.87–20.10
	RBC	$\times 10^6/\mu l$	6.15–8.70	6.12–11.86
	Hemoglobin	g/dl	14.1–20.0	9.0–15.6
	Hematocrit	%	43.3–59.3	29.3–49.8
	MCV	fl	63.0–77.1	41.9–54.8
	MCH	pg	21.1–24.8	12.5–17.6
	MCHC	g/dl	29.9–35.6	28.1–32.0
	Platelets	$\times 10^3/\mu l$	164–510	26–470*
	MPV†	fl	3.9–6.1	4.1–8.3
	RDW†	%	11.9–14.9	14.2–17.6
	HDW†	g/dl	1.49–2.17	1.71–2.41

Table 2. Results of X - ray readings Lungs - pulmonary compared with the results of Leucocytes (WBC)

Sample	Patterns change in Lungs-pulmonary	WBC Results	Specification
Cat 1	Normal	18,40 x $10^3/\mu l$	Normal
Cat 2	Normal	29,20 x $10^3/\mu l$	Increased
Cat 3	Vasculer (Pulmonary Vein)	26,40 x $10^3/\mu l$	Increased
Cat 4	Peribroncial	25,80 x $10^3/\mu l$	Increased
Cat 5	Vasculer (Pulmonary Vein)	34,30 x $10^3/\mu l$	Increased
Cat 6	Interstitial (non structure)	23,90 x $10^3/\mu l$	Increased
Cat 7	Vasculer (Pulmonary Vein)	20,90 x $10^3/\mu l$	Increased
Cat 8	Normal	15,70 x $10^3/\mu l$	Normal
Cat 9	Interstitial dan Bronkhial	21,00 x $10^3/\mu l$	Increased

6. Recommendations

For Government :
Reboisation in around industrial area and in another place which is need it
Making the rules and punishment about air regulation for company

For Company :
Recycling waste product to decrease air pollution

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THE UTILIZATION OF BIOTIC AND ABIOTIC ELICITORS TO IMPROVE ROSE OIL CONTENTS THROUGH IN VITRO PROPAGATION

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Abstract : Recently, total rose oil needs are supplied by Bulgaria (70%-80%) while the rest are supplied by Germany and Iran (20%). Indonesia still imports its national rose oil needs. Roses cultivated in Indonesia contain less rose essential oil compared to Bulgarian and Kashmiri roses. In this study, the writers conducted a research to improve rose essential oil contents through tissue culture and elicitation technique. This research used light as abiotic elicitor in elicitation technique. This research applied Completely Randomized Factorial (CRF) Design, with the first factor (Factor I) was the irradiation length (0, 4, 8, 12, 16, 20, and 24 hours/day) and the second factor (Factor II) was the wavelength of the light (White, Red, Yellow, and Blue). The results of this study indicated that the quality and quantity of calluses were affected by exposure length and the color of light exposed. Friable calluses quality was found on treatment in dark and yellow light exposure. This study resulted calluses in moderate quantity and the highest *citronellol* content was resulted from dark treatment and yellow light irradiation treatment.

Keywords: abiotic elicitors, light, callus, rose oil

1. Introduction

Plants are the main source of chemical compounds used widely in pharmaceutical industries, used as food additive, and perfume industries. Almost all of these compounds was secondary metabolite products extracted from tropical plant species, including roses. Roses are widely used in pharmaceutical industries, as food additive, and as one of perfume ingredients. Rose oil industries had been developed in Indonesia since 17th centuries although most of the ingredients was imported until recently (Satuhu and Murtiningsih, 2005).

Various kinds of roses have been cultivated in Indonesia. Most of these roses were originated from The Netherlands and adapted to Indonesian environment. They come from hybrid tea type (Ercisli, 2005). This type contains rose essential oil 0.08%-0.14% with absolute rose oil yield as much as 0.04%-0.06% (Yulianingsih et al, 2006).

Recently, rose oil is obtained through distillation process, namely by distilling rose petals. Rose oil is composed *geraniol* and *citronellol* which produce fragrance and *rose camphor* (odorless paraffin wax). In their study, Yulianingsih et al (2006) found out that local red roses contained 27.23% *citronellol* and 16.18% *geraniol*.

Among the attempts conducted to improve rose oil content are tissue culture and elicitation techniques. Tissue culture may improve secondary metabolite contents (even from zero) by adding precursors composing the secondary metabolites (Taji et al, 2002). Meanwhile, elicitation technique refers to a process in which secondary metabolites are induced from existing metabolites or other metabolites which normally are not accumulated (Pereira et al, 2000). Ramawat (2008) classified elicitors into two categories: biotic elicitors and abiotic elicitors. Abiotic elicitors consist of non-organic compounds, physical stimuli (such as irradiation), heavy metals, and detergents. Biotic elicitors are differentiated into endogenous elicitors (elicitors taken from the parts of the plant itself, such as damaged parts of cellular walls/polygalacturonic acid caused by pathogenic infection or resulted by hydrolysis enzymes activity as a response on pathogenic infections) and exogenous elicitors (elicitors originated from fungi, enzymes, and synthesized substances).

Among the previous studies, some of them utilized light and irradiation as abiotic elicitor, such as: the improvement of *saponin* content was higher in light condition than in dark condition (Samsumaharto, 2009), the improvement of *astaxantin* content on micro algae culture after being irradiated by UV light for 3 hours followed by high-intensity light irradiation (Muzaki et al, 2008), and the improvement of *Eurycoma lungifolia Jack* cellular

suspension culture *cathinone* alkaloid content using 1525 lux light intensity as conducted by Siregar et al. (2010). Meanwhile, Ribkahwati (2015) conducted a research to improve *citronellol* content with elicitors other than light.

This study was intended to improve rose oil content through tissue culture and elicitation technique by using abiotic elicitors, namely irradiation length and wave length (colors of the light).

2. Research Methods

This study was conducted in April-July 2015 at Tissue Culture Laboratory of Faculty of Agriculture, Wijaya Kusuma University, Surabaya.

a. Research Design

This study applied Completely Randomized Factorial Design with different lengths of irradiation (L1: 0 hour/day, L2: 4 hours/day, L3: 8 hours/day, L4: 12 hours/day, L5: 16 hours/day, L6: 20 hours/day, and L7: 24 hours/day) and different length of light wave (C1 White, C2: Red, C3: Yellow, and C4: Blue).

b. Medium Preparation

In this study, the writers used Murashige and Skoog medium which had beem modified by adding 125 mg/L *Saccharomyces cereviceas H.* as culture medium.

c. Culture

The explants were taken from *Rosa hybrida L.* young leaf calluses. The explants were sterilized using antibiotics and chopped down 1 cm3 and being cultured inside culture flasks containing modified MS medium.

d. Incubation

After the explants were cultured, the culture flasks were put into incubation racks equipped with color wave length and timer based on each treatment group. The treatments were conducted for 10 weeks to induce the calluses to produce rose oil.

e. Findings

Callus Quality

The examination on callus quality indicated significant interaction between irradiation length and the length of light wave used as treatment at the 35th day after culture (as indicated on Table 1 below). The significant results based on irradiation length single factor were found on 28, 35, 56, and 63 days old calluses (after culture) while the significant results based on length of light wave used were found on 21, 28, 35, and 63 days old calluses (as presented on Table 2 below).

Table 1 and Table 2 below indicated that friable calluses were found on treatments in dark condition and yellow light irradiation. On the other hands, 4-hour, 8-hour, 12-hour, 16-hour, 20-hour, and 24-hour per day irradiation treatments with white light, red light, and blue light resulted compact callus.

Table 1: The Quality of Calluses Formed by Different Irradiation Length and Different Wave Length Treatments

Treatments	Age of Calluses (days after culture)									
	7	14	21	28	35	42	49	56	63	70
L1	1,00	1,00	1,00	1,00	1,00 c	1,33	1,67	2,33	2,67	2,67
L2C1	1,00	1,00	1,00	1,00	1,33 b	2,00	2,00	2,00	2,00	2,00
L2C2	1,00	1,00	1,00	1,00	1,00 c	1,33	1,67	2,00	2,00	2,00
L2C3	1,00	1,00	1,33	1,67	2,00 a	2,00	2,00	2,00	2,67	3,00
L2C4	1,00	1,00	1,00	1,00	1,00 c	1,33	1,67	2,00	2,00	2,00
L3C1	1,00	1,00	1,00	1,00	1,00 c	1,33	1,67	2,00	2,00	2,00
L3C2	1,00	1,00	1,00	1,00	1,33 b	2,00	2,00	2,00	2,00	2,00
L3C3	1,00	1,00	1,33	1,67	2,00 a	2,00	2,00	2,00	2,67	3,00

L3C4	1,00	1,00	1,00	1,33	1,67 ab	2,00	2,00	2,00	2,00	2,00
L4C1	1,00	1,00	1,00	1,00	1,00 c	1,33	1,67	2,00	2,00	2,00
L4C2	1,00	1,00	1,00	1,00	1,00 c	1,33	1,67	2,00	2,00	2,00
L4C3	1,00	1,00	1,33	1,67	2,00 a	2,00	2,00	2,00	2,67	3,00
L4C4	1,00	1,00	1,00	1,33	2,00 a	2,00	2,00	2,00	2,00	2,00
L5C1	1,00	1,00	1,00	1,00	1,33 b	2,00	2,00	2,00	2,00	2,00
L5C2	1,00	1,00	1,00	1,00	1,00 c	1,33	1,67	2,00	2,00	2,00
L5C3	1,00	1,00	1,00	1,00	1,00 c	1,33	1,67	2,00	2,67	3,00
L5C4	1,00	1,00	1,00	1,00	1,00 c	1,33	1,67	2,00	2,00	2,00
L6C1	1,00	1,00	1,00	1,00	1,00 c	1,33	1,67	2,00	2,00	2,00
L6C2	1,00	1,00	1,00	1,00	1,00 c	1,33	1,67	2,00	2,00	2,00
L6C3	1,00	1,00	1,00	1,00	1,00 c	1,33	1,67	2,00	2,67	3,00
L6C4	1,00	1,00	1,00	1,00	1,33 b	1,67	2,00	2,00	2,00	2,00
L7C1	1,00	1,00	1,00	1,00	1,33 b	1,67	2,00	2,00	2,00	2,00
L7C2	1,00	1,00	1,00	1,00	1,00 c	1,33	1,67	2,00	2,00	2,00
L7C3	1,00	1,00	1,00	1,00	1,00 c	1,33	1,67	2,00	2,67	3,00
L7C4	1,00	1,00	1,00	1,00	1,00 c	1,33	1,67	2,00	2,00	2,00
LSD 5 %	NS	NS	NS	NS	S	NS	NS	NS	NS	NS

Note : NS = Non Significant
S = Significant

Table 2 : The Quality of Calluses Formed Based on Irradiation Length and Length of Light Wave (Single Factors)

Treatments	Age of Calluses (days after culture)									
	7	14	21	28	35	42	49	56	63	70
L1	1,00	1,00	1,00	1,00 b	1,00 c	1,33	1,67	2,33 a	2,67 a	3,00
L2	1,00	1,00	1,08	1,17 a	1,33 a	1,67	1,84	2,00 b	2,17 b	2,25
L3	1,00	1,00	1,08	1,25 a	1,50 a	1,92	1,92	2,00 b	2,17 b	2,25
L4	1,00	1,00	1,08	1,25 a	1,50 a	1,67	1,84	2,00 b	2,17 b	2,25
L5	1,00	1,00	1,00	1,00 b	1,08 b	1,75	1,75	2,00 b	2,17 b	2,25
L6	1,00	1,00	1,00	1,00 b	1,08 b	1,75	1,75	2,00 b	2,17 b	2,25
L7	1,00	1,00	1,00	1,00 b	1,08 b	1,75	1,75	2,00 b	2.17 b	2,25
LSD 5 %	NS	NS	NS	S	S	NS	NS	S	S	NS
C1	1,00	1,00	1,00 b	1,00 c	1,00 c	1,76	1,81	2,05	2,09 b	2,14
C2	1,00	1,00	1,00 b	1.00 c	1,14 b	1,72	1,72	2,05	2,09 b	2,14
C3	1,00	1,00	1,14 a	1,29 a	1,29 a	1,81	1,81	2,05	2,67 a	3,00
C4	1,00	1,00	1,00 b	1,19 b	1,14 b	1,76	1,78	2,05	2,09 b	2,14
LSD 5 %	NS	NS	S	S	S	NS	NS	NS	S	NS

Note : NS = Non Significant
S = Significant

Callus Quantity

The results of examination on callus quantity indicated significant quantity on 35 days old and 49 days old calluses (after culture) as the interaction between irradiation length and the length of light waves used as treatments (as presented on Table 3 below). The significant results based on irradiation length single factor were found on 28th day, 35th day, 49th day, and 56th day after culture while the significant results based on length of light wave used were found on 21st day, 28th day, 35th day, and 56th days after culture (as presented on Table 4 below). Based on Table 3 and Table 4, it was found that both treatments based on irradiation lengths and length of light wave produced moderate amount of calluses.

Table 3: The Quantity of Calluses Produced by Irradiation Length and Length of Light Wave

Treatments	Age of Calluses (days after culture)									
	7	14	21	28	35	42	49	56	63	70
L1	1,00	1,00	1,00	1,00	1,00 c	1,33	1,67 c	2,00	2,67	2,67
L2C1	1,00	1,00	1,00	1,00	1,33 bc	2,00	2,33 b	2,33	2,67	2,67
L2C2	1,00	1,00	1,00	1,00	1,00 c	1,33	1,67 c	2,00	2,67	2,67
L2C3	1,00	1,00	1,33	1,67	2,33 a	2,67	3,00 a	3,00	3,00	3,00
L2C4	1,00	1,00	1,00	1,00	1,00 c	1,33	1,67 c	2,00	2,67	2,67
L3C1	1,00	1,00	1,00	1,00	1,00 c	1,33	1,67 c	2,00	2,67	2,67
L3C2	1,00	1,00	1,00	1,00	1,33 bc	2,33	3,00 a	3,00	3,00	3,00
L3C3	1,00	1,00	1,33	1,67	2,33 a	2,67	2,69 ab	3,00	3,00	3,00
L3C4	1,00	1,00	1,00	1,33	1,67 b	2,33	3,00 a	3,00	3,00	3,00
L4C1	1,00	1,00	1,00	1,00	1,00 c	1,33	1,67 c	2,00	2,67	2,67
L4C2	1,00	1,00	1,00	1,00	1,00 c	1,33	1,67 c	2,00	2,67	2,67
L4C3	1,00	1,00	1,33	1,67	2,33 a	2,67	3,00 a	3,00	3,00	3,00
L4C4	1,00	1,00	1,00	1,33	2,33 a	2,67	2,67 ab	3,00	3,00	3,00
L5C1	1,00	1,00	1,00	1,00	1,33 bc	2,67	2,33 b	2,33	3,00	3,00
L5C2	1,00	1,00	1,00	1,00	1,00 c	1,33	1,67 c	2,00	2,67	2,67
L5C3	1,00	1,00	1,00	1,00	1,00 c	1,33	1,67 c	2,00	2,67	2,67
L5C4	1,00	1,00	1,00	1,00	1,00 c	1,33	1,67 c	2,00	2,67	2,67
L6C1	1,00	1,00	1,00	1,00	1,00 c	1,33	1,33 c	2,00	2,67	2,67
L6C2	1,00	1,00	1,00	1,00	1,00 c	1,33	1,33 c	2,00	2,67	2,67
L6C3	1,00	1,00	1,00	1,00	1,00 c	1,33	1,33 c	2,00	2,33	2,33
L6C4	1,00	1,00	1,00	1,00	1,33 bc	1,67	1,67 c	2,00	2,67	2,67
L7C1	1,00	1,00	1,00	1,00	1,33 bc	1,67	1,67 c	2,00	2,67	2,67
L7C2	1,00	1,00	1,00	1,00	1,00 c	1,33	1,33 c	2,00	2,67	2,67
L7C3	1,00	1,00	1,00	1,00	1,00 c	1,33	1,33 c	2,00	2,33	2,33
L7C4	1,00	1,00	1,00	1,00	1,00 c	1,33	1,33 c	2,00	2,67	2,67
LSD 5 %	NS	NS	NS	NS	S	NS	S	NS	NS	NS

Note : NS = Non Significant
S = Significant

Table 4: The Quantity of Calluses Produced Based on Irradiation Length and Length of Light Wave (Single Factors)

Treatments	Age of Calluses (days after culture)									
	7	14	21	28	35	42	49	56	63	70
L1	1,00	1,00	1,00	1,00 b	1,00 b	1,33	1,67 bc	2,00 c	2,67	2,67
L2	1,00	1,00	1,08	1,17 a	1,42 a	1,92	2,17 ab	2,33 b	2,75	2,75
L3	1,00	1,00	1,08	1,25 a	1,58 a	2,16	2,58 a	2,75 a	2,92	2,92
L4	1,00	1,00	1,08	1,25 a	1,67 a	2,00	2,17 ab	2,50 ab	2,84	2,84
L5	1,00	1,00	1,00	1,00 b	1,08 b	1,67	1,67 bc	2,08 bc	2,75	2,75
L6	1,00	1,00	1,00	1,00 b	1,08 b	1,42	1,42 c	2,00 c	2,59	2,59
L7	1,00	1,00	1,00	1,00 b	1,08 b	1,42	1,42 c	2,00 c	2,59	2,59
LSD 5 %	NS	NS	NS	S	S	NS	S	S	NS	NS
C1	1,00	1,00	1,00 b	1,05 c	1,16 b	1,87	1,87	2,09 c	2,72	2,72
C2	1,00	1,00	1,00 b	1.00 c	1,05 b	1,33	1,76	2,14 bc	2,76	2,76
C3	1,00	1,00	1,14 a	1,29 a	1,67 a	1,67	2,09	2,43 a	2,81	2,81
C4	1,00	1,00	1,00 b	1,19 b	1,39 ab	1,67	2,14	2,28 b	2,76	2,76
LSD 5 %	NS	NS	S	S	S	NS	NS	S	NS	NS

Note : NS = Non Significant
S = Significant

***Citronellol* Content Examination**

The results of *Citronellol* content produced after irradiation length and length of light wave treatments indicated significant interaction between the two treatments (as presented on Table 5 below). Table 5 below indicated that treatment in dark condition and 20 hours/day and 24 hours/day irradiations using yellow light wave resulted the highest *citronellol* content.

3. Discussion

The findings of this study indicated that the quality of calluses might be influenced by irradiation length and the length of light waves (colors). Friable calluses were found on treatments in dark condition and yellow light irradiation. This result showed conformity with the findings of a research conducted by Ribkahwati et al. (2015). They found that friable calluses with transparent color might be produced from treatment in dark condition. Yellow light might stress the calluses because it could not be absorbed and inhibited photosynthesis process undergoing in plant cells.

Table 5: *Citronellol* Content Resulted by Irradiation Length and Length of Light Wave Treatments

Treatments	Age of Calluses (days after culture)
	56
L1	1,35 a
L2C1	1,15 de
L2C2	1,20 cd
L2C3	1,30 b
L2C4	1,23 c
L3C1	0,99 f
L3C2	1,15 de
L3C3	1,30 b
L3C4	1,18 d
L4C1	0,94 f
L4C2	1,12 e
L4C3	1,32 ab
L4C4	1,15 de
L5C1	0,88 g
L5C2	1,12 e
L5C3	1,32 ab
L5C4	1,12 e
L6C1	0,88 g
L6C2	1,10 ef
L6C3	1.35 a
L6C4	1,10 ef
L7C1	0,80 g
L7C2	0,99 f
L7C3	1,35 a
L7C4	0,98 f
LSD 5 %	S

Note : NS = Non Significant
S = Significant

The Ouantity callus was statistically affected by irradiation length and length of light waves, but in this treatment quantity callus showed only moderate amount of callus, callus quantity does not find to produce that much amount of callus. In general, the quantity of calluses depends on the substances contained within the medium, especially carbohydrate as the source of energy. Energy is used to grow and to activate secondary metabolites (Rahmawati, 2006). In this study, glucan compounds found on *Saccharomyces cereviceae H.* played its role as carbohydrate source. The utilization of *Saccharomyces cereviceae H.* might enhance callus growth, development of cellular membrane, and the production of amino acids in cellular walls, including *lignin* (Mukarlina, 2006).

The highest *citronellol* contents were found on dark condition treatment and yellow light irradiation treatment. This finding conformed to what found by Ribkahwati et al. (2015). They found that dark condition inhibited the production of chlorophyll so that the plant could not conduct photosynthesis. Sucrose contained within MS medium was used to form ATP. The improvement of ATP induced *geraniol dehydrogenase* enzyme stimulating *geraniol* to produce *citronellol*. Yellow light was not needed by plants and might stress the plants. The stressed condition on plants might improve its metabolite contents.

4. Conclusion

1. Quality and quantity of calluses might be affected by irradiation length and the length of light waves (color).
2. Friable calluses were found on dark condition treatment and yellow light irradiation treatment.
3. The quantity of callus influenced by irradiation length and the length of light waves only statistically, but the quantity of callus formed to produce moderate amount of calluses.
4. The highest *citronellol* contents were resulted by dark room treatment and yellow light irradiation treatment.

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STRATEGY FOR MINIMIZING POST-HARVEST LOSSES THROUGH TECHNOLOGY DEVELOPMENT IN TUBAN REGENCY, EAST JAVA, INDONESIA

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Abstract*:* Main problem encountered on rice post-harvest handling is high rice losses quantitatively or qualitatively. Paddy grain with high water content show easily damage characteristic and will loss at post-harvest handling and other operations. This study aims to know (1) how much rice losses during post-harvesting operations; (2) conversion unit from Harvested Dried Paddy to Milling Dried Paddy; (3) milling conversion unit from Milling Dried Paddy to rice. The results showed that increase of rice production in Tuban can be achieved by increasing production per hectare unit and reducing post-harvesting losses. Post-harvest losses in Tuban still quite high 11.15%. This means that every year Tuban still lose paddy grain more than 70.882 tons or about IDR 212.65 million annually. Largest losses occurred at the harvesting and threshing process. This process is still using simple technology. Farmer groups need more modern and efficient of post-harvest machines. Recommendation, one of machine recommended is reaper type and combine harvester. Rice mill is also an important part of the post-harvest losses. In this process, farmers produce rice grain from paddy to be sold and consumed. Inspection of rice milling technology regularly will make efficiency achieved.

Keywords: Post-harvest Losses, Strategy and technology.

1. INTRODUCTION

Rice post-harvest handling was a strategic effort to support national food security due to its important roles, directly or indirectly. Directly, post-harvesting system had roles to minimized product losses, maintained the quality of crop, and increased adding value, competitiveness, farmer's income. Thus, post-harvesting system indirectly supported national food security program [1].

There were some factors that affected post-harvest losses such as rice variety, post-harvest equipments and operation that determined number of product losses, farmers, harvest time, threshing technology, location, season. It was presumably caused by (1) the technology was still not technically, economically appropriate for local social culture that different in some areas, (2) no incentive for high quality paddy or rice so farmers ignored how to handling crop better [2].

Main problem encountered on rice post-harvesting operation was a high losses both quantitative and qualitative aspect. Paddy grain (unmilled rice) with high water content showed easily damage characteristic and would be loss at post-harvest handling and processing. This problem caused low income for farmers [3].

Actually, rice production could be increased when supported with good handling at harvest time and milling process. At harvest time, threshing, transportation, drying, storing, and milling could be the source of most losses with high percentage. Survey by Central Bureau of Statistic showed that rice losses in Indonesia were currently high reach 10.12% [4].

Many factors affected rice losses during post-harvesting operations such as rice variety, plant condition, level of maturity, harvesting system, rice production, post-harvesting equipments, and milling system. While the cause of rice losses variation were caused by (1) information about technology for minimizing rice losses did not reach to local farmers; (2) dissemination of technologies still not optimally achieved so the farmers get a problem to do an innovation on the technology; (3) Rice losses measurement method used had not been uniform; (4) man who measured rice losses in the field had not yet implemented the methods properly [5].

In this regard and consider that the application of post-harvest technology currently had experienced with many changes so it was necessary to studied on the post-harvest losses. It aimed to obtain data of rice losses and rice conversion accurately [6].

Main problem encountered on rice post-harvesting operation was a high losses both quantitative and qualitative aspect. This problem caused tendency on no incentive for farmers to increase their income. Paddy with high water content possessed easily damage characteristic and loss at post-harvest handling and processing [7][8].

This study aimed to know (1) how much rice losses during post-harvesting operations (stacking, threshing, drying, and milling); (2) conversion unit from Harvested Dried Paddy into Milling Dried Paddy; (3) milling conversion unit from Milling Dried Paddy to rice.

The benefits of the research is provide advice to government, especially in Tuban district, in order to improve the farmers living through increased incomes by improving rice post-harvest handling.

2. RESEARCH METHODS

This study located at Tuban district, from 20 subdistricts was randomly selected five sub districts for sample. The sub districts were Merak Urak, Singgahan, Rengel, Tambak Boyo, and Widang. From each sub district was selected one village and from this village would be chosen one farmer group. The respondents were members of the farmer group and were selected three persons from the staff and seven farmers. So, total of respondents were 50 persons randomly selected. The operations of the study were measuring rice post-harvesting losses from the field including stacking, threshing, drying, and milling. This study was carried out at paddy field ecosystem in Tuban.

Method for rice losses measuring on stacking operation

Losses measuring were conducted by using gunny-sack as place for the bundles of panicles after cutting. Scattered paddy on gunny-sack used the farmers and stacked paddy were weighed respectively [9].

Method for rice losses measuring on threshing operation

For measuring losses on threshing operation was conducted by (1) collected and weighed the paddy that spilling out from the thresher used by the farmers at the thresher mat, (2) separated and weighed the paddy that mixed with undesirable materials, (3) separated and weighed unthreshed paddy and paddy that still attached on straw.

Method for rice losses measuring on drying operation

Measuring method that used was comparing weight of paddy before and after drying process at the same water content.

Method for rice losses measuring on milling operation

Measuring was carried out by comparing rice production value between milling process usually applied by the farmers with national rice production.

3. DISCUSSION

Potention of rice production in five districts

Total of rice production in five districts under study was 162.637 ton per year and contributed 33.27% to total rice production at Tuban regency. It showed that these districts had significant effect to rice production stability in Tuban. Rice productivity at three districts, Merak Urak (63.1 kw/ha), Singgahan (63.93 kw/ha) and Widang (65.9 kw/ha), were higher than the average production at regency level (60.61 kw/ha) [10]. Rice productivity in Tuban regency actually could be increased. Because empirical data of rice productivity from other area in East and West Java Province, for Ciherang variety that mostly planted, able to yielded rice up to 70-90 kw/ha. Even, demplot data from research institute for Ciherang variety showed its potential up to 85 kw/ha.

From potential of post-harvesting losses, the production of five districts provided information about rice losses reach 14.52% or equal with 24.395 tons per year. The high losses deserved special attention by the farmers due to it could increase their income. The results showed that the highest losses were on harvesting and threshing process. Post-harvesting losses was found at five operation stages including rice harvesting, stacking, threshing, drying and milling process.

Post-Harvesting Losses of rice in 5 Sub Districts

Post-harvesting losses at five district was started on harvesting process include cutting the rice stalk in the field at maturity date. The result showed that post-harvesting losses was 2.67% on average. These losses occurred due to using of serrated sickle and cutting tools rather optimally. Besides that, speed of harvesters when cutting process in order to obtained maximal product also increased rice losses. The highest losses were known at Rengel (2.83%) and Singgahan (3.14%). Combine harvester machine was only one unit in each district so it was impossible to serve all of farmer groups.

There were 72 units serrated sickle found at Tambakboyo but all of them were highly broken and not useful again. From the table, it have been seen that the technology unevenly disseminated.

This was one of high post-harvest losses causes at Tuban. The condition of harvest equipments in study area was still relatively poor although evenly farmer groups found there. Limitations of the modern crop tools provided an indication that the farmer groups had not been interested to applying modern technology for harvest activity. The farmers still passively waited for government to procurement of new harvest tools.

Rice losses on stacking stage

The results showed an average loss during stacking process by 2.85%. The highest losses found at Widang (3.55%) and Singgahan (3.45%) districts. Loosing rate was due to the way to rice stacking did not use an adequate base equipments. Paddy just placed only on land at the harvest operation. Grain losses were usually due to scattered when removal of

stacked rice to thresher machine. Some farmers even brought the panicle far enough towards thresher machine used, for example, their home. Distances between the field and thresher caused more loss grain on the way.

Rice losses on threshing stage
For threshing, all of districts have been used thresher machine. There was no treading or beating on a board. There were a thousand of threshers in Tuban. The results showed an average loss on threshing process by 5.4%. Level of losses was caused by the threshing way that not maximally operated. Rice losses were due to rice grain spilling out from pedestal set up on land. Rice grain thrown out from thresher was more than 1 kg on average for every 51.5 kg grain. Then it followed by the grain blown out with undesirable materials and empty grains. And the grain that did not fall out because it was still attached to the paddy stalk in this process. The greatest losses were occurred in Merak Urak (5.98%) and Widang (5.79%) districts.
To avoid losses during threshing used thresher machine the farmers should be using nets or covering in order to the scattered grain could be accommodated again. In addition, it recommended that farmers used wide tarpaulins or plastic mat under thresher so that there was not a lot of grain scattered on the ground and difficult to be collected.

Rice losses at drying stage
Losses during the drying process on average by 1.20%. The highest losses encountered in Tambakboyo (1.60%) and Rengel (1.37%) district. Drying process in all districts used same method namely sun-drying. Drying process usually conducted for two days with grain thickness range from 4 – 7 cm. Grain losses usually increased when farmers dried them on the road side, Staurpalin or plastic mat. So when it was dried and placed in a sack would create a lot of losses. Good drying should be done on the floor drying of cement (concrete) which had a slightly slope. So the grain would dry quickly and there was not much grain left behind when taken back. However, not many farmers had area specifically for drying operation. For farmers located near the rice milling, usually they dried the paddy grain at filed of owned milling. So, after dry and ready to be milled at optimum moisture content, under 14%, farmers could directly mill grain into rice. Harvested Dried Paddy in area study observed range between 23-25%.
To produce good quality rice, the rice grain should be promptly dried, either by sun drying or artificial drying (flat bed dryer). If late, the quality of rice would decrease because the grain with high water content and moisture could cause spoilage, mildew, germinated or turn yellow rice. Beside caused by poor drying floor, rice losses also occurred because attacked by birds or chickens.

Rice losses at milling stage
Milling was stripping process of paddy grain to yield rice. In this process, there were two types of rice milling tool namely one phase (single pass) and two phase (double pass) types. In one phase type, the process of dehusking and milling was fused, loading grain to machine would be out become rice in one-time process, whereas in 2 phase type, the process was carried out twice. Usually, grain losses were caused by incorrect adjustment of blower suction and blowing for husk and bran, thus large amounts of rice grain also carried there. The rice yield was calculated from 100 kg milled rice owned the farmers as sample. The yield of 60 means every 100 kg of milled rice produces 60 kg of rice. The yield of 60 percent was assumed as a number of national rice yield.
The largest losses encountered in milling at Tambakboyo (3.83%) and Singgahan (2.83%) district. The average losses at 5 districts were 2.40%. The losses incurred due to the milling could vary depending on where farmers milled their paddy grains. For each mill was different one another concerning with the operation, depending on machine quality and operator skills. Milling losses was out of control the farmers.

Losses control for rice milling could be done if the relevant departments always performed inspection the feasibility of milling machines in their area. This was very important because the number of rice mills in Tuban was many and vary in size. Recorded by Department of Agriculture, there were 200 units of small-scale rice mills with rice production of less than 500 kg per hour, 382 units of medium-scale rice mills with rice production of 500-1000 kg per hour, and 26 units large-scale with rice production more than 1,500 kg per hour.
Harvest and post-harvest activities was so susceptible to quantitative and qualitative losses. Quantity losses or volume losses caused by large number of rice be expelled at harvesting, during transport, scattered at threshing operation, or drying. While qualitative losses could be due to a chemical or physical damage, such as germinated grain, cracked, yellow beans, and etc.

Post-harvest losses analysis and solutions
From the observations and calculations performed above, could also be shown the conversion value of grain produced, called Harvested Dried Paddy, ready to be milled after the water content was declined. At five districts under study were used 100 kilograms of sample grain from the farmers groups. In each 100 kg of harvested dried paddy with water content range 23-25% could be decreased up to 10-14%. After declining the moisture and other losses would be obtained the weight of Milled Dried Paddy range 66-82 kg. This mean that the conversion value of Harvested Dried Paddy to Milled Dried Paddy was in range 66-82%. The average conversion value in the district was 72%.

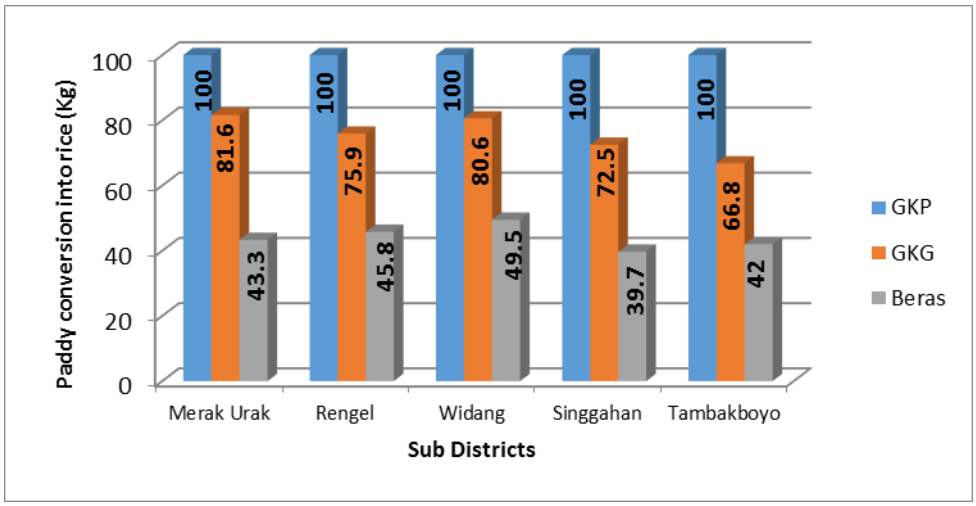

Figure 1. Paddy conversion into rice in 5 sub districts

Improving of skills and post-harvest technologies need to be applied, because it involves post-harvest losses that caused by the process of harvesting, threshing and drying. Furthermore, the calculation of conversion value from paddy into rice was also varied. In each 100 kg of milled rice (GKG) which converted into rice, the gained weight range between 55-60 kg of rice. Average value of conversion in five districts was 58%. The conversion rate could still be improved, but it could not be achieved directly by farmer groups, because it related to the milling process performance that existed in the region.

Overall post-harvest losses in five districts were still quite high reach 11.15% on average. The largest losses occurred in the process of harvesting, stacking and threshing. So it was recommended that the application of modern harvesting equipment should be evenly disseminate among farmer groups. Use of sickle should be gradually changed to paddy cutting scissors type and carrying, so it could be expected losses declining.

Table 1. Results of rice post-harvest losses, 2014

No	Activities	Tuban (%)	East Java (%)	National (%)
1	Stacking	2.85	2.90	0.73
2	Threshing	5.40	5.50	6.00
3	Drying	1.20	1.47	1.83
4	Milling	2.40	2.45	1.00
Total losses		11.15	12.32	9.56

Source: Research primary data 2014

Technology for minimizing rice losses

The critical point of losses occurred at the stage of harvesting and threshing. Both of stages were also cause of post-harvest losses in Tuban. Department of Agricultural in Tuban together with farmer groups were expected to perform a variety of attempts to suppress or reduced the rate of losses by increasing rice post-harvest technology applications. The goals were farmers could reduce or suppress the rice losses, improve the quality of paddy grain and rice, and increase the yield of milled rice and selling price. The technology to suppressed post-harvest losses could be described as follows:

Technology for determine harvest time

Farmers were expected to perform harvesting at optimal age. Optimal harvest time achieved after 90-95% of rice grain attached on panicle was already yellow or golden yellow. Harvested rice in this condition would yield very good grain with low content of green grain or grain whitewash. Harvested rice at optimum conditions would also yield high rice milled.

Stacking stage
The process before rice loading into thresher machine was stacking and collecting rice panicles. This stage also had the losses potential. To avoid or reduce the losses at harvest it should use suitable plastic mat or gonny sack at stacking and transport stage, so that the scattered paddy grain could be accommodated within the plastic mat or sack. The use of plastic mat and container at the stacking and transport process was able to suppressed losses up to 2%.

Threshing stage
Farmers in Tuban detached paddy kernel from the panicle by using power thresher machine. Indirect threshing of harvested paddy must be avoided, because indirect threshing of harvested paddy also yields losses when transported or feed by animals. Indirect threshing operation would damage the quality of grain due to moisture and chemical damage.
Grain damage after threshing delay for a day could increase losses between 1-3%. Paddy grain damage impacted on rice quality. Stacking operation should not be conducted for more than one day and storage using plastic mat or tarpaulin, not placed on the ground or floor.
Thresher machine performance would determine the degree of losses. Rotation speed of cylinder on thresher determined the outcome threshing, grain losses, and unthreshed paddy due to still attached to the panicle. Power thresher machine owned by farmer groups were suggested to run at speed of 400-450 rpm.
The main losses on threshing process was affected the behavior of farmers who worked less carefully, and rice reversal frequency in the tresher machine. The farmers did not aware the threshing cylinder speed and size of plastics used during threshing. Farmer groups were expected to use the optimal speed and tarpaulin to accommodate scattered paddy grain. Because paddy grain not only fall into the machine,but also much grain thrown out of the machine.
Some groups of farmer in Tuban had more advanced in harvesting technology. Some districts had familiar with reaper harvesting machine and combine harvester had also been done. Performance of both tools proved that farmers could harvest faster, cheaper and saved the lost grain. Reaper and combine harvester machine really able to minimized losses range 6-10%.

Drying technology
The drying process still need to be improved because not all farmers had drying place. Mostly drying process was sun-dried and it resulted losses caused by scattered, fed animals, and mixed with undesirable materials.

Sun-drying should consider to the light intensity, temperature changing, thickness and frequency of reversal. Drying process without regard to the matters mentioned above could lead to decrease rice quality, for example rice would be broken on milling process. Artificial dryer technology with husk fuel was superior technology that easy to apply because the drying cost was cheaper and more efficient with good quality.

Storaging technology
Generally farmers stored paddy grain in two ways (1) bulk system, dried paddy was stored in a place that was safe from pests and weather, and (2) storing used plastic bags, goony sack, dustpan basket and the others.
Losses during storing was caused by the condition of packaging, storage place, pests and diseases, local weather, and grain moisture content that would follow the equilibrium of air in the outside. In an airtight storage the moisture generally would not much change, while in the no airtight storage grain moisture would follow the change of surrounding humidity. Farmers who saved their paddy grain usually they dried until the moisture content below 10%, very dry, because usually the grain would be stored until the next harvest.

Milling technology
Milling operation was stripping process to produced rice grain by separation of lemma and palea layers and take out rice seed. In this process, farmers very depend on the milling machine and operator skills. Losses in milling stage was generally caused by incorrect adjustment of the suction blower (milling equipment), inappropriate blowing of the husk and bran. The losses could reach up to 2%.
Rice quality would be determined in the polishing process. A good process would yield rice with bright and shiny appearance, high degree of polishing. Incorrect milling process yielded brown rice, lower milling meter, high percentage of broken rice. Milling and polishing process that affected rice quality should be monitored and supervised by the farmers and agricultural department regularly. Because the large number of rice mills in a region did not guarantee good quality rice and even.

4. CONCLUSION

a. Increase of rice production in Tuban can be achieved by increasing production per hectare unit and reducing post-harvesting losses.
b. Post-harvest losses in Tuban still quite high 11.15%. This means that every year Tuban still lose paddy grain more than 70.882 tonnes or about IDR 212.65 million anually.
c. Largest losses occurred at the harvesting and threshing process. This processes are still using simple technology. Farmer groups need more modern and efficient of post-harvest machines.

Recommendation

a. One of machine recommended is reaper type and combine harvester. The machines can be managed together, so it can increase the income of farmer groups.
b. Rice mill is also an important part of the post-harvest losses. In this process, farmers produce rice grain from paddy to be sold and consumed. Inspection of rice milling technology regularly will make efficiency achieved.
c. It is expected that this study can be comprehensively continued in all districts to determine the priority areas in the government policy concerning with rice and other crops production.

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3 HEALTHY

INFLUENCE OF PEEL OF MANGOSTEENS FOR TOTAL CHOLESTEROL, LDL, HDL SERUM IN USED WASTE COOKING OIL

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Abstract Waste cooking oil causes increased level of total cholesterol and LDL and decreased level of HDL serum, which became coronary heart disease. The aim of this study was to evaluate the effect of mangosteen peels extract, which contain alpha-mangostin (xanthone) to decreased level of total cholesterol and LDL and increased level of HDL in rats exposed to waste cooking oil per oral. This study used true experimental designs with randomized post-test only control group design. This study used thirty rats were dividing into six treatment group, which group exposed to waste cooking oil per oral at dosage 1.4 ml / 200 g body weight have levels of total cholesterol and LDL higher than others and HDL lower than others, and group exposed to waste cooking oil per oral at same dosage with extract of mangosteen peels at dosages of 600, 800 and 1000 mg/kg body weight has decreased levels of total cholesterol and LDL and increased levels of HDL. Besides there are two control groups, which exposed only received Na-CMC 0.5% and only extract of mangosteen peels at dosage 800 mg/kg body weight/day. All groups were given treatment for 12 weeks. After 12 weeks, rats were anesthetized with chloroform for collection of blood by cardiac puncture. This study provide that extract of mangosteen peels can decreased level of total cholesterol and LDL and increased level of HDL serum.

Keywords: Waste cooking oil, mangosteen peels, total cholesterol, LDL, HDL

1. Introduction

In 2011, World Health Organization (WHO) acknowledge the coronary heart disease was the number one cause of death in the world, while the result of The National Basic Health Research of Indonesia acknowledge it is the eighth leading cause of death.

One of causes of coronary heart disease in Indonesia was increased level of LDL serum caused by food consumption pattern. Indonesia's people liked fried foods, which fried process usually used waste cooking oils, which considered economical cost (Bekti, 2011).

The good cooking oils were oil with unsaturated fatty acid content of more than the content of saturated fatty acids, one of which is vegetable oil. This kind of cooking oil contains about 80% unsaturated fatty acids, except for oil palm (Sartika, 2009).

Waste cooking oils can be derived from many types of cooking oils, which used from various types of food frying and have experienced change in chemical composition (Rukmini, 2007). Indonesian people liked of fried foods especially deep frying process, because it was considered make those foods become crispier. Deep frying is fried method which uses cooking oil in large quantities, with repeated heating and at high temperatures (Sartika,2009). The used of waste cooking oil in deep frying process can changed the unsaturated fatty acids into trans-saturated fatty acids (Sartika,2009), which can increased levels of LDL, triglycerides, and total cholesterol serum, and decreased level of HDL serum (Stachowska, 2010). The given waste cooking oils at dosage 1.4 ml / 200 g body weight orally in male white rats strain Wistar (150-250 g) for 14 days can increased level of total cholesterol serum (Fajrin, 2010).

The peel of mangosteens have healthy benefits because contains anthocyanins, tannin, phenolics/ polyphenols, epicatechin, and xanthones. The peel of mangosteens contains fourteen types of xanthone derivates, which alpha-mangosteen at the mostly (Wiwin, 2010). Alpha-mangosteen has ability to suppress the formation of carcinogenic compounds in colon. Therefore, xanthones in the peels of mangosteen could role of antioxidant, antidiabetic, anticancer, antiimflammatory, hepatoprotective, immuno-modulation, aromatase inhibitors, antibacterial, also is more functionally (Wiwin, 2010).

In the previous studies known that the peels of mangosteen have antilipid effect, which increased activity of Lipoprotein Lipase thereby increased the catabolism of VLDL would result decreased the levels

of total cholesterol, triglycerides, and LDL, and increased the levels of HDL (Bekti, 2011). The other studied known that administration of ethanolic extract of mangosteen pericarp reduced blood cholesterol and triglyceride levels at dosages of 400 mg/kgBW and 800 mg/kgBW (Adiputro DL,2013).

Ethanol extract of mangosteen peels (Garcinia mangostana L) orally was able to improved the ratio of HDL/LDL by decreased levels of LDL and increased levels of HDL serum in male white rats strain Wistar in model of atherogenic at the optimal dose of 800 mg/kg body weight/day (Bekti, 2011).

Based on the above description, the researchers wanted research on the effect of mangosteen peels extract to decreased levels of cholesterol total and LDL, and increased levels of HDL serum in male white rats strain Wistar with exposure by waste cooking oils.

2. Materials and methods

This study is pure experimental research with animal experiments performed in animal unit of the Biochemistry Laboratory of the Faculty Medicine, University of the Wijaya Kusuma Surabaya in February 2015 until June 2015.

This study used thirty white male rats (160-170g) strain Wistar (Rattus Norvegicus), obtained from animal unit of the Faculty of Medicine, University of Wijaya Kusuma Surabaya. The rats were placed in the room with temperature and humidity controlled and dark-light cycle alternately every 12 hours. The rats were divided randomly into six treatment groups, namely: group with exposure only received Na-CMC 0.5% (K_{CMC}), only received extract of mangosteen peel at dosage 800 mg/kg body weight/day (K_{KM}), only received waste cooking oil orally at dosage 1.4 ml / 200 g body weight (K_{MJ}), and group received waste cooking oil orally at same dosage with extract of mangosteen peels at dosages of 600 (P_1), 800 (P_2) and 1000 (P_3) mg/kg body weight/day.

All groups were given treatment for twelve weeks, which before its acclimatization during one week. After twelve weeks, rats were anesthetized with chloroform for collection of blood by cardiac puncture.

The extract of mangosteen peel made with maceration, which 3 kg mangosteens only taken the peels then dried with aerated and should not be exposed to sunlight for one day. The dried mangosteen peel cut into small pieces and blends until it becomes dry powder of 50 g and stored in dried plastic container. Furthermore, the mangosteen peel powders were extracted by maceration using ethanol 70% for 6 days at room temperature. The filtrate was separated and the process was repeated twice. The filtrate obtained then concentrated by evaporation so that obtained filtrate lumpy of 25.7 g.

Measurement levels of total cholesterol used spectrophotometer with Cholesterol FS (CHOD-PAP method) DiaSys Cat.No.1 1300 99 10 026, Measurement levels of LDL used spectrophotometer with LDL precipitant (CHOD-PAP method) DiaSys Cat.No. 1 4330 99 90 885, Measurement levels of HDL used spectrophotometer with HDL precipitant (CHOD-PAP method) DiaSys Cat.No. 1 3540 99 90 885.

The bloods of rats of all treatment groups are taken by intra-cardiac puncture then inserted into test tube. The test tube centrifuged so that the blood cells precipitated and the supernatant obtained in the form of serum. The serum were measurementedin accordance with each working procedures. The results were expressed in mg/dl.

All data were expressed as mean ± SD. Then all these data analyzed by One Way ANOVA followed by Least Significant Difference (LSD) that is used to compare the differences between the treatment groups. In this study used $p < 0.05$ to reject the null hypothesis as the indication of a significant statistical difference. The statistical calculation used PASW (Predictive Analytic software) version Statistics 18.0.

3. Results

The result of this study indicated that levels of cholesterol total in group with only received waste cooking oil orally at dosage 1.4 ml / 200 g body weight (K_{MJ}) was higher than other treatment groups (figure 1). Furthermore, the treatment groups received waste cooking oil orally at same dosage with extract of mangosteen peels at dosages of 600 (P_1), 800 (P_2) and 1000 (P_3) mg/kg body weight/day indicated that levels of cholesterol total have decreased (figure 1).

Results of analysis of the mean ($\bar{x}$) and standard deviation (SD) for levels of cholesterol total, LDL, HDL serum at six treatment groups are presented in the following table:

Table 1 the mean ($\bar{x}$) and standard deviation (SD) of levels of cholesterol total, LDL, HDL

Variable Research	Treatment groups					
	K_{KM}	K_{CMC}	K_{MJ}	P_1	P_2	P_3
Cholesterol total (mg/dl)	36.82± 1.05	30.47± 1.22	92.87± 0.99	78.32± 0.59	65.77± 0.79	56.34± 0.53
LDL (mg/dl)	28.41± 0.71	33.16± 0.69	55.34± 0.70	47.97± 0.59	44.99± 0.54	39.43± 0.99
HDL (mg/dl)	33.99± 1.18	38.48± 1.14	26.36± 0.78	26.56± 0.64	28.72± 0.72	29.72± 0.67

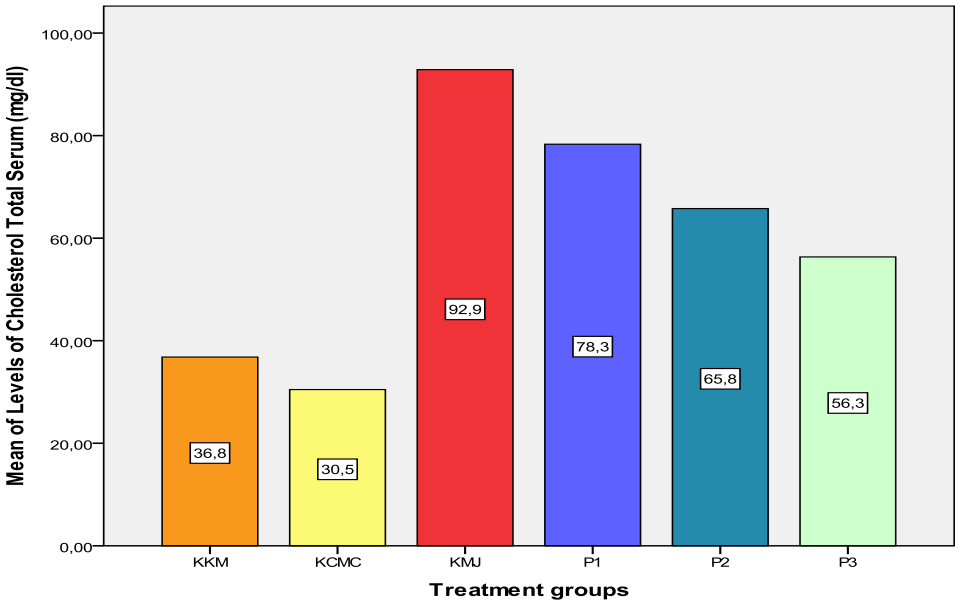

Figure 1 Mean of Levels of Cholesterol Total

KCMC, only received Na-CMC 0.5%; KKM, only received extract of mangosteen peel at dosage 800 mg/kg body weight/day; KMJ, only received waste cooking oil orally at dosage 1.4 ml / 200 g body weight; P1, received waste cooking oil orally at same dosage with extract of mangosteen peels at dosages of 600 mg/kg body weight/day; P2, 800 mg/kg body weight/day; P3, 1000 mg/kg body weight/day

This study also indicated that levels of LDL in group with only received waste cooking oil orally at dosage 1.4 ml / 200 g body weight (K_{MJ}) was higher than other treatment groups and the treatment groups received waste cooking oil orally at same dosage with extract of mangosteen peels at dosages of 600 (P_1), 800 (P_2) and 1000 (P_3) mg/kg body weight/day indicated that levels of LDL have decreased (figure 2).

Otherwise, levels of HDL in group with only received waste cooking oil orally at dosage 1.4 ml / 200 g body weight (K_{MJ}) was lower than other treatment groups (figure 3). As well as the treatment group received waste cooking oil orally at same dosage with extract of mangosteen peels at dosages of 600 (P_1), 800 (P_2) and 1000 (P_3) mg/kg body weight/day indicated that levels of LDL have decreased, while the level of HDL have increased (figure 3).

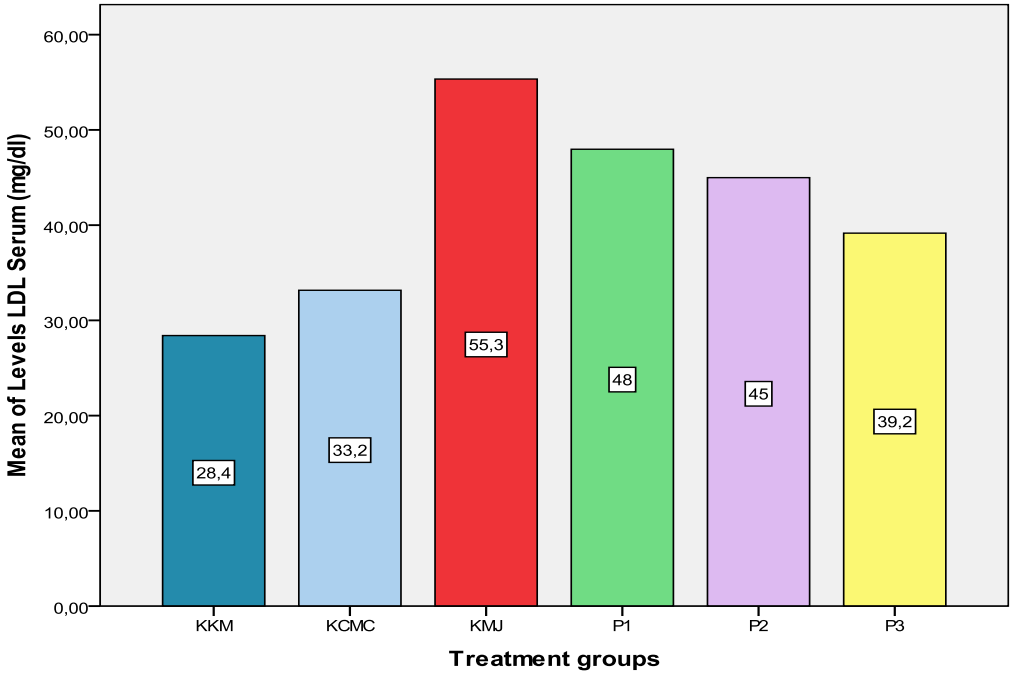

Figure 2 Mean of Levels of LDL Serum

KCMC, only received Na-CMC 0.5%; KKM, only received extract of mangosteen peel at dosage 800 mg/kg body weight/day; KMJ, only received waste cooking oil orally at dosage 1.4 ml / 200 g body weight; P1, received waste cooking oil orally at same dosage with extract of mangosteen peels at dosages of 600 mg/kg body weight/day; P2, 800 mg/kg body weight/day; P3, 1000 mg/kg body weight/day

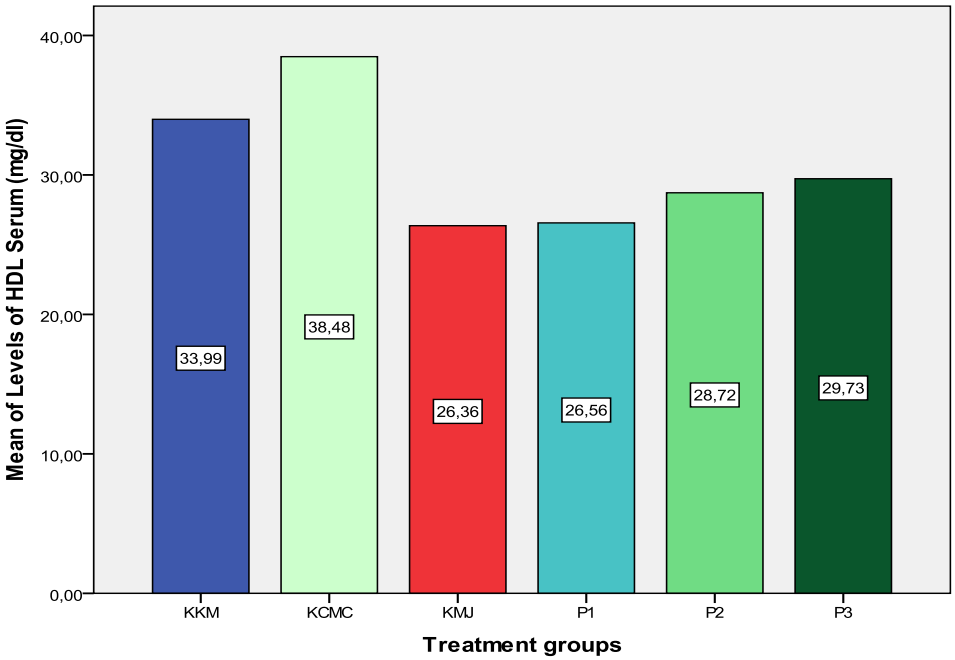

Figure 3 Mean of Levels of HDL Serum

KCMC, only received Na-CMC 0.5%; KKM, only received extract of mangosteen peel at dosage 800 mg/kg body weight/day; KMJ, only received waste cooking oil orally at dosage 1.4 ml / 200 g body weight; P1, received waste cooking oil orally at same dosage with extract of mangosteen peels at dosages of 600 mg/kg body weight/day; P2, 800 mg/kg body weight/day; P3, 1000 mg/kg body weight/day

Table 2 Post Hoc with Least Significant Difference (LSD) levels of Cholesterol Total

Treatment Groups	Variable Research
	Levels of Cholesterol Total (mg/dl) $\bar{x} \pm SD$
K_{KM}	36.82 ± 1.05^{a}
K_{CMC}	30.47 ± 1.22^{b}
K_{MJ}	92.87 ± 0.99^{c}
P1	78.32 ± 0.59^{d}
P2	65.77 ± 0.79^{e}
P3	56.34 ± 0.53^{f}

Description: Superscript a, b, c, d, e, f with the same letter in the column of the variables research (Levels of Cholesterol Total) means there is no significant difference ($p > 0.05$)

The result of Post Hoc with Least Significant Difference (LSD) indicated that levels of cholesterol total in group with received waste cooking oil orally at dosage 1.4 ml / 200 g body weight with extract of mangosteen peels at dosages of 600 (P_1), 800 (P_2) and 1000 (P_3) mg/kg body weight/day have significant decreased while compared with group only received waste cooking oil orally at same dosage (K_{MJ}) (table 2). Moreover, the results of this study indicated significant increased of levels of cholesterol total in group only received waste cooking oil orally at dosage 1.4 ml / 200 g body weight (K_{MJ}) while compared with group only received Na-CMC 0.5% (K_{CMC}) (table 2).

Table 3 Post Hoc with Least Significant Difference (LSD) levels of LDL Serum

Treatment Groups	Variable Research
	Levels of LDL serum (mg/dl) $\bar{x} \pm SD$
K_{KM}	28.41 ± 0.71^{a}
K_{CMC}	33.16 ± 0.69^{b}
K_{MJ}	55.34 ± 0.70^{c}
P1	47.97 ± 0.59^{d}
P2	44.99 ± 0.54^{e}
P3	39.43 ± 0.99^{f}

Description: Superscript a, b, c, d, e, f with the same letter in the column of the variables research (Levels of LDL serum) means there is no significant difference ($p > 0.05$)

The result of Post Hoc with Least Significant Difference (LSD) indicated that levels of LDL serum in group with received waste cooking oil orally at dosage 1.4 ml / 200 g body weight with extract of mangosteen peels at dosages of 600 (P_1), 800 (P_2) and 1000 (P_3) mg/kg body weight/day have significant decreased while compared with group only received waste cooking oil orally at same dosage (K_{MJ}) (table 3). Moreover, the results of this study indicated significant increased of levels of LDL serum in group only received waste cooking oil orally at dosage 1.4 ml / 200 g body weight (K_{MJ}) while compared with group only received Na-CMC 0.5% (K_{CMC}) (table 3).

Table 4 Post Hoc with Least Significant Difference (LSD) levels of HDL Serum

Treatment Groups	Variable Research
	Levels of HDL serum (mg/dl) $\bar{x} \pm SD$
K_{KM}	33.99 ± 1.18^{a}

K_{CMC}	38.48± 1.14[b]
K_{MJ}	26.36± 0.78[c]
P1	26.56± 0.64[d]
P2	28.72± 0.72[e]
P3	29.72± 0.67[f]

Description: Superscript a, b, c, d, e, f with the same letter in the column of the variables research (Levels of HDL serum) means there is no significant difference (p> 0.05)

The result of Post Hoc with Least Significant Difference (LSD) indicated that levels of HDL serum in group with received waste cooking oil orally at dosage 1.4 ml / 200 g body weight with extract of mangosteen peels at dosages of 600 (P_1), 800 (P_2) and 1000 (P_3) mg/kg body weight/day have significant increased while compared with group only received waste cooking oil orally at same dosage (K_{MJ}) (table 4). Moreover, the results of this study indicated significant decreased of levels of HDL serum in group only received waste cooking oil orally at dosage 1.4 ml / 200 g body weight (K_{MJ}) while compared with group only received Na-CMC 0.5% (K_{CMC}) (table 4).

4. Discussion

The result of this study indicated that levels of cholesterol total in group with only received waste cooking oil orally at dosage 1.4 ml / 200 g body weight (K_{MJ}) was higher than treatment groups which did not get its (K_{MC} and K_{KM}) (figure 1). This indicated that used of waste cooking oil in deep frying process can changed the unsaturated fatty acids into trans-saturated fatty acids (Sartika,2009), which the higher levels of trans-saturated fatty acids could increased levels of cholesterol total (Matthan NR,2004). Trans-saturated fatty acids could induce decreased activity of liver enzyme acyl-CoA:cholesterol acyltransferase (ACAT) that converts free cholesterol to its esterified form (Matthan NR,2004). The situation could accumulation of hepatic free cholesterol could lead to down-regulation of the LDL receptor (Harvey RA,2011) and thus causing accumulation of LDL particles in plasma and increased formation of LDL from VLDL (Baum SJ,2012). Moreover, Trans-saturated fatty acids could inhibited activity of Lipoprotein Lipase so that decreased catabolism of chylomicron and VLDL (Adiputro DL,2013). The increased of levels of LDL, levels of VLDL, and levels of chylomicron eventually also increase levels of cholesterol total (Baum SJ,2012).

In the treatment groups received waste cooking oil orally at dosage 1.4 ml / 200 g body weight with extract of mangosteen peels at dosages of 600 (P_1), 800 (P_2) and 1000 (P_3) mg/kg body weight/day indicated that levels of cholesterol total have significant decreased while compared with group only received waste cooking oil orally at same dosage (K_{MJ}). This is because the extract of mangosteen peel contained mainly xanthones could inhibition of cholesterol formation in stage of squalene synthesis before becoming cholesterol (Adiputro DL,2013). These stage there was the combination of two molecules of farnesyl pyrophosphate and elimination of pyrophosphate radicals (Harvey RA,2011). The combination of two molecules of farnesyl pyrophosphate is marked by the combination of two farnesyl pyrophosphate radicals, which these process inhibited by xanthones of the ethanolic extract of mangosteen peel, thus inhibiting squalene formation and decreased of cholesterol synthesis (Adiputro DL,2013).

This study also indicated that levels of LDL in group with only received waste cooking oil orally at dosage 1.4 ml / 200 g body weight (K_{MJ}) was higher than treatment groups which did not get its (K_{MC} and K_{KM}) (figure 2). This indicated that used of waste cooking oil in deep frying process led to the formation of trans-saturated fatty acids could increase levels of LDL serum (Bekti, 2011). In the above description that trans-saturated fatty acids could induce decreased activity of liver enzyme acyl-CoA:cholesterol acyltransferase (ACAT) that converts free cholesterol to its esterified form (Matthan NR,2004). The situation could accumulation of hepatic free cholesterol could lead to down-regulation of the LDL receptor (Botham KM,2015) and thus causing accumulation of LDL particles in plasma and increased formation of LDL from VLDL (Baum SJ,2012).

In the treatment groups received waste cooking oil orally at dosage 1.4 ml / 200 g body weight with extract of mangosteen peels at dosages of 600 (P_1), 800 (P_2) and 1000 (P_3) mg/kg body weight/day indicated that levels of LDL serum have significant decreased while compared with group only received waste cooking oil orally at same dosage (K_{MJ}). This is because the extract of mangosteen peel contained mainly xanthones could increase activity of Lipoprotein Lipase thereby increased the catabolism of VLDL (Bekti, 2011) and inhibiting squalene formation and decreased of cholesterol synthesis (Adiputro DL,2013). Therefore, extract

of mangosteen peels at dosages of 600 (P_1), 800 (P_2) and 1000 (P_3) mg/kg body weight/day could decrease levels of LDL serum in used waste cooking oils.

Furthermore, this study indicated that levels of HDL serum in group with only received waste cooking oil orally at dosage 1.4 ml / 200 g body weight (K_{MJ}) was lower than treatment groups which did not get its (K_{MC} and K_{KM}) (figure 3). This is because the extract of mangosteen peel contained mainly xanthones could increase synthesis and secretion HDL by the liver and intestines (Adiputro DL,2013). The main function of HDL is as a storage site of apolipoproteins C and E, which are needed in the catabolism of chylomicrons and VLDL, where apolipoprotein C is a cofactor of lipoprotein lipase and apoliprotein E is a ligand for LDL receptors (Botham KM,2015). Therefore, extract of mangosteen peels at dosages of 600 (P_1), 800 (P_2) and 1000 (P_3) mg/kg body weight/day could increase levels of HDL serum in used waste cooking oils.

5. CONCLUSION

Ethanolic extract of mangosteen peels have beneficial effects to decreased levels of cholesterol total and LDL serum, and increased levels of HDL serum in used waste cooking oil.

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UTILIZATION OF TURMERIC (*CURCUMA DOMESTICA VAL*) AS IMMUNOMODULATOR CANDIDATE (HERBAL MEDICINE) FOR PULLORUM DISEASES

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Abstract: The aim of this research was to prove the benefits of turmeric as immunomodulator candidate (herbal medicine) for *pullorum disease* in chicken. The research carried out forty chicken, they were divided into four groups of treatment. Group 1= (P0) as a control, was the group that has been given drinking water without *Curcuma domestica val*, group 2=(P1) as a treatment group, was the group that has been given drinking water+*Curcuma domestica val* 40 % two times a day for 2 weeks, group 3=(P2) as a treatment, was the group that has been given drinking water+ *Curcuma domestica val* 50 % two times a day for 2 weeks and the group 4=(P3) as a treatment, was the group that has been given drinking water+*Curcuma domestica val* 60 % two times a day for 2 weeks. They were infected *Salmonella pullorum* antigen after a weeks treatment then the total leucocyte blood were counted. Experimental method was based on Completely Randomized Design (CRD). The data obtained were analyzed by ANOVA. The result of this research showed that Turmeric (*Curcuma domestica val*) consentration 50 % significantly increased total leucocyte.

Keywords: Pullorum disease, Salmonella pullorum, Leucocyte, Turmeric, Curcuma domestica val

1. Introduction

Pullorum disease is a disease of birds caused by infection of *Salmonella pullorum* which is also known as *white bicillary diarrhea* , *white diarrhea* or *defecation lime* . *Salmonella pullorum* mainly attacks chickens and turkeys and other fowl under the age of one month . (Purnomo , 2004) .

Salmonella pullorum in Indonesia was first isolated in 1971 (Purnomo , 1971) . Salmonella pullorum can cause huge economic losses due to eggs production fell, low eggs fertility, lower hatchability , high embryo mortality, high death of chicks under 3 weeks with 20-80 % mortality . It can also infect the gastrointestinal tract in humans from consuming food contaminated by *Salmonella pullorum* in large numbers (Tabbu , 2000) .

Pullorum disease remains a scourge for chicken farmers especially poultry breeding farm entrepreneurs (Tabbu , 2000) . These incident often occur in chickens that do not have immunity or groups who have low immunity due to late vaccinated or because of the failure of vaccination.

Immunomodulator is a compound that can boost the body's defense mechanisms of both specific and non - specific (Anthony et al , 1999) . The compounds that have fairly good prospects to increase the activity of the immune system is usually of the flavonoid , curcumin , limonoids , vitamin C , vitamin E (tocopherol) and catechins . One of the medicinal plants that can be used as an immunomodulator is turmeric . Turmeric contains curcumin compounds include , demetoxykurkumin , bisdemetoxykurkumin and essential oil

Assessment of the use of turmeric as an immunomodulator in broilers in Indonesia is still quite a bit . It is necessary for further research on the use of turmeric as an immunomodulator in pullorum disease .

2. Literature Review

Theoretical Review

Immunomodulatory activity of curcumin: Antony S, Kuttan R, Kuttan G (1999) stated that Curcumin, an active ingredient present in Curcuma longa, was analysed for the immunomodulatory activity in Balb/c mice. Curcumin administration was found to increase the total WRC count (15,290) significantly on the 12th day Group of animals treated with vehicle alone showed results similar to that of normal animal (10,130 on 12th day). Curcumin increased the circulating antibody titre (512) against SRBC. Curcumin administration increased the plaque forming cells (PFC) in the spleen and the maximum number of PFC was observed on the 6th day (1,130 PFC/10(6) spleen cells) after immunization with SRBC. Rone marrow cellularity (16.9x10(6) cells/femur) and alpha-esterase positive cells (1,622/4000 cells) were also enhanced by Curcumin administration. A significant increase in macrophage phagocytic activity was also observed in Curcumin treated animals ($P<0.001$). These results indicate the immunostimulatory activity of Curcumin.

Curcumin increases the pathogenicity of Salmonella enterica serovar Typhimurium in murine model: Marathe SA, Ray S, Chakravotty D (2010) stated that Curcumin has gained immense importance for its vast therapeutic and prophylactic applications. Contrary to this, our study reveals that it regulates the defense pathways of Salmonella

enterica serovar Typhimurium (S. Typhimurium) to enhance its pathogenicity. In a murine model of typhoid fever, we observed higher bacterial load in Peyer's patches, mesenteric lymph node, spleen and liver, when infected with curcumin-treated Salmonella. Curcumin increased the resistance of S. Typhimurium against antimicrobial agents like antimicrobial peptides, reactive oxygen and nitrogen species. This increased tolerance might be attributed to the up-regulation of genes involved in resistance against antimicrobial peptides--pmrD and pmrHFIJKLM and genes with antioxidant function--mntH, sodA and sitA. We implicate that iron chelation property of curcumin have a role in regulating mntH and sitA. Interestingly, we see that the curcumin-mediated modulation of pmr genes is through the PhoPQ regulatory system. Curcumin downregulates SPI1 genes, required for entry into epithelial cells and upregulates SPI2 genes required to intracellular survival. Since it is known that the SPI1 and SPI2 system can be regulated by the PhoPQ system, this common regulator could explain curcumin's mode of action. This data urges us to rethink the indiscriminate use of curcumin especially during Salmonella outbreaks

Hypotheses

- Curcumin increased total monocyte and heterophile in blood chicken after being infected *Salmonella pullorum* antigen and received Curcumin (*Curcuma domestica val*)
- These result indicate the immunostimulatory activity of Curcumin

3. Research Method

Research Plan: The research was planned by using experimental animals Day Old Chicken (DOC) broiler obtained from PT. Charoen Pokphan which were divided into four groups. Group 1 received drinking water, group 2 received drinking water + 40 % Curcumin (*Curcuma domestica val*) twice a day for 2 weeks, group 3 received drinking water + 50 % Curcumin (*Curcuma domestica val*) and group 4 received drinking water + 60 % Curcumin (*Curcuma domestica val*). They were infected with *Salmonella pullorum* antigen after 2 weeks and total monocyt and heterophil were counted

Population and Sample: The research used experimental animals comprising 40 Day Old Chicken (DOC) broiler. Blood sampling was carried out once the DOC arrived. As many as four samples of blood were taken, and the volume taken from each sample was maximally 1 ml. DOC blood samplinh was done through wing veins, and the blood was collected in EDTA tubes to prevent blood clotting. After rearing for seven days, chicken blood sample was taken again through the brachial vein and the blood was collected in EDTA tubes to prevent the clotting. Three days after being infected with *Salmonella pullorum* antigen, chicken blood samples was taken again through the brachial vein and the blood was collected in EDTA tubes to prevent blood clotting. Monocyte and heterophile counting was done in the laboratory.

Discussion

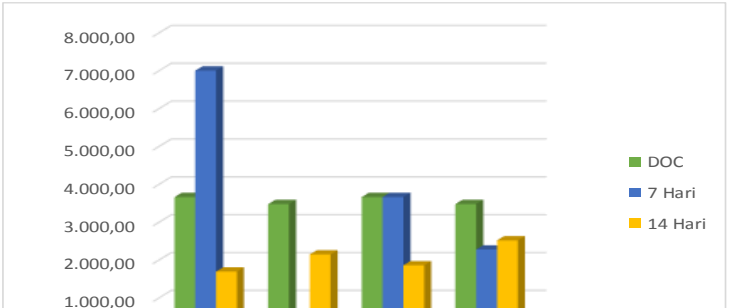
The observation of the number of monocytes and heterophile broilers were given turmeric juice and after infected with *Salmonella pullorum* antigen can be seen in the table below.

Table 4.1 . The average and standard deviation (X ± St. D) The number of monocytes (/ mm^3)

Treatment	Age	X ± St. D
P0	0 day (DOC)	$(3,667.20 \pm 1,599.30)^{b,b}$
	7days	$(7,008.00 \pm 2,927.61)^{b,b}$
	14days	$(1,638.40 \pm 1,698.47)^{b,a}$
P1	0 day (DOC)	$(3,481.60 \pm 1,544.38)^{a,b}$
	7days	$(0,915.20 \pm 0,719.68)^{a,b}$
	14 days	$(2,150.40 \pm 1,005.43)^{a,a}$
P2	0 day (DOC)	$(3,667.20 \pm 1,599.30)^{ab,b}$
	7 days	$(3,308.80 \pm 3,024.43)^{ab,b}$
	14 days	$(1,331.20 \pm 1,863.38)^{ab,a}$
P3	0 day (DOC)	$(3,481.60 \pm 1,544.38)^{ab,b}$
	7 days	$(2,073.60 \pm 2,280.26)^{ab,b}$
	14 days	$(2,521.60 \pm 1,464.75)^{ab,a}$

Description : The same superscript letters in the same column declared significantly different at $P \leq 0.05$ level .

Graph 4.1 . Charts the average number of monocytes (/ mm^3)



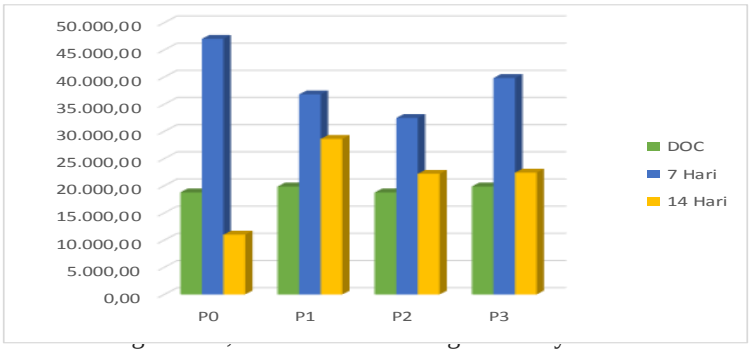
Based on Graph 4.1 , chickens at the age of 7 days seen a decrease in the average value of the number of monocytes in the treatment group P1 and continues to increase in the treatment group P2 and P3 . Chickens aged 14 days or 7 days after infection seen a decrease in the average value of the number of monocytes in the treatment group P2 .

Table . 4.2 Average and standard deviation (X ± St. D) Total heterophile (/ mm^3)

Treatment	Age	X ± St. D
P0	0 day (DOC)	(18,790.40 ± 5,797.14)^{a,a}
	7 days	(47,040.00 ± 10,437.86)^{a,b}
	14 days	(11,014.40 ± 5,121.22)^{a,a}
P1	0 day (DOC)	(19,865.60 ± 8,262.40)^{a,a}
	7 days	(36,819.20 ± 12,754.75)^{a,b}
	14 days	(28,627.20 ± 13,274.30)^{a,a}
P2	0 day (DOC)	(18,790.40 ± 5,797.14)^{a,a}
	7 days	(32,480.00 ± 10,795.63)^{a,b}
	14 days	(22,208.00 ± 8,713.05)^{a,a}
P3	0 day (DOC)	(19,865.60 ± 8,262.40)^{a,a}
	7 days	(39,820.80 ± 13,124.15)^{a,b}
	14 days	(22,419.20 ± 18,561.14)^{a,a}

Description : The same superscript letter are not significantly different states at the level of P ≥ 0.05 .

Graph 4.2 . Charts the average number of heterophile (/ mm^3)



in the value of the average number of heterophile the treatment group P1 and P2 , P3 increased in the treatment group . Chickens aged 14 days or 7 days after infection seen a decrease in the value of the average number of heterophile the treatment group P2 .

At the age of 7 days (P0 : (7,008.00 ± 2,927.61) b , b / mm3) seen an increase in the average value of monocytes very significant when compared with the other treatment groups . Such improvements can be caused by several factors, including stress and infection. Where in the treatment group there were a few chickens that died due to a bacterial infection that is thought to have come from drinking water sources . In addition one of the functions of turmeric is as immunostimulan , thereby causing an increase in leukocytes into circulation (Kohli et al , 2005) , including monocytes .

At the age of 14 days or 7 days (P2 : (1,331.20 ± 1,863.38) ab , a / mm3) after infection seen a decrease in the average value of the number of monocytes when compared with the other treatment groups . The decline can be influenced by anti-bacterial . According to Kumar et al (2001) , one of the functions of turmeric (curcumin) as anti baterial that can inhibit the formation of monocytes . In addition another compound curcumin in turmeric is bisdesmetoksikurkumin , where the properties of these compounds are antagonistic to the work activity of curcumin and

desmetoksikurkumin (Afifah , 2003) . According to Kohli et al (2005) , one of the functions of turmeric (curcumin) is as an anti -inflammatory that can inhibit spending monocytes into circulation . The inflammation comes from salmonella pullorum antigen that has been infected with pullorum disease incubation period of 4-5 days on average (Alexander , 1991) . In accordance with the statement of Melvin and Williams (1993) that the monocytes have enzyme systems that can fagocyt tissue debris from the inflammatory reaction which causes the number of monocytes is reduced.

Provision of turmeric juice with graded doses (40 % , 50 % , and 60 % turmeric juice) until the age of 14 days was not significant. But seen from the average number of monocytes increased compared with the number of normal monocytes . The amount of normal monocytes chicken according Mitruka (1981) is 0.04 to 0.16 x 103 / mm3 . This is consistent with the function of one of the compounds present in turmeric is curcumin as an immunomodulator that can increase the total leukocyte count , including monosiet (Napirah et al. , 2013) .

At the age of 7 days (P0 : (47,040.00 ± 10,437.86) a, b / mm3) seen an increase in the average value of heterophile very significant when compared with the other treatment groups . This can be caused by many factors , including stress and infection. Where in the treatment group there were a few chickens that died due to a bacterial infection that is thought to have come from drinking water sources . Returning again to the main function of these cells is the destroyer of foreign material through a process called phagocytosis . Leukocyte cells is interested in perbagai bacterial products , various products are released by damaged cells and various immune reactions (Tizard 1999) . Heterophile is growing based on the effect of interleukin , granulocyte / monocyte colony stimulating factor and granulocyte stimulating factor (Jackson 2007) . According to research conducted by Altan et al. , (2000) , shows that significant heat stress by increasing the number of heterophile .

At the age of 14 days (P0 : (11,014.40 ± 5,121.22) a, a / mm3) after infection seen a decrease in the value of the average number of heterophile when compared with the other treatment groups . This disebakan due to infection of salmonella pullorum antigen were infected . Heterophile have amuboid activity and phagocytosis is to defend the body against infections or foreign bodies such as bacteria and other small particles that cause inflammation (Melvin and William , 1993) . It is strengthened by Tizard (1999) that heterophile sanggat actively working and fast memfagositosis but rapidly exhausted and spent a short time in the circulation refatif .

Based on the results of tables and graphs the average number of heterophile showed that administration of turmeric juice with graded doses (40 % , 50 % , and 60 % turmeric juice) until the age of 14 days was not significant. According Mitruka (1981) , the amount of normal basophils in chickens is 2:23 - 9.76 x 103 / mm3 . And this time the number of heterophile increased if in view of the average number of heterofilnya than normal heterophile number . This is caused by the administration of turmeric juice -containing compounds (Protochatechuic acid) that can enhance and stimulate immunity.

4. Conclusion

From the results of this research can be concluded that the administration of turmeric juice with a concentration of 50 % in all age groups showed an increase in the average value of the number of monocytes and heterophile when compared to the treatment group 40 % and 60 % .

5. Recommendations

For Practitioners: Application administration turmeric juice in the world of farming is advisable to use a concentration of 50 % during the 14 -day -old chickens yet .

For Government: Needs to be further research on the effect of turmeric juice as an immunomodulator to the immune system of chickens were exposed to other antigens .

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TECHNOLOGY INTEGRATION MODEL OF SUSTAINABLE RESERVE FOOD GARDENT (KRPL) IN SUPPORTING SUSTAINABLE AGRICULTURE IN PACITAN DISTRICT

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Abstract: Sustainable Reserve Food Gardent (KRPL) is one of the programs the Ministry of Agriculture in order to optimize the lawn yard in an region. The aim of KRPL program is developing the ability of families and communities in self sufficient the food and nutritions in a sustainable manner. This study is an evaluation of the implementation of program activities Sustainable Reserve Food Gardent (KRPL). This study used a method with a model approach Planing Rapid Assessment and Execution. Two approaches a unity means used to facilitate the process of implementing a program. Team implementation of the program has been conducting outreach, training and introducing innovation / Appropriate Technology in Agriculture, so that farmer groups can independently manage land yard, can provide added value and increase the income of farm families in particular, and may increase the rural economy. Results seen: (1)Tthe change in the behavior of farmers group better, more familiar, more a sense of togetherness in the group increases. (2) Members of farmer groups have been motivated to utilize their yards and could provide added value (3) The benefits for families is to get the cost savings for food consumption which range between Rp. 90.000,00 to Rp.700.000,00 per month per family. The value of savings is limited, due to the number of plants cultivated still limited by each family.4) Integration Model in aplication of a combination of several policy environment-friendly technology in Sustainable Food Gardent program could support the development of sustainable agriculture in Pacitan District.

Keywords: Integration ,Technology, KRPL, Families,Sustainable Agricultural

1. INTRODUCTION

Pacitan district is a place of which is located on the southern coast of java and having the characteristics of 85 % hilly areas in the form of .Based on analysis of the sectoralpacitan in agriculture , fisheries , and animal husbandry has become the top seed .Pacitan is a small town that also has the potential , other like tourism potential , the potential of the craft and the potential of culture .

A person who does not have a jobis still high, there is also have a problem in terms of the number of poor family. It is because the lack of availability of infrastructure sectors of maritime, fisheries, and the sectors of agriculture, the transport, the availability of clean water, and the lack of partnership. Pacitan have the potential in the agricultural sector , fisheries , the authenticity of nature relating to natural resources , industrial facilities and infrastructure as well as small and medium enterprises .The fact that various factors has led to a parapet certainly affects the rate of development in Pacitan.

Drs.Indartato,MM the regent of Pacitan within a negotiating and exchange information with a retinue of wijayakusumasurabaya, expressed his view on the development of an agricultural county pacitan and expecting support and collaboration in the development of technological innovation, recommendations, the dissemination of information, and mentoring in pacitan. In the discussions was also voiced by flanking the need for agricultural development program , so they will materialize a course of agriculture development in a sustainable way . Especially through the development of a krpl (food house area).

RPL is housing that are making efforts to home-lots intensively to be exploited with a variety of local resources in an imprudent manner which ensures that the continuity of the provision of material household food quality and diverse. If rpl developed in the scale of broad , based hamlet (kampung) , village , or region to another that allows , the application of the principle of food house area (rpl) called sustainable food house area(krpl) .In addition , krpl also includes efforts to the intensification of the use of a living hedge , the village road , and other public facilities (school , house of worship , and other) , green open land , and to develop the processing and marketing (BBP2TP , 2011).The concept of *Sustainable Reserve Food Gardent* is not a mere of land use home-lots course, but includes the concept of independence of food diversified food based on local food resources, the preservation of the genetic resources of food and Garden Seeds.

Food is basic needs and is also the essence of human life , the availability of a kind of food and allspice abundant in Indonesia , nevertheless the realization of public consumption suggestion is still below .Hence one of the efforts to improve food security family and nutrition community must be started from the utilization of resources

available and can be provided in the environment .Food security according to FAO (1996) food security exist when all people , at all times , have physical and economic access to suffisient , safe and nutritious food and meets their dietary needs and food preferences for an active and healthy life.

One justification of krpl program is that food security must begin national food security of the household level. These efforts is to use land home-lots managed by every family. The arrangement home-lots devoted to benefit optimal management through a home-lot intensively to the layout of in accordance with the selection of commodities. The movement of the development of KRPL well done is expected to accelerate the realization of national food security that are becoming increasingly tough .But in fact the use of a home-lot in its management still in the form of by-product , to fill spare time.

Sustainable agricultural development programme through development model krpl (Kementerian Pertanian , 2011) aim: (1) to fulfill the needs of nutrition food and family and community through the courts for optimizing sustainably; (2) To increasethe ability of the family and the community in of land use yard in urban and rural areas to the cultivation of food crops and Fruit, vegetables and medicinal plants family (a toga), raise livestock and fish, the results as well as processing waste processing households to become compost; (3) develop a source of seeds and seed to maintain the sustainability of utilization of lawns and plants do the preservation of local food for the future; (4) Develop productive economy activities the family, and so capable of being improved family welfare and create green environment a clean and healthy independently. Based on the purpose , the targets achievement krpl from those this is the expansion of the family the ability and the community in economic and social to meet the needs and nutritional food been sustainably , to family and prosperous society (Kementerian Pertanian, 2011).

Of land use home-lots for planting the plant family needs the community has been done long ago and continue until now but has not been designed with good and systematic development especially in maintaining sustainability of resources. Hence, the government commitment to involving the home of a ladder in achieving independence through diversification food food based local resources and conservation of food-crop for the future need to actualized in moving a cultural cultivate in a home-lot, in both urban and in rural areas. This model was also expected to be able to contribute income and welfare group of agricultural specifically the farm.

In the development of a sustainable agriculture; the organic agriculture is one of the solutions.Therefore, the development of organic agriculture cannot be separated from the development of agriculture altogether.In sustainable agricultural development does not mean that the use of chemical materials agriculture (agrochemical) are not allowed at all, but to some extent is still possible to.It is also used in the application of the concept of integrated pest (pht) until today.

A grand development strategy is mentioned that agriculture agricultural development to be done to sustainably with blends between the aspect of the organization as institutional development economic technology and ecological. One of the approach of sustainable agriculture is a system leisa (low external input and sustainable agriculture or sustainable agriculture with the input of outside low that optimize the utilization of natural resources land , water , herbs , plants , animals and microorganisms (power as well as human , knowledge and skills) available in place; and economically viable , steady ecologically , in accordance with fair in social and cultural. LEISA the Reijntjes, et al.(1999); Plucknert and Winkelmann (1995) it aims to achieve maximum production in the short run, but to achieve a stable and inadequate production in the long run.

The purpose of research is 1)Identify potentials and the development of a sustainable model a house full of household wealth and economic in pacitan village 2) to evaluate the response of the community over the application of farm program krpl; 3)Studies program krpl impact on economic development farm households, 4) Formulate policy recommendations replication krpl development model.

2. METHODS

This research approach with a model used method of rapid assessment andplaning execution.Two approach is the unity of the way used to ease the process of implementing a program. The approach is very easy where it has become a model of the implementation of the strategy in the field. A different Model approach is to look at the situation and problems that happens, who use such methods : 1) Socialapproach , Namely approach through a process of communication to the public to explain the intent and purposeof the program . 2) the direct observation or related to the object of an activity related to directly know the situation.

A method of activities planned activities using a model based on information from the observation and socialization of the formerly with the community in the village of hadiluwih and village of cokrokembang, Ngadirojo, Pacitan District.With the existence of these activities program to ease the delivery of a material to the community. Activities that done designed simple but beneficial and can reach of the community farmer groups with consideration the ability of an object , time , and adjust the situation in the location which related .The event was held by using the method of activities such as:

a) A method of approach , namely the method or manner that was done to know each other between researchers with local residents of hamlet .The approach of not only done to the community but also the environment

b) A method of socialization , namely the method or manner of that done in interacting with the village community Hadiluwih andCokrokembang village of communication.

c) Offering mediation) (program , namely a way to support the implementation of activities carried out by offering a plan to the community activities program to obtain agreement together so that the problems happened can be resolved together.

d) The implementation of program, were carrying out activities that have been designed and mutually agreed upon schedule has been made

To obtain information from the respondents used a method of putting quisener interview. While secondary data obtained by means of collecting data of a monograph research area. The program was to simplify matters, to a democratic societIy the implementation of the program is coordinated with the local dept. of animal husbandry and food crops pacitan and regency governments.

3. DISCUSSION

A . Physical State Territory

Pacitan is one of the 38 districts in the province of east java which lies at the south of southwest with a total area 1.389,8716 km^2 or 138.987,16 ha . Most of the area of the hills is less than 85 percent , small mountains of less than 300 more fruit spread throughout the district pacitan and a precipitous included in a row of the thousand longitudinal along the southern island of java , was the rest is the low. Pacitan located in the southern coast of java island and adjacent to the province of central java with the physical condition the lime longitudinal south of Gunung Kidul, Trenggalek to districts facing the ocean to Indonesia. The district administration pacitan after the enactment of the act of no.32 th 2004 about the local government acted upon by government regulation no 72/ 2005, about the village , and in district Pacitan there has been the development of a region especially in villages which happened between the village were 7 (seven) village. This resulted in changes in the district administration sub-district pacitan from the previous 12 , 5 to 12 urban village and 159 in the village , 5 urban village and 166 village (a total of 171 village with geographical location is between 1100º 55'- 1110º 25' and 7^0 55'east longitude and 8^0 17'south latitude .

Table 1. **The boundary Administrasion of Pacitan District**

The east side	**District ofTrenggalek**
Tthe south side	**The IndonesianOcean**
The west side	**District ofWonogiri (CentralJava).**
The north side	**District ofPonorogo (East Java) and District ofWonogiri (Central Java).**

Based on topografi, The areas of pacitan are varied .If measured from the surface of the sea , the height of a place may detailed like a table 2:

Table 2.Wide area with various altitudes place.

0 - 25 m altitude	area of 37,76 km or 2, 62%
25-100 m altitude	area of *38 km or 2,67 %*
100-500 m altitude	area of *747,75 km or 52,68 %*
500-1000 m altitude	area of *517,13 km or 36,43 %*
>1000 m altitude	area of *79,40 km or 5,59 %*

B . The population and of land use

In planning a program , data and analysis of population is one of the very important , is considering the subject and object development of an area . By knowing characteristic population a territory , so business needs services to the future it is estimated according to calculation that has been set. To get decent living they need shelter / house , based on the book district pacitan in the number of housing pacitan year 2000 about 142.031 , while in 2011 the number of 151.020

Table 3 .The number of houses in pacitan districts

District	Number of homes

Donorojo	10.371
Punung	9.741
Pringkuku	9.039
Pacitan	20.054
Kebonagung	11.340
Arjosari	10.777
Nawangan	12.722
Bandar	12.298
Tegalombo	13.416
Tulakan	21.584
Ngadirojo	12.510
Sudimoro	7.168,0
Jumlah	151.020,0

Source : Pacitan in figure , 2011

When viewed from the pattern of land use in Pacitan grouped into:dense forest, shrub forest, artificial forest, mixed gardens, fields, fields, residence described in Table 3.

From table 2 and 3 it can be seen that an area of moor land and yards seen from the number of houses in pacitan distric be potential sources of revenue to be developed in a program to develop a model of sustainable reserve food gardent (krpl). But the case some villages that to scatter uneven topography , many hills , are still complaining about about the supply of water , especially in the dry season

Table 4. Area of Land Use in Pacitan

District	land for building	moor	wood plants	community forests	state forests	other
Donorojo	195,10	781,31	678,77	8.380,38	77,30	711,87
Punung	183,77	4.643,18	2.294,46	2.275,47	9,30	771,49
Pringkuku	171,77	2.290,38	8.550,96	610,47	172,00	1.050,16
Pacitan	310,55	1.693,72	2.637,21	782,70	299,50	780,66
Kebonagung	178,80	3.036,45	4.949,86	765,10	14,35	1.787,31
Arjosari	162,40	1.057,09	8.416,88	579,08	81,70	536,97
Nawangan	239,76	1.430,54	6.857,43	932,70	75,30	938,54
Bandar	283,02	2.688,02	1.179,57	4.586,56	409,40	910,22
Tegalombo	294,34	4.242,97	2.629,33	5.215,17	41,10	1.286,04
Tulakan	540,04	4.342,61	2.984,05	4.931,05	-	1.546,28
Ngadirojo	402,83	2.406,16	2.679,27	2.506,16	16,30	785,08
Sudimoro	190,95	1.278,15	1.355,99	3.404,13	18,00	426,37
Jumlah	*3.153,33*	*29.890,58*	*45.213,78*	*34968,97*	*1214,25*	*11530,99*

Source : Pacitan in figure , 2011

C . Sustainable Agriculture

Sustainable agriculture (sustainable agriculture is resource utilization that can be renewed (renewable resources and resource not can be renewed (unrenewable resources) to a process of agricultural production by pressing a negative impact on the environment. The sustainability of referred to covering use of resources, the quality and quantity of production, and their environment.The process of agricultural production sustainable will more directed to the use of biological products friendly to the environment.

The word "sustainability" is now widely used within the scope of the development program ustainability can be defined as "keeping an ongoing effort", the ability to survive and keep from slumping ". Sustainable agriculture has several principles, namely: (a) using the external input system of effective, productive, inexpensive, and dispose of the production method that uses a system of input from industry; b) understand and appreciate local knowledge as well as greater involvement of farmers' role in the management of natural resources and agriculture; c) carry out the conservation of natural resources used in production systems (Shepherd, 1998 in Budiasa, 2011). The problems frequently encountered in realizing sustainable agriculture is the existence of -- interesting pull between various development interests. Some of the factors that influence the success of sustainable agriculture among other social

factors, economic, and institutional (Purwanto and Cahyono, 2012);factor of technical options appropriate conservation, according to social background, economic, cultural (Sabiham in Arsyad, S. and E. Rustiadi, 2008);individual factors, economic, and institutional (Illkpitiya and Gopalakrishnan, 2003); institutional factors, government policies, and changes in technology (Ananda and Herath, 2003). How is an attempt to harmonize various aspects of interests while maintaining environmental sustainability are challenges in achieving sustainable agricultural development.

Sustainable agriculture is a return to nature, the agricultural system that does not break, do not change, harmonious, and balanced with environmental or agricultural obedient and subject to the rules of nature.Human efforts that deny the principles of ecosystem in the short term may be able to boost land productivity and yields. But , in the long term usually will only destruction environment .Sustainable agriculture system is an activity based on morality value (Anonymous , 2007)

Components of sustainable agriculture includes components of physical, biological and socio-economic, as represented by farming systems that implement, reduction of input materials synthetic chemicals compared to traditional farming systems, soil erosion control, and weed control, have an efficiency of agricultural activity (on-farm) and maximum input materials, maintenance of soil fertility by adding plant nutrients, and use the basics of biology on the implementation of the farm.

The green revolution has led Indonesia achieves self-sufficiency in rice in 1984, but not a few problems that we face today as a result of the application of green revolution. Agroekosistem condition can be said to be damaged rice fields, among others, characterized by the extinction of species and non-target insects, environmental pollution, toxicity and other adverse effects due to the use of synthetic chemical pesticides excessive and unwise. Along with the increasing awareness of the importance of healthy living, people began leaving food containing residues of synthetic chemicals. To restore of life at order more balanced and work on those problems that inflicted by green revolution , People with various elements enterprising develop and apply sustainable agriculture (Salikin, 2003)

D. Technology Integration Model Of Sustainable Reserve Food Gardent *(KRPL) in Pacitan District.*

The agriculture ministry (2011) define agricultural area as a room geographical dideliniasi by bounds imaginer ecosystem and incorporated performed at infrastructure the same economy so as to form the contains a business activities of agricultural starting from provision of the means of production cultivation , handling after harvest , and marketing and various activities his supporters . Rural development emphasis on agricultural development, rural housing environment service center, with a range of local services is allocated evenly spread in the village centers. which has a population of adequate and around the settlement centers. The activities required in the agricultural life in rural areas, among others :

1) Agriculture (farming) , fisheries , animal husbandry , and forestry
2) Agro-industry;
3) The distribution of agricultural products to order to support their beaches tourism and agrotourism.

Agriculture in (farming) , fisheries , farm , and forestry be in rural areas while the other is in center of growth or center services is a concentration of settlement be reflected in one points / system rural area done by establishing service center for rural areas in berhirarki , covering.

1)Service center for each village (service center for environment);
2) The center of services to every hamlet or group settlement.

The village is the object of development .The village became one of the target object agricultural development .That basically have development goals that are mutidimensional , which includes the aspect of growth (growht); justice or equity (equity); sustainability (sustainebility); poverty / hunger (FAO , 2009)

The food house sustainable (krpl) is one of the program the ministry of agriculture in optimizing the a home lot environmentally friendly in an area.The mansion can be realized in an area include the neighborhood , several neighborhood, the community units, the hamlet / region or the village (Badan Litbang Pertanian , 2012. In the region, including also the existence of a fence home environment , the village road , open land green and other public facilities located in that area .

The concept of *Sustainable Food Gardent program* is not just a utilization home-lot course , but independence of including the concept of food , diversified food based on local food resources , the preservation of the genetic resources of food and garden seeds.

M-KRPL have been proved a lot of benefits to society both for investors rpl and the surrounding area. For creative rpl, this raid can provide food contributions to be consumed for the family, save of family income in fulfilling food colloquial and diversification food consumption on households rpl agents. For the environment area , this event can made the atmosphere and fresh environment is more comfortable.

Engineering development model of Region Sustainable Food House (KRPL) carried out through several stages: (1) the formation of groups, (2) the identification of needs, (3) the drafting of activity plan , (4) training , (5) garden seeds and (6) environmental design area.

The Establishment of Groups

KRPL ideally done by the group as a collection of individuals who have the same purpose in achieving the goal.The group it is necessary to stipulate or using group that has previously formed in the region .If it is a new organization, field officers or extension is obliged to establish and maintain the group to be a group of farmers who registered at the Department of Agriculture.The establishment of a group will create area , considering krpl is an area .The area can be manifested in one or more neighborhood unit or community unit , even in one village .

The group krpl ideally having (1) members who are experienced in the field of plant cultivation, processing and marketing, (2) land that could be used to build a nursery, (3) members who have a yard area for development KRPL, (4) organization that groups function properly, (5) high member participation and spirit of the KRPL activity . KRPL managed by groups with organization and the structure of the organization clear and has a minimum committee chairman , secretary , treasurer and of manager of the nursery section and marketing results.

KRPL management group if it is in a strategic location that will be easily accessible by field officers and extension. Since the beginning of that group gets assistance from field officers or extension.To that end, the group should have a regular schedule for meetings or group activities, so that field officers or counselors may conduct training at the time of the meeting.

The Identification of Needs

Identification group needs to be done as one step prior preparation before developing KRPL. Identification needs included facilities and infrastructure needs , technology and plants Commodities. Identification of facilities and infrastructure needs required among other needs to plant seeds , garden seeds , Equipment and supplies.The required information includingextensive nursery, nursery placements and supporting facilities necessary for the operation of the nursery. Data of technology needs used as a basis determine the training material.

The identification of crop needed done to the get the data of various kinds of plant local food resources that have high economically value..Vegetable crops that have been developed in Pacitan for example convolvulus, spinach, cauliflower, slada, mustard,pare, squash, eggplant or other. Plants spices and medicine that is ginger , kencur , curcuma , saffron or other.Fruits include papaya, guava, star fruit, sugar apple, soursop or other. Similarly local foodsuch as yams, cassava, canna, arrowroot or other.Food resources animal who mostly consumed daily and will be developed is local chicken, rabbits, catfishes or other.Identification water especially on the availability of superabundant water and available all the time, and the fountain not too far and easily obtained. Water is required for nurseries namely watering and continuity of the cultivation of plants .

Identification this need can be obtained through a discussion in a meeting group or deepening to several members of the group on a limited meeting. In identification also excavated and solutions solving problems associated with KRPL development plan.The identification requirement is necessary to get the database site characteristics and socio-economic and cultural conditions in the region before KRPL activities.

Besides identification physical needs for the development of KRPL, a survey on expectations Dietary Pattern (PPH) to know the diversity public consumption in the region also early activities.Data collected in identification is a database early activities, so but known increased or change data or condition after running KRPL activities. PPH survey conducted in mid and end of the activity to determine the consumption patterns in the region.

The Plans of Activity

The planning of the activities carried out by involving officials and members of the group by filling out the form (blank) is jointly led by field officers or extension and direction of the local village.

Form (blank) fields presented using electronic facilities (laptops and LCD), or use newspaper, then escort officers to facilitate filling together. Activity plan includes the type of activity,location, time of execution, and the implementers. Types of activities include nurseries, sustainable food home, the arrangement of the region, and development.

Technical planning of activities carried out by filling out one by one the activities in the blank fields, so the determination of the type of activity, location and timing of implementation already a shared commitment of the group. Plans of activity are arranged to a certain period of time with a clear outcome targets, including the executive responsible for the implementation of activities.The plan of the event is a guide to conduct KRPL .Although has been developed accompanied schedule , but being flexible and adjust progress on implementing activities.The target result of each type of activity is a reference used to determine the next step.The action plan has also been prepared according to the conditions of human resources in the group and the state of natural resources in the local area.

Training

The main subject of training is the cultivation of vegetables plants, food crops and breeding , and depends on the identification needs.Technology innovation save land and environmentally friendly is main technology to be implemented utilization yards optimally. Technology necessary to be delivered at training to the development of KRPL in Pacitan district is presented in Table 5.

Table 5. Technology on training needs in the development of KRPL

NO	Types of technology in the development of krpl
	Technology of Seedbed plants ~
	Technology of Planting in polibag
	Technology of The calendar planting and schedule planting
	Technology of Fertilizing and maintenance of plants in polybag and pots
	Technology of Vegetable Vertikulture.
	Technology of pest management
	Technology of treatment and vertilizer plant
	Technology of handling and harvesting
	Technology of cultivation of medicinal plants.
	Technology of cultivation Vegetable plants
	Technology of cultivation food crop non rice.
	Technology of cultivation of fruit plants
	Technology of Cultivation of cattle (potential a location)
	Technology of Cultivation fishing
	Technology of composting
	Technology of manufacture of fertilizers liquid organic / MOL
	Technology of Nursery Gardent
	Technology of vegetative plant propagation
	Technology Analysis of agricultural cultivation
	Technology of Community empowerment Partner

To realize krpl development, then required the role of extension workers, because with the agricultural extension because the presence of agricultural extension, the farmer's knowledge about KRPL itself will be growing, so as to increase agricultural productivity and can also increase the income of farmers so that the farmer's welfare is ultimately expected to be realized. An agricultural extension is agent for change in the behavior of farmers, by encouraging people to change their behavior farmers be farmers with better skills and able to make their own decisions, which in turn will have a better life (Kartasapoetra, 1994).Through the role of extension workers, farmers are expected to realize the shortcomings or needs, to increase the ability of themselves and can contribute to a better society.

Main task of agricultural extension worker is counsel, the counsel can be further divided into a set up, conduct training, develop, evaluate, and report counseling activity (Badan Pengembangan SDM Pertanian, 2010).

The implementation oftraining adapted to stage on a schedule plans for activities and undertaken in intermitern with the grace a week between matter into matter next. The training method is 30 % the theory and 70 % practice. Application of technology environment-friendly to vegetable crops, of fruits of plants, medicinal plants or biofarma, food crops non rice and commodities cattle specific location and management of nurseries are the main characteristics in the development of KRPL.

Creation and management of nursery garden

Nursery garden is one source of the seeds in the development KRPL, as an effort towards the creation of sustainable food home (RPL). RPL is households that utilize optimally yard for the cultivation of vegetables, food, cattle and fish, use a land-saving technology sustainably to meet the needs of food and nutrition in everyday situations, and increase family income.

Nursery garden can provide continuity the business of cultivating plants for members and economic benefit for the business group by the sale of seeds and plants. Nursery garden is land for a nursery equipped with some equipment and managed on the active participation of the community to produce seeds to meet the needs of plant seeds for participants RPL and citizens in the region. Land for nursery garden should be an open land, and a lot of direct sunlight, close to water source and ample land in the vicinity, thus simplifying the development of nurseries in the future. The nursery garden size depends on the volume of seed seedlings that will be in production and size of the seed house building area.

Nursery garden built for the purpose of producing seed crop seeds to meet the needs of household members (RPL).

That nurseries based on need and the be-able to manage well, so design a nursery made by taking into account the layout of components garden, Among others (1) location of houses seeds, (2) the laying seeds young, (3) the location storage seeds ready planting, (4) a rack vertikultur, (5) pond nursery, (6) right-dang chicken day / rabbits / livestock, (7) warehouse, (8) the location a seedbed and media planting, and (9 Households dump site. The seed house is a building made of seeds to make appropriate plant nurseries necessary conditions, so as to produce healthy seedlings in a

relatively quick time. The seed house is needed so that activities farming still conducted although temperature and weather outside the seed house irrelevant to plants .
Should be built on land flat and not shaded, so that rain did not flooded and receive sunlight enough. In the rainy season, seed houses should get the intensity of sunlight and temperature sufficient support, it is meaning not too hot nor too cold. The benefit of seed house is that seedbed held climatic conditions manageable micro to the growth of plants , especially bibit that is vulnerable to the direct effect rain , the wind , and microorganisms that can cause disease in plants. In the implementation of the KRPL program in Pacitan, the target village has given assistance paranet, seeds, polybags, growing media, participatory partners for further follow-up to the manufacture of KBD (Nursery area) and perform a nursery activities in groups.

Structuring the environment area

Environment area to be cool, green and can be used as media promotion to the society we need to structuring the region. Design for structuring the plants on the environment areas are arranged together all citizens with attention to aesthetics and interests of citizens. Maintenance of the plants on the environment areas are the responsibility of the household or adjacent RPL. Some examples of design / structuring the plants within the area of RPL.
KRPL in Pacitan have done the formation of groups . Members of the team has worked in participatory.Some technologies krpl development has been given and partners have started to apply to the practice of direct implement optimization a home lot its masing-masing households. Training, Demo, Practice and guidance have been implemented by PPL officer, from the Office of Related and collaborate with instructors from the College. Application of Technology in an integrated (integration) has been implemented by each member of Partners. With Developing KRPL by each citizen, its benefits are starting to be felt. The society participation is quite high. Model development KRPL in Pacitan already said been quite successful. Environmental region to be clean, neat, beautiful, and additional income is already being felt by every citizen. Residents can get additional economies around Rp.90.000- Rp.700,000 / month.

4. CONCLUSION

KRPL development techniques in Pacitan is done through the stages of (1) the formation of the group, (2) the identification of needs, (3) the preparation of the action plan, (4) training, (5) the manufacture of nursery and (6) environmental regulation region. Technique development according to the stage of the development embody replication KRPL quickly and can give a clear benefit for families . KRPL in Pacitan been growing rapidly; Each KRPL in the district. Pacitan already has a characteristic that has a nursery, implemented by a number of members (RPL) is incorporated in the group and are in the neighborhood or a particular region. KRPL benefits for families are getting cost savings / family income for food consumption between Rp.90.000,00 - Rp.700.000,00 per family. The magnitude of saving is still limited, because of the limited the quantity of a crop done by each family.

The existence of Extension plays an important role in the development of KRPL in Pacitan. This can be seen from the activities of the counselors in performing his duties as motivator , edukator , liaison , organizers , communicator and advisor for the farm.

Integration in aplication some of TTG is necessary for the successful development of KRPL in Pacitan.

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THE STUDY OF THE USE OF ORGANIC WASTE AS A SOURCE OF POC TO INCREASE THE PRODUCTION OF SOYBEANS

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Abstract: The orientation of modern agriculture production who pursues way to the top and the quality of being good make of the farmers is very much dependent on the use of fertilizer. Correct use of fertilizer must consider the impact on the environment and to balance the ecosystem around it.
The purpose of research is to know the influence of the application of POC made with various sources of organic waste in an effort to improve growth and improve the results of soybean.
The research done by means of a random group of treatment as follows; P1 : without POC (control), P2 : POC waste water hyacinth, P3: POC waste dregs and skin the sugarcane, P4: POC waste coconut coir, P5: POC waste water hyacinth + manure, P6 : POC sugarcane waste dregs + manure + cocopeat, P7: POC waste coconut coir + cocopeat. Each treatment repeated four times, so that was obtained 28 tenement experiment , by using plants 10 sample every tenement.
The research note that the treatment poc dregs cane + manure + cocopeat (P6) give heavy dry seed / swaths better than other treatment, Although no different real the treatment poc dregs cane (P3), So also with the potential of the results, Where p6 able to provide the 2,36 tons / ha was p3 able to give a ton / ha 2,12. While in parameters 1.000 the weight , the treatment poc dregs cane + manure + cocopeat (P6) give 1.000 weight of the best, Although no different treatment real with the provision of waste poc dregs and skin cane (P3) or P5.

Keywords: Organic Waste, Liquid organic fertilizer, and Soybean Production

1. INTRODUCTION

Until now , soybeans still be one of the priority food commodities in Indonesia, Caused by high price fluctuations that it is possible to shake the economy of Indonesian. This could be the study material to rethink, that aspect of food security that relies on its own strength is about to be promoted and realized ,
Especially if not always want to be dependent on other countries (Adisarwanto, 2008).

One of the main program of the ministry of agriculture is the achievement of soybean self-sufficient, which must be supported by all parties in the production process. Results of the experience so far has shown that the level of national production of soybean planting area is determined by the level of productivity. This opportunity who is wide open in order to increase production through improvements productivity, Considering soybean productivity at the farm gate are still low which is about 1,29 ton / ha (Anonimus, 2009).

Orientation modern agricultural production as much as possible pursuit and good quality makes farmers highly dependent on the use of fertilizers. However without adequate knowledge, the use of chemical fertilizers actually cause a decrease in the quality of crop production. In addition the use of chemical fertilizers / inorganic in the long term a continuous and uncontrolled would be bad on soil fertility and the environment. The use of fertilizer correctly must consider the impact on the environment and to balance the ecosystem around it (Novizan, 2003). Herawati (2003), the results of his research in 2001 found the presence of heavy metals Cd on some inorganic fertilizer containing phosphorus (P) , which is about 0.1 to 0.7 ppm.

Land is often given inorganic fertilizers gradually becomes hard, difficult processed so disrupt plant growth, therefore the use of organic fertilizer helped improve soil structure, increasing the soil permeability and reduce dependence on inorganic fertilizers land. Organic fertilizers also serves as a source of food for microorganisms land and increasing the number and activity of soil microorganisms , so that the soil becomes loose (Hadisuwito, 2008).

Organic fertilizer derived from organic materials and organic fertilizer based on its shape is divided into two, namely solid organic fertilizer and liquid organic fertilizer (POC). Raw materials the organic can be obtained by use waste organic abounding around human life, among rubbish coconut husk , bagasse garbage , water hyacinth and others. From the research Suryaningsih , Jajuk and Johanes (2010), concluded that the provision of solid waste organic fertilizer home industry POC bread combined with a mixture of goat manure and coconut coir, provide better results than the organic fertilizer home industrial solid waste bread alone on mustard plants.

From the research Herath , Indarwati and Achmadi (2012), concluded that the application of organic liquid fertilizer Mol waste water hyacinth on soybean plants can increase soybean yield of 21.6 % compared with no provision of waste water hyacinth Mol.

This study aims to assess and apply the technology of making POC from various sources organic waste to increase crop production in the effort to achieve self-sufficiency and accelerating the achievement of food sovereignty in Indonesia. Besides it is also a solution to overcome the waste problem in indonesia.

2. RESEARCH METHODS

2.1. Place And Time

The research was done in the laboratory production Faculty of Agriculture, University of Wijaya Kusuma Surabaya, and experimental garden Institute for Agricultural Technology Mojosari , Mojokerto. This study began in January 2015 and ended in September 2015

2.2. Material And Tool

Material needed in research divided into 2, Namely materials needed for the manufacture of POC, among others : waste coconut husks, waste bagasse , the waste water hyacinth , a source of carbohydrates (sugar) , coconut water , rice water and well water.

Being the materials needed at planting in the field , among others : soybean seed , fertilizer Phonska Petroganik , manure , etc.

The equipment required for this research are :

POC Making Equipment: A tub poc, hose, stirrer, a knife, telenan, bottles, jerrycans, the meter, isolation etc.

Field Research Equipment: hoe , yells , trowel , bucket , Sprayer , camera and others .

2.3. Methods

The research was conducted using a randomized block design of one factor by treatment as follows :

P1 : Without POC (Control)
P2 : POC Waste Water Hyacinth
P3 : POC Waste Bagasse
P4 : POC Waste Coconut Husks
P5 : POC Waste Water Hyacinth + Manure
P6 : POC Waste Bagasse + Manure + cocopeat
P7 : POC Waste Coconut Husks + cocopeat

Of each treatment was repeated 4 times , so that it takes as many as 28 (7 x 4) plot trial

Research year to ii was advanced research years i with develop the results of the study years i who combined with the use of fertilizer inorganic in the soybean plant is , sought the interaction of the best.

2.4. Implementation of Research

2.4.1. The manufacture of fertilizers liquid organic (POC)

The first implementation of this research is the production of organic fertilizer (POC) derived from various sources organic waste in the Laboratory of the Faculty of Agricultural Production Universtas Wijaya Kusuma Surabaya

The manufacture is as follows :

a. Prepare all materials and instrument required in the manufacture of organic fertilizers
b. Setting up all sources of organic waste (bagasse , coconut husk and water hyacinth) and then cleared after it sliced / diced
c. Incorporate organic waste that has been cut into small pieces into each tub POC appropriate treatment , then add all the ingredients needed ie brown sugar 1 kg , coconut water , rice water and well water as much as approximately 50 liters up submerged , after it stirred until blended.
d. Budge the tub poc , and given air holes by entering the lapse of plastic which is connected with the waste a bottle mineral already are filled with water
e. Allowed to smell like alcohol or tape for 15 days . (2 weeks)

2.4.2. Harvesting of Organic Fertilizer (POC)

Harvesting is done after 15 days of making the POC and smell like alcohol / tape. POC harvested by filtration and then included in jiregen prepared, and ready to be applied to land in accordance with the treatment .

2.4.3. Soybean Planting and Plant Maintenance

Land Preparation

Land preparation activities such as tillage to increase production (Siswadi , 2006) ,and should be done when to plant soybeans in dry land in the beginning of the rainy season. This is because the surface of the ground are generally already hardened because the soil be left long enough. Making the channel draenase also necessary to accelerate the disposal of excess water and to prevent the increase in soil erosion due to actions processing .

Making the experiment plots for planting

After tillage with tilling the soil, then the experimental plots were left for one week in order to pests and diseases die in the sun. After that then doused with water to destroy chunks of land. Preparation of a plot to be used for soybean planting measuring 3 x 6 m2 = 18 m2 x 28 plot trials , divided into four arrays , each array are 7 plots

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Planting and Fertilization

After a finished processed next activities are planting to the distance planting soybean 40cmx15cm (herawati , dkk .2012), followed by fertilization. Basic fertilizer used is urea , TSP and KCl. Organic fertilizers as treatment given on the same day when planting , namely in the afternoon to reducing the evaporation. After planting then continued with the POC as liquid fertilizer in accordance with the treatment , which is given once every week for five times.

Soybean Plant Maintenance

Maintenance is important for the cultivation of soybean, so it will greatly affect the results to be obtained. The first thing to note is watering. Watering during dry season is done 1 time a day in the morning or evening, from planting to harvest. The next step is weeding. Weeding is done to reduce the competition between wild soybean plants (weeds) to obtain water and nutrients from the soil. Weeding is done mechanically to get rid of weeds or wild plants that may be used as the host caterpillar pests onion. At the time of weeding done taking pest if there is an attack (Sartono J. and I. Wibisono , 2007).

Maintenance of the other is to control pests and diseases, Performed with the use of seeds --virus free; sanitation ; crop rotation; to revoke: discard or burn the infected plants at a distance; take and destroy eggs or caterpillars that attack crops; and other natural ways .

Harvest

The time of harvest the soybean plant is in addition to determined by the accuracy of age in accordance with description varieties are grown, 70% of the leaves have yellowed and fall as well as pods have hardened and browned (if they are interested and Purnamawati H. , 2002), also by the number of pods that turn into yellow brown (approximately 95 % of pods have changed color and the leaves are still lagging behind in plants around 5-10 %).

Harvesting is done by cutting the stems of soybean plants as close as possible to the ground surface using a sharp serrated sickle. After that is done weighing on soybean yields.

Post-harvest

After harvesting the crops, then made weighing on yields in accordance with the variable / parameter observations made. Only after that is done drying with direct drying in the sun for approximately 3 days.

3. DISCUSSION

From the observation has been done in this study, where harvesting of the soybean crop post-harvest handling is done around the end of July to early August 2015, with the following results:

3.1. Growth Parameters

3.1.1. Number Of Leaves / Plant

Table 1. it can be seen that there was no significant difference between treatments in the parameters of the number of leaves, but at the age of 42 HST observations occurred a real difference, where the provision of treatment of waste bagasse + POC manure and cocopeat (P6) has an average number leaves more than other treatments, although not significantly different from P2 and P7.

Table 1. Average Number of leaves / plant (leaf stalk) because of Various Sources of Organic Waste Treatment in Different Age Observations

Treatment	dap (days after planting)							
	7	14	21	28	35	42	49	56
Sources of Organic Waste								
P1	1,95	3,83	4,85	5,30	6,93	8,78 c	13,28	13,88
P2	2,00	3,93	4,90	5,40	7,28	9,45 a	13,33	14,15
P3	2,00	3,88	4,90	5,45	6,98	8,78 c	13,75	13.98
P4	1,95	3,88	5,03	5,40	7,20	8,75 c	13,88	13,95
P5	2,00	3,95	4,95	5,48	7,23	9,03 bc	14,35	14,60
P6	2,00	3,93	5,03	5,58	7,23	9,48 a	14,20	14,28
P7	2,10	3,95	5,08	5,68	7,23	9,20 ab	13,75	14,18
BNT 5%	TN	TN	TN	TN	TN	0,36	TN	TN

Description: The numbers followed by the same letter in the same column are not significantly different in LSD 5%

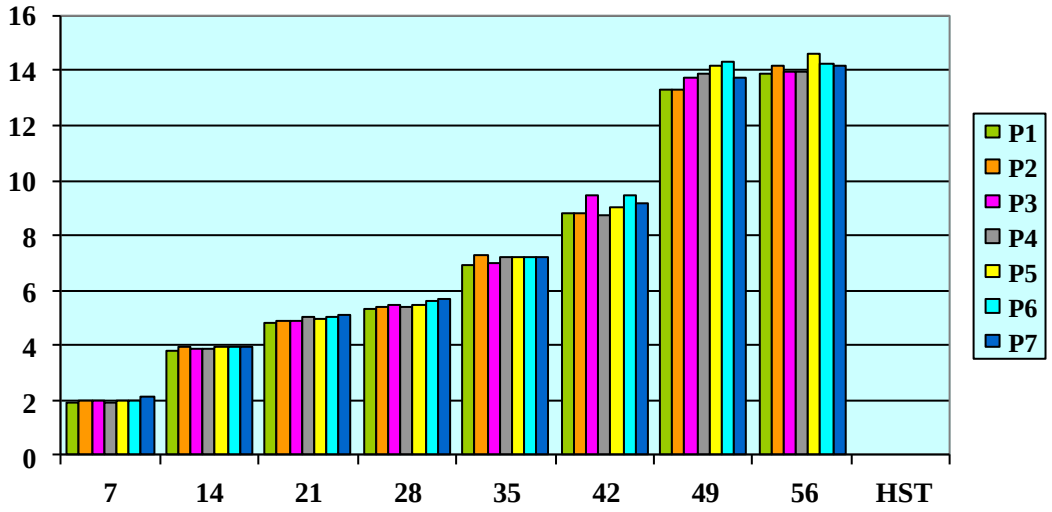

Figure 1. Diagram Rod Average Number of leaves / plant (leaf stalk) For Organic Waste Treatment Various Sources in Different Age Observations

3.1.2. Plant height

Table 2 can be seen from a real difference in the treatment of plant height parameter with the observation age 7-28 DAP, Whereas, at the age of observation 35-56 hst not occur significant differences between treatments. At the age of observation 7-14 DAP, giving treatment POC hyacinth + manure (P5) gives the best plant height, although not significantly different from the P6 and P7. At the age of 21 DAP observation of treatment administration of POC waste bagasse + manure and cocopeat (P6) had an average plant height were better than other treatments, although not significantly different from P7, P5 and P2. Being at the age of 28 DAP observations, granting POC treatment of waste coconut coir + cocopeat give an average plant height is best compared to other yan treatment.

Table 2. Average Plant High (Cm) for Treatment of Various Sources of Organic Waste in Various Age observations (DAP)

Treatment	dap (days after planting)							
	7	14	21	28	35	42	49	56

Sources of Organic Waste								
P1	8,13 d	13,35 d	18,25 d	21,93 f	32,75	41,03	48,18	48,90
P2	8,90bc	14,23bc	19,23abc	22,20 e	33,40	43,98	50,43	50,73
P3	8,38cd	13,43 d	18,85cd	24,25 c	33,20	42,35	48,20	48,83
P4	8,93bc	13,98 c	19,13bc	22,85 d	34,33	43,70	49,13	49,98
P5	9,70 a	15,08 a	19,80ab	24,60 b	34,10	43,68	50,85	51,45
P6	9,60 a	14,93ab	19,93 a	24,58 b	33,83	44,03	49,45	49,63
P7	9,38ab	14,73abc	19,83ab	24,90 a	34,30	44,23	50,50	51,40
BNT 5%	0,61	0,77	0,77	0,155	TN	TN	TN	TN

Description: The numbers followed by the same letter in the column
the same is not significantly different in LSD 5%

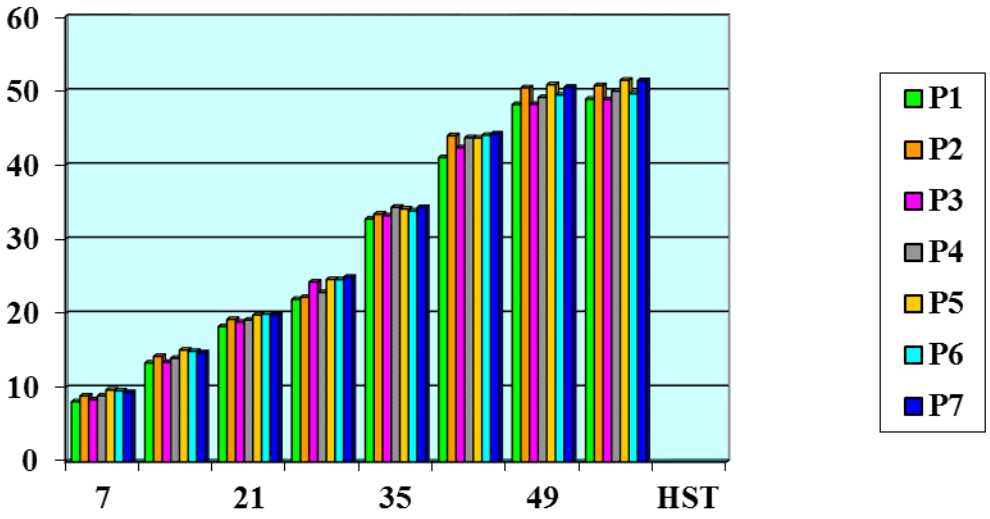

Figure 2. Diagram Rod of High Average Plant (Cm) For Organic Waste Treatment Various Sources at Various Age Observations

3.2. Production parameters

3.2.1. Fill number of pods / plant

Table 3. Average number of pods / Crop for Organic Waste Treatment Various Sources

Treatment	Number of pods When the Harvest
Sources of Organic Waste	
P1	51,3 b
P2	69,0 a
P3	77,7 a
P4	77,9 a
P5	78,0 a
P6	80,3 a
P7	68,6 a
BNT 5%	12,34

Description: The numbers followed by the same letter in the column the same was not significantly different in LSD 5%

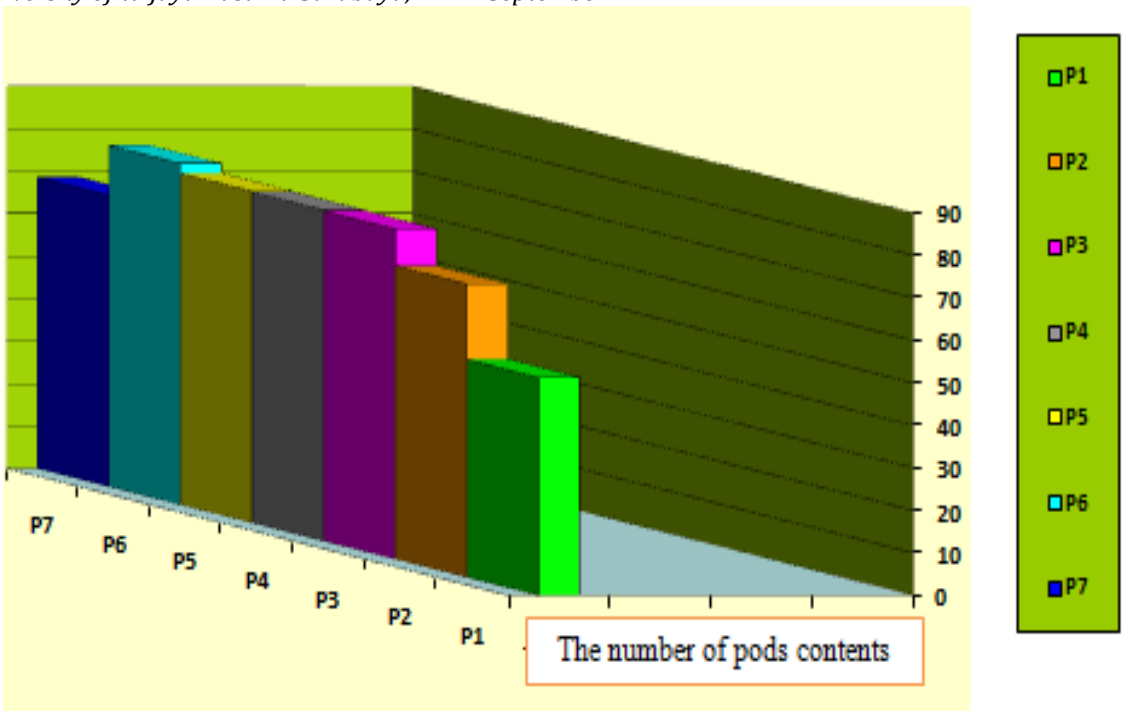

Figure 3. Diagram Rod of Pods Average Number of Contents / Plants (Gram) Treatment of Various Sources for Carbohydrates When the Harvest

Table 3 can be seen the real difference in the treatment of sources of organic waste, where treatment provision of POC waste bagasse + manure and Cocopeat produce an average number of pods / plant which is more than in the controls, although not significantly different from other treatments.

3.2.2. Soybean Seeds Dry weight / plot (kg)

Table 4. Average Weight Dry Beans / plot (kg) for Treatment of Various Sources of Organic Waste

Treatment	When the Harvest
Sources of Organic Waste	
P1	2,54 c
P2	3,45 b
P3	3,82 ab
P4	3,52 b
P5	3,60 b
P6	4,24 a
P7	3,54 b
BNT 5%	0,52

Description: The numbers followed by the same letter in the column the same is not significantly different in LSD 5%

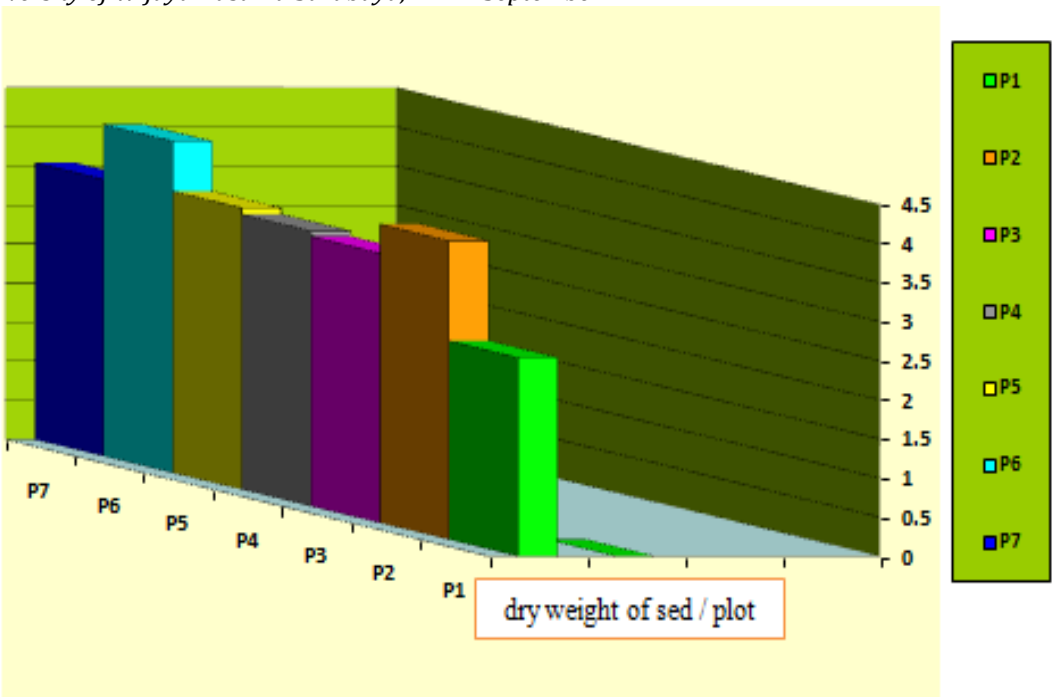

Figure 4. Average Weight Dry Beans / plot (kg) for Treatment of Various Sources of Organic Waste

Table 4 it can be seen the real difference in the treatment of sources of organic waste, where treatment provision of POC waste bagasse + manure and cocopeat (P6), resulting in an average weight of dry seeds / plot more than the other interventions, though not different POC real by giving treatment of waste bagasse (P3).

3.2.3. Potential Outcomes / soybean seed dry weight / ha (tons)

Table 5. Average Dry Weight seeds / ha (tons) due to Various Sources of Organic Waste Treatment

Treatment	When the Harvest
Sources of Organic Waste	
P1	1,41 c
P2	1,92 b
P3	2,12 ab
P4	1,96 b
P5	2,00 b
P6	2,36 a
P7	1,97 b
BNT 5%	0,25

Description: The numbers followed by the same letter in the column The same was not significantly different in LSD 5%

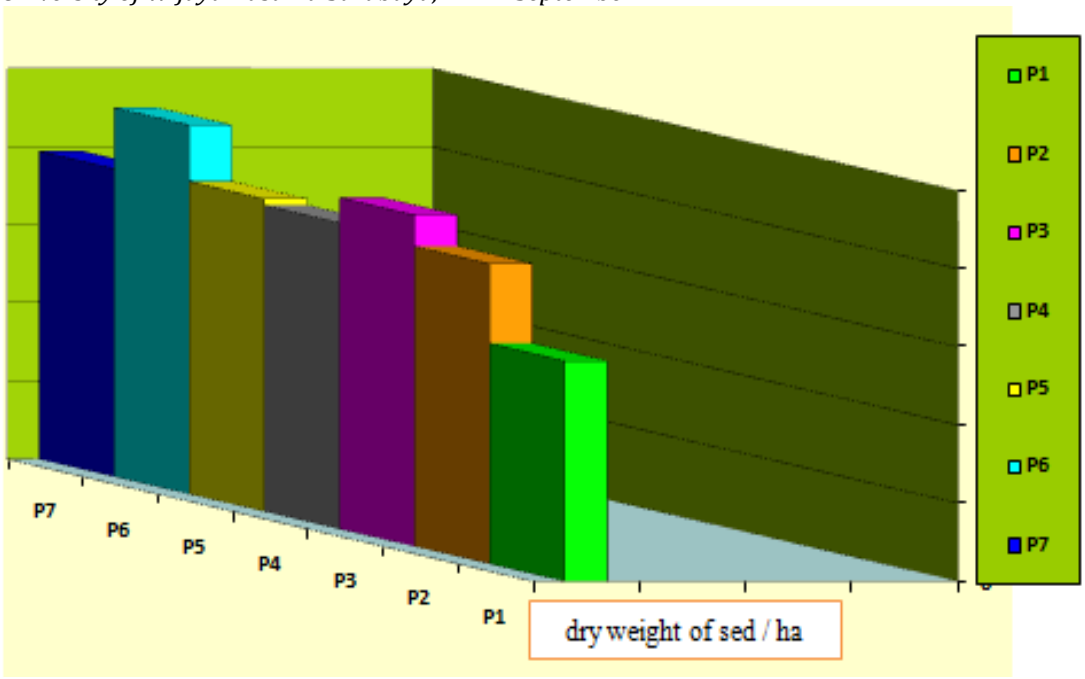

Figure 5. Average Dry Weight seeds / ha (kg) for Treatment of Various Sources of Organic Waste When the Harvest

Table 5 can be seen the real difference in the treatment of sources of organic waste, where treatment provision of POC waste bagasse + manure and cocopeat (P6), resulting in an average weight of dry seeds / ha more than the other interventions, though not different POC real by giving treatment of waste bagasse (P3).

3.2.4. Weight of 1000 seeds

Table 6. Average weight of 1000 seeds Soybean When the Harvest (g) for Treatment of Various Sources of carbohydrates and Varieties

Treatment	When the Harvest
Sources of Organic Waste	
P1	143,75 c
P2	157,25 b
P3	166,00 a
P4	157,0 b
P5	163,9 a
P6	168,25 a
P7	157,5 b
BNT 5%	5,98

Description: The numbers followed by the same letter in the column the same is not significantly different in LSD 5%

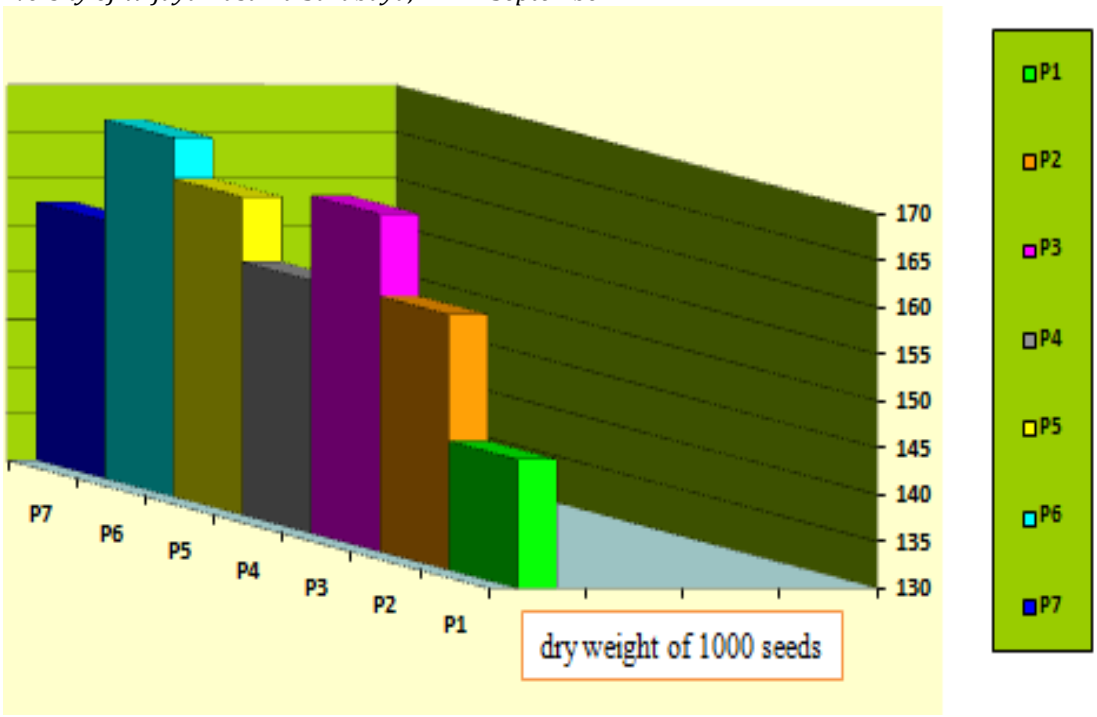

Figure 6. Average Dry Weight 1000 Seeds (Gram) for Treatment of Various Sources of Organic Waste

3.3. Discussion

Results of the analysis of the nutrient content in each POC presented in Table 7.

Table 7. Results of Analysis Nutrient Content POC

POC	N (%)	P_2O_5 (%)	K_2O (%)	C Org.	C/N	Beneficial microbes
Water hyacinth	0,07	0,05	0,31	1,12	14,5	Photosynthesis Bacteria, Bacterial Fermentation
Sugar cane dregs	0,11	0,12	0,88	1,52	13,6	Lactobacillus, Actinomycetes
Coconut Fiber	0,06	0,08	0,82	1,21	18,2	Actinomycetes, Bacteria Solvent P

Source: Laboratory Test Results Research Institute and Consulting Industry Surabaya - East Java (2015)

Being the result of the analysis of the nutrient content in the soil of each treatment plot are presented in Table 8.

Table 8. Results of Soil Nutrient Content Analysis

Treatment Plot	N (%)	P_2O_5 (%)	K_2O (%)	C Org.	Beneficial microbes
Control (P1)	0,03	0,028	0,091	2,88	Actinomycetes

POC Water Hyacinth (P2)	0,07	0,021	0,086	3,21	Bacterial Fermentation
POC Sugar Cane Dregs (P3)	0,06	0,024	0,062	3,35	Lactobacillus
POC Coconut Fiber (P4)	0,08	0,020	0,059	2,96	Bacterial Fermentation
POC Water Hyacinth + Dung (P5)	0,12	0,017	0,075	3,17	Lactobacillus
POC Sugar Cane Dregs + Dung + Cocopeat (P6)	0,09	0,18	0,060	3,54	Bacterial Fermentation
POC Coconut Fiber + Cocopeat (P7)	0,11	0,16	0,049	2,90	Acetobakter

Source: Laboratory Test Results Research Institute and Consulting Industry Surabaya – Jawa Timur (2015)

Results of analysis of variance (ANOVA) showed that the various types of POC significantly affected parameters of growth in the number of leaves only at the age of observation of 42 DAP, where treatment provision of POC bagasse + chicken dung + cocopeat (P6) gives the number of leaves of most, though not different real with P2 and P7. Being on the parameters plant height real effect on the life of observation 7-28 DAP.

Growth occurs because of the division and cell elongation process that requires a lot of supply of nutrients. This is in line with the opinion of Dwijoseputro (2000), that if the nutrients available in sufficient quantities and can be absorbed properly, then the plant will grow optimally. This is evidenced by the high average soybean crop Anjasmoro studied until the age of 56 DAP only about 49-51 cm (Table 2), is lower when compared to its growth potential with a plant height reaches 64-68 cm based on the description of soybean varieties Anjasmoro by Balitkabi (attachment).

On production parameters number of pods / plant P6 provide better results compared to the control, although not significantly different from other treatments. Treatment provision POC this is one of the organic fertilizer has the function, among others, are: 1) improve soil structure, because organic matter can bind soil particles into aggregates steady, 2) improve the pore size distribution of land so that the power hold the groundwater to rise and air movement (aeration) in the ground the better. Compost biological function is as a source of energy and food for the microbes in the soil. With the availability of sufficient organic material, the activity of soil organisms which also affects the availability of nutrients, nutrient cycling, and the establishment of micro and macro pores of soil become better (Conservation, et al., 2011).

On a dry weight parameters seeds / plot and / ha as a potential result gives a real difference, where treatment P6 showed the best results, although not significantly different from P3. Being on the production parameters dry weight of 1,000 seeds, P6 also gives the best result although not significantly different with P3 and P5.

Growth and crop production is the result of interaction between internal factors with the external factors of plants. Growth and results are influenced by the growth environment (Gardner et. Al. 2004), and genetic characteristics (Nyakpa, et. Al. 1998). Environmental factors include nutrient, water, temperature, humidity, solar radiation, soil conditions, and interactions with other organisms such as pest and microorganisms. Growth and yield can be achieved if environmental factors in optimum condition. Unfavorable environment can inhibit even stop the growth.

In the parameters of potential outcomes occur significant differences in treatment provision of POC, but not all treatments POC administration can achieve yield potential in accordance with the description of the plant, which is

between 2.03 to 2.25 tonnes / ha. This is presumably because the high C / N ratio of each POC are still not in accordance with the C / N ratio of the soil, so that the nutrients from the POC still be absorbed by plants and has yet to show its influence. Novizan (2003), explaining that only a small proportion of nutrients derived from organic fertilizer can be directly used by the plant, partly decomposed in a long time span. To be available for plants, nutrients N, P and K contained in organic fertilizers must undergo the process of decomposition in the soil first (Watanabe, 1984), and the decomposition depends on the value of C / N ratio and a source of organic matter Hakim et al., (1986).

According to Rafsanjani, KA, Sarwono and Noriyant, RD (2012), the results of research it is said that the water hyacinth is organic waste which has a very large water content up to 90% of the weight of the actual plant.

4. CONCLUSION

The observation of this first year can be concluded:

a) There were no significant differences in growth parameters number of leaves, but at the age of 42 DAP observations, and happened a real difference in the growth parameters plant height at observation 7-28 DAP.

b) There was a significant difference in the production parameters number of pods / plant, BK soybean / plot, BK seeds / ha and 1,000 grain weight.

c) By giving POC treatment of various sources of organic waste on soybean plants capable of producing dry seed weight from 1.92 to 2.36 tonnes / ha.

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CALCULATION MODEL OF CARBON STOCKS IN COMMUNITY FOREST THAT CERTIFIED BY TIMBER LEGALITY VERIFICATION SYSTEM /TLVS

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Abstract One of policies to support REDD+ implementation of the forestry sector is Regulation P.20/2012 on the Implementation of the Forest Carbon. Calculation of carbon stocks mostly done or tested in peat forest areas, timber estates that managed by private companies or state-owned companies. No research were designing a model calculation of carbon stocks in forest Communitys to approach the baseline methodology. The study aimed to calculate carbon stocks in Community Forest that certified by TLVS in preparing the PDD (Project Design Document). The research method using the baseline methodology that based on the measurement of carbon stock changes. The results showed that the calculation model of forest carbon stocks in Community Forest that are already certified TLVS is a trend of carbon uptake and carbon changes in the next 30 years, taking into account the maximum cycle in teak, it can be simulated that the total reserves of carbon pool be a C sink amounted to 311.335 tons / hectare with baseline 44.698 tons ha and is estimated at 30% buffer C then tradable carbon potential of 186.644 tons per hectare to be able to absorb CO2 as many as 684, 9903 tons per hectare per year.

Keywords : carbon stocks, baseline, forest Communitys, TLVS, PDD

1. INTRODUCTION

The increasing of Greenhouse Emission Gas (GEG) such as carbon dioxide (CO2), methane (CH4) and nitrous oxide (N2O) intensifies earth temperature which causes global warming. Then, It causes the climate change resulting in long drought, flood, storm and the increasing of sea level. The concentration of GREENHOUSE has now reached the endangering earth climate and ecosystem stability level (Jagger *et al.*, 2011).

GEG is mostly caused by incineration processes of fossil done by big industries contributing 80% of emission, whereas farm and forest sectors only contribute 20% of emission. Nevertheless, forest sector is one of sectors which has a big role in controlling GEG through decreasing emission from deforestation and forest degradation. Perpres 61/2011 about A Plan of National Action to decrease Greenhouse Emission Gas, states that forest sector is on strategic position which has a big role in decreasing greenhouse effect until 2020. Pustanling data 2011 shows that forestry action plan in deacreasing GEG is directed to : controlling land and forest fire, network system and waterworks management, land and forest rehabilitation, timber estates development (HTI), Community Forest development, illegal logging eradication, deforestation prevention and society empowerment.

Not only having an important role in GEG degradation, forestry sector also faces an issue about timber trade along with its commodity derivatives. These two things are contrast in its substance. The climate change mitigation orients more on the effort of keeping the preservation, whereas timber trade issue demands legality. Indonesia Government has commitment to fight against illegal logging and complies market demand through Peraturan Menteri Kehutanan (Rule of Forestry Minister) no. P.38 tahun 2009 jo. P.68 tahun 2011 jo. P.45 tahun 2012 about Timber Legality Verifcation System (SVLK). This verification is mandatory for all business units which are doing forest management, forest yields both in state forest and Community forest.

Although not understood by many parties, Community Forest (HR), a part of action plans in reducing GEG and climate change, also contributes significantly in timber production in Java. (Setiahadi et al, 2010). Community Forest contribution as raw material supplier for furniture industries and plywood in Java Island has a strong link (Setiahadi & Novianto, 2013). Moreover, there is SVLK mandatory for industries which do export for industrial forest products to international market. Considering the important role of Community Forest in Java Island both in climate change and timber production, their synergy will make Community Forest role stronger aside from its main role for ecosystem.

The strategic position of Community Forest region as an ecosystem buffer in Java Island cannot be ignored. Therefore, researches, needed to place Community Forest comprehensively in order to support carrying capacity of ecosystem to prevent global climate change, are done to get optimal results.

The calculation of carbon stock has been done in natural forest region, peat lands and region of palm oil conversion. However, it is rarely done in Community Forest region. The decreasing of forest area caused by deforestation and degradation happened in natural forest region. Yet, it is different from the condition of Community Forest region, especially in Java Island which is increasing. BPKH XI,2010 data mentions that Community Forest area in Java Island reaches 3.1 million hectares, whereas state forest area managed by BUMN is only 2.5 million hectares in which 30% of the area is blank.

Considering the great number of methods which is developed in forest carbon stock calculation, appropriate researches of model development of carbon stock calculation is done. It is to arrange PDD (project design document) which can be used to take decision in Community Forest development. The usage of allometric method can be for connecting rod diameter and other variable like timber volume, tree biomass and carbon in felled stands or straightened stands (Badan Standarisasi Nasional, 2011b). However, the problems often found is carbon calculating by measuring the diameter of feeling trees in Community Forest. Calculating carbon by cutting sampling trees cannot be done in Community Forest because of economic consideration (Setiahadi *et al*, 2010).

The usage of allometric method for various types of trees to calculate biomass and carbon stock in Community Forest done by BPKH XI in 2009 shows that allometric equation application in Community Forest is adjusted with the condition of land or moor. In the other hand, the development of *allometric* method done in Community Forest (HKm) in Gunung Kidul (Setiahadi et al, 2011) can be applied by using *base line methodology*.

This research is to map out the carbon stock calculating model with base line methodology to prepare for PDD (project document design) in Community Forest (Hutan Rakyat) which has got SVLK certificate. The research result can hopefully be used as material to arrange PDD in order to support Community Forest development. Doing so, it can be continued economically and ecologically to reduce GEG.

2. RESEARCH METHODOLOGY

Research Location and Time

The research was done in Kare sub-district, Madiun regency, East Java Province. Community Forest is located in 8 villages which are clustered in Management Units Farmer Group of Kare Lestari in West part of Wilis Mountainside.

The plots unit (PU) is located in 4 villages that is Kuwiran, Randualas, Kare and Morang. Plot location selection is done by *purposive sampling* with random start in order to represent topographic condition and Community Forest vegetation distribution managed by UPHR Kare Lestari. Information about geographic and topographic position of plot location can be seen in Table 1.

Table 1. Geographic position and topography of measurement plot location

The corner plot location	Geographic position	Elevation (masl)	Tilt (%)
Plot 1 Kuwiran Zone	S : 7° 41' 56" E : 111° 39' 37" Azymuth 173° , 2,1 m	430	8 – 15
Plot 2 Randualas Zone	S : 7° 42' 16" E : 111° 40' 33" Azymuth 286° , 20,40 m	500	16 – 25
Plot 3 Kare Zone	S : 7° 43' 16" E : 111° 41' 33" Azymuth 143° , 1,2 m	500	16 – 25
Plot 4 Morang Zone	S : 7° 44' 16" E : 111° 42' 33" Azymuth 245°, 1,5 m	650	– 45

Data Collecting Method

This research is done to arrange baseline by measuring carbon stock. The research stage is started from making plot measurement in 4 location/ Community Forest zones. Carbon components are measured from Community Forest based on Badan Standarisasi Nasional, 2011a and Badan Standarisasi Nasional, 2011b. The tree biomass and land organic materials are measured in each plot.

Data-collecting is done in plot measurement located in 4 villages (zones) : Kuwiran zone, Randualas zone, Morang zone and Kare zone. In each zones, the plots of recording unit are determined as many as 16 plots with the size of 25x 25 m so that the width of each measurement plot in each zone has 1 hectare width. The steps of taking data in each measurement plot, following NFI standard (National Forest Inventory) in document 3 in Badan Standarisasi Nasional (2011a). The stages are as follow:

a) Determining the latitude and azimuth of corner plot with GPS.
b) Determining compass direction firing angle in order to make plots of recording unit as many as 16 plots. Each plot recording is bordered by raffia string.
c) Determining the latitude and azimuth of recording unit center (for trees or trees nearby the center)
d) Doing inventory for the number of trees, dbh, height of trees, type of trees and trees vegetation distribution in each recording unit and noted in *tally sheet*. Vegetation noted is

vegetation which has been included in stake classification. Yet, for feeling method, sampling trees with minimum periphery diameter 63cm are chosen from each type of vegetation.

Sketch of measurement plot and recording unit showed in Figure 1.

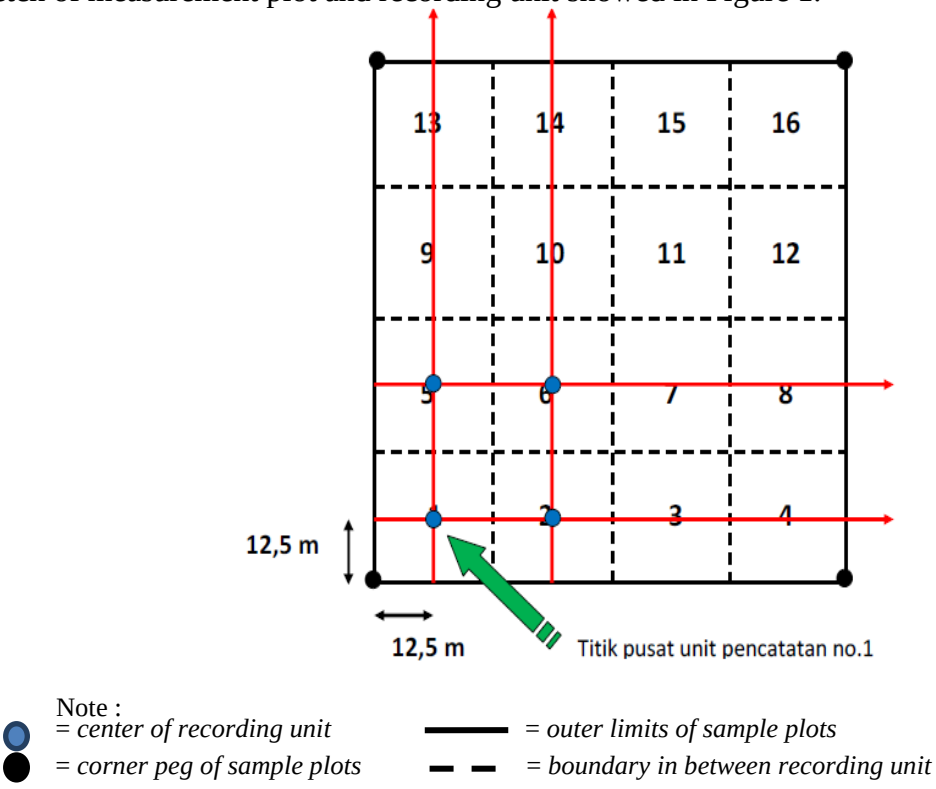

Figure 1.Sketch of measurement plot and recording unit

Data Analysis

The total calculation of forest carbon stock is based on the biomass content and organic materials in five carbon pools that is land surface biomass, biomass beneath land surface, weathered wood, litter and land organic materials (Badan Standarisasi Nasional, 2011a). Badan Standarisasi Nasional, 2011b states that the need of calculating the total of carbon stock in Community Forest depends on the need and ease in data taking. There are two *carbon pool* in Community Forest which has to be measured that is biomass of the surface and land organic material. If possible, underneath biomass (nekromassa) and litter can be added.

Carbon calculation from density biomass using formula as follow :

$C_{bj} = B \times \% C_{organic}$ (1)

where :

C_b : carbon content of biomass types (kg)

B : total of biomass types (kg)

$\% C_{organic}$: percentage of carbon content, or using values obtained from the measurements in the laboratory.

Soil Carbon calculation using pattern as follow :

$C_t = K_d \times \rho \times \% C_{organic}$ (2)

where :

C_t : carbon content of the soil (g/cm^2)

K_d : depth of soil samples (cm)

ρ : bulk density (g/cm^3)

$\% C_{organic}$: percentage of carbon content, or using values obtained from the measurements in the laboratory.

Total Carbon Stock calculation.

Organic Carbon content calculation in soil per hectare using equation as follow:

$C_{soil} = C_t \times 100$ (3)

where :

C_{soil} : organic carbon content of soil per hectare (tons/ha)

C_t : carbon content of the soil (g/cm^2)
100 : conversion factor from g/cm^2 to tons/ha

Total Carbon Stock calculation in plot measurement using equation as follow:
$C_{plot} = (C_{bj} + C_{soil})$ (4)
where :
C_{plot} : total carbon in plots (tons/ha)
C_{bj} : total biomass types per hectare in plots (tons/ha)
C_{tanah} : total carbon soil per hectare in plots (ton/ha).

Carbon Stock calculation per hectare in each plot for biomass on the soil surface using equation as follow:

$$Cn = \frac{Cx}{1000} \times \frac{10000}{lplot}$$

where :
C_n : carbon content per hectare in each carbon pool on each plot (ton/ha)
C_x : carbon content of each carbon pool on each plot (kg)
l_{plot} : spacious plot in each pool (m^2)

3. DISCUSSION

Typology Zone of Plot Measurement.
The research location is in high land. The topography of Kare sub-district is generally presented on Table 2.
Table 2. Topography of Kare sub-district

Elevation (masl)	*Extent (hectares)*	Slope (%)	*Extent (hectares)*
100-500	8885,10	8-15	231,47
501-1000	6125,13	16-25	5425,47
1001-2000	4002,56	26-45	2772,31
>2000	77,21	>45	10685,75

Source : "Map of Madiun Regency, 2009".
The distribution area of community forest in 4 zones measurement plot of Kare, Kuwiran, Randualas, and Morang, are presented in Table 3
Table 3. Distribution of Community Forest in 4 research locations

No	Village	Extent (hectares)		Total extent (hectares)
		Yard	Dry land	
1	Kuwiran	-	27,58	27,58
2	Randualas	-	397,03	397,03
3	Kare	3,5	54,81	58,31
4	Morang	89,27	146,4	235,67
	Jumlah	92.77	625.82	718.59

Source : "Profile of Forest Farmer Group Kare Lestari, 2011".

The plant type of Community forest that is cultivated by farmer in four plot measurement zones, they are: (a) Perennial plant type that is dominantly developed by farmer for example: Teak (Tectona grandis), Acacia (Acacia mangian), Mahogany (Swietenia mahogany) and Alba (Albizia falcataria); (b) under plant stand type, such as corn, cassava, peanuts and bulrush; (c) plantation plant type, such as clove, chocolate/cacao, and jackfruit.

Distribution of Tree Species Based on Inventory Results.

Based on inventory result from sixteen points of recording unit that is known that distribution of tree is dominated by Teak (Tectona grandis) and Mahogany (Switenia mahogany). Sengon variety (Albizia falcataria) occurs in several recording unit points in Randualas and Morang Zone, while Acacia (Acacia auriculiformis) only occurs in Kuwiran zone. The description of distribution type in form of poles and trees in each plot zone is presented on table 4
Table 4. Descriptive distribution of poles and trees in each zone.

	Zone	Amount of poles and trees per species								Amount	
		Acaccia		Mahogany		Teak		Alba			
		N	V	N	V	N	V	N	V	N	V
1.	Kuwiran	56	20,54	19	2,88	603	89,55	0	0	678	112,97
	Average/PU	4	1,28	1,19	0.18	38	5,60	0	0		
2.	Randualas	5	4,15	133	26,29	631	136,56	17	4,01	786	171,01

	Average/PU	0,31	0,26	8,31	1,64	39,44	8,54	1.1	0,25		
3.	Kare	43	18,01	23	2,88	658	91,88	31	10,40	755	123.17
	Average/PU	3	1,13	1,44	0,18	41,13	5,74	2	0,65		
4.	Morang	19	5,25	144	26,59	645	139,16	35	4,55	843	176,24
	Average/PU	1,19	0,35	9	1,66	40,31	8,70	2,19	0,29		
Total amount of zones		123	47,94	319	58,64	2537	457,15	83	18,96	3062	583,39
Average/ha		30,75	11,96	79,75	14,66	634,25	114,29	20,75	4,74	766	145,85

Remark: PU – measurement plots; N – amount of tree; V – volume (m^3)

Based on data on table 4 can be known that average of total tree per hectare for Acacia type is thirty one trees with 11,9854 m^3/ha volume, Teak is 634 trees with 114,2282 m^3/ha volume and Alba is 21 trees with 4,7396 m^3/ha volume. Furthermore this data is converted with the wide of Community forest region that include dry land class so total and volume tree potential can be known in accordance with distribution in four plot zones measurement based on cultivated type of plant. Conversion result is presented on table 5.

Table 5. Potential quantity and volume of timber based on plant species in 4 zones

No.	Village/ zone	Plants Species	Average of species/ measurement plot	Average of volume / measurement plot (m^3)	Plot extent (Ha)	Land area (Ha)	Total volume (m^3)
1.	Kuwiran	Jati	38	5,597	0,0625	27,58	154,365
		Mahoni	1,19	0,18	0,0625		4,964
		Akasia	4,0	1,28	0,0625		35,302
		Sengon	0	0	0,0625		0
2.	Randualas	Jati	39,44	8,54	0,0625	397,03	3390,636
		Mahoni	8,31	1,643	0,0625		652,320
		Akasia	0,31	0,2593	0,0625		102,950
		Sengon	1,1	0,2505	0,0625		99,456
3.	Kare	Jati	41,13	5,743	0,0625	54,81	314,774
		Mahoni	1,44	0,1800	0,0625		9,866
		Akasia	3,0	1,125	0,0625		61,661
		Sengon	2,0	0,650	0,0625		35,627
4.	Morang	Jati	40,31	8,70	0,0625	146,4	1273,680
		Mahoni	9,0	1,662	0,0625		243,317
		Akasia	1,19	0,3280	0,0625		48,019
		Sengon	2,19	0,2845	0,0625		41,651
	Total amount of land area and plants volume					625.82	6468,589

Carbon Pool Measurement Result

C.1. Carbon Content of Biomass per Type

Carbon measurement of biomass uses equation formula (1). Biomass per type of each zone is presented on table 6.

Table 6. Biomass per type on 4 zones

Tree species	Amount of biomass per type from 4 zones (kgs)						Total (tonnes)
	N	V (m^3)	Trunk	Root	Branch	Leaves	
Acasia	123	47,942	22,704	1,760	1,837	1,399	27,701
Mahogany	319	58,640	26,802	17,014	5,984	5,197	54,999
Teak	2537	457,153	329,522	116,697	67,921	53,949	568,091
Albizia	83	18.959	6,955	2,504	1,090	1,071	11,622

Data on table 6 informs that plant biomass per type in all zone measurement plots depend on total of tree population and volume. Teak plant has highest total biomass (568,091 ton), next Mahogany (54,999 ton), Acacia (27,701 ton). Albizia plant that has lowest population in all zones has lowest biomass (11,622 ton).

Total biomass plant per type then used for calculate carbon per type with equation formula (1). Result of measurement is presented on table

Table 7. The carbon content of each type in 4 zones

Tree species	The amount of carbon per type in 4 zone (kgs)				Total (tonnes)
	Trunk	Root	Branch	Leaves	

Acasia	10,670	827.241	863,600	657,778	13,020
Mahogany	12,597	7,996	2,812	2,442	25,850
Teak	154,875	54,847	31,923	25,356	267,003
Albizia	3,268	1,177	512.424	503.823	5,462
Carbon total amount					311,335
Carbon average amount per hectare					77,833
Carbon potential amount with forest right land area in 4 zones					48.709,9174

A lot of carbon potential in four type of plant in measurement plot on one hectare area is 311,335 ton with average 77,833 ton/ha. So that carbon potential in Community Forest in four zone area of 625, 82 hectare is 48.709,914 ton of carbon.

C.2. Soil Carbon Content.

Measurement of soil carbon at each plot was done used equation (2). As those carbon calculation bases, content calculation of organic soil substance (OSS) and soil dry weight are firstly done. Soil sample is taken from 30 cm depth, and then weight of soil volume and weight of soil content (p) are calculated. General reference OSS value in each soil depth, refers to Widianto's research result (2012).

Measurement result of soil carbon content at 4 plots measurement zones is presented on table 8.

Table 8. The results of measurements of carbon content of the soil in mearurement plots in 4 zones

Layer	Level of OSS	Weight content	Soil Volume per 1 hectare	Weight of dry land in 1 ha	Amount of Organic matter	Amount of Carbon (tonnes)
00-10 cm	27 kg/t	1,1 t/m^3	1.000 m^3	1.100 ton	29,7 ton	17,3
10-20 cm	22 kg/t	1,2 t/m^3	1.000 m^3	1.200 ton	25,2 ton	14,7
20-30 cm	16 kg/t	1,3 t/m^3	1.000 m^3	1.300 ton	23,4 ton	13,6
Amount of soil carbon content in the layer of 0-30 cm per zone per hectare						45,5
Average of soil carbon content per zone per hectare						11,375
Amount of soil carbon content with forest right land area in 4 zone						7118,7025

C.3. Calculation of Total Carbon Pool

Calculation of total carbon pool is calculated with equation 3, 4 and 5. And data that is presented on table 7 and table 8. Calculation of total carbon reserve in all Community Forest region UPHR Kare Lestari at 4 measurement plot zones is presented on table 9.

Table 9. Amount of carbon content (carbon pool) in 4 mesaurement zone

No	Carbon sources	Extent (Ha)	Amount of carbon (tonnnes/ha)	Total amount of carbon (tonnes)
1	Stand	625,82	77,833	48.709,9174
2	Soil	625,82	11,375	7118,7025
Total amount of carbon pool				55.828,6199

C.4. Baseline of Measurement Carbon Pool Community Forest UPHR Kare Lestari.

Community Forest has multifunction such as, social, economy and ecology (Awang, 2005 in Setiahadi, et al., 2010). The usage of Community Forest in form of agroforesty, simultaneously could give economic effect like the increase of farmer's income through many effort schemes. Moreover it is also in form of the increase service environment provision like spring, ecotourism, limited biodiversity and carbon absorption. Community Forest also gives a function as climate mitigation (Stern, 2006 in Setiahadi, et al., 2010). Though it can play a role in climate change mitigation, especially carbon trade, role of Community Forest is influenced by willingness to accept/WTA) in farmer level and Willingness to Pay/WTP in user/consumer's environment service level (Perman, et al., 2003 in Kaufman, et al., 2012).

As for willingness to pay and farmer participation are influenced by farmer's comprehension toward climate change mitigation. So farmer participation level is one thing that can't be neglected in Community Forest role encouragement in GRK emission reduction program. Irawan's research result in 2011 showed farmer participation that support climate mitigation activity trough forest right is influenced by age, formal education, family number and experience in a farm Community Forest business. While for farmer who refuses, influenced by compensation value, monthly cost value and land broadness that is being worked on.

Carbon reserve measurement with allometrik equation assess carbon potential above ground surface for one type of plant can be done referring to Brown (1998 in BKPH IX, 2010). But, to support PDD arrangement in REDD+

scheme, carbon reserve measurement is done comprehensively at same land unit (Golden Agri Resources, 2012). Measurement is done above and below ground biomass, shrubs, nekromassa, litter fall, harvested soil and trees organic substance (BSN, 2011a). Measurement method total carbon reserve on Community Forest depends on need and easiness in data collection. There are two carbon pools for Community Forest that should be measured, they are plant type biomass and ground organic substance (Irawan, 2011).

In the context PDD arrangement at Community Forest for voluntary market parties' agreement are needed to prepare baseline methodology in PDD preparation become important factor that can't be ignored (Navratil, 2012). In this research, baseline is a basic line if forest right didn't manage intensively. In research the assumption that is used in Community Forest, if land didn't manage intensively with agricultural plantation so that total plant in Community Forest areal is 100 trees/ha.

For arranging methodology baseline of carbon reserve, the following data are needed such as carbon stock data, carbon sequestration level accordance to cycle. Plant cycle on Community Forest, though it is very influenced by harvest need cycle, though it can be assumed that plant cycle depend on plant type. Albiizia and Acacia have ten years maximum cycle, Mahogany has 20 years cycle and Teak has 30 – 35 years cycle. Carbon absorption analysis prediction is done by making changing analysis in 20 years, as assumption average cycle on all types of wood plant that is being worked on.

Baseline simulation of carbon absorption from one of the terrace measuring sample on Kuwiran zone and Morang zone, with teak as primary plant planted on 1995 is presented on table 10.

Table 10. Carbon sequestration of sample plot in Kuwiran and Morang zone

Location : Kuwiran	Year of planting : 1995	Average diameter : 32,46 cm
Extent : 27,58 ha	Amount of plant : 3.767	Initial stock of carbon : 10,940 t/ha
Location : Morang	Year of planting : 1995	Average diameter : 49,46 cm
Extent : 146,4	Amount of plant : 6.150	Initial stock of carbon : 23,145 t/ha

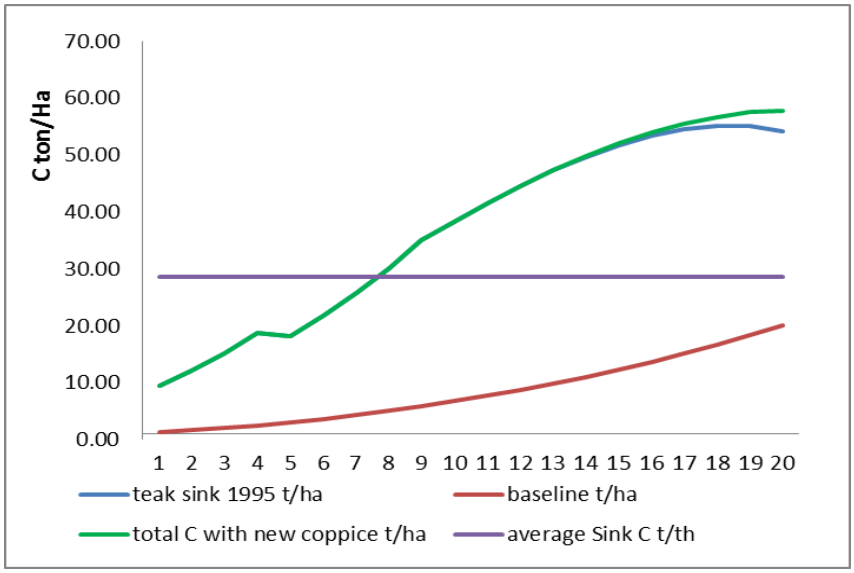

Figure 2. Graphic of carbon sequestration in 1995 plantation at "Kuwiran" zone

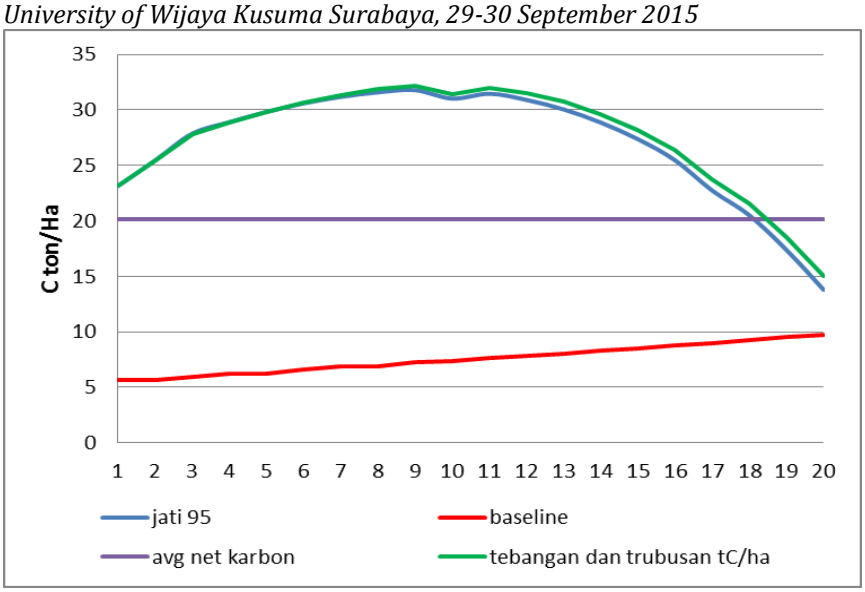

Figure 3. Graphic of carbon sequestration in 1995 plantation at "Morang" zone.

Carbon calculation simulation for forest right management on teak's primary type plant at UPHR Kare Lestari based on assumptions such as: thinning activity on 15th year 7 -15 cm's diameter, trees cutting is done at 20th year for >18cm diameter, with total cutting 30 tress/ha/year, coppice plant already absorbed carbon on 2 year age, increment diameter is = 3, 18 cm/year and buffer level reaches 30 % as risk anticipation in management. Change trend carbon absorption is presented on figure 4.

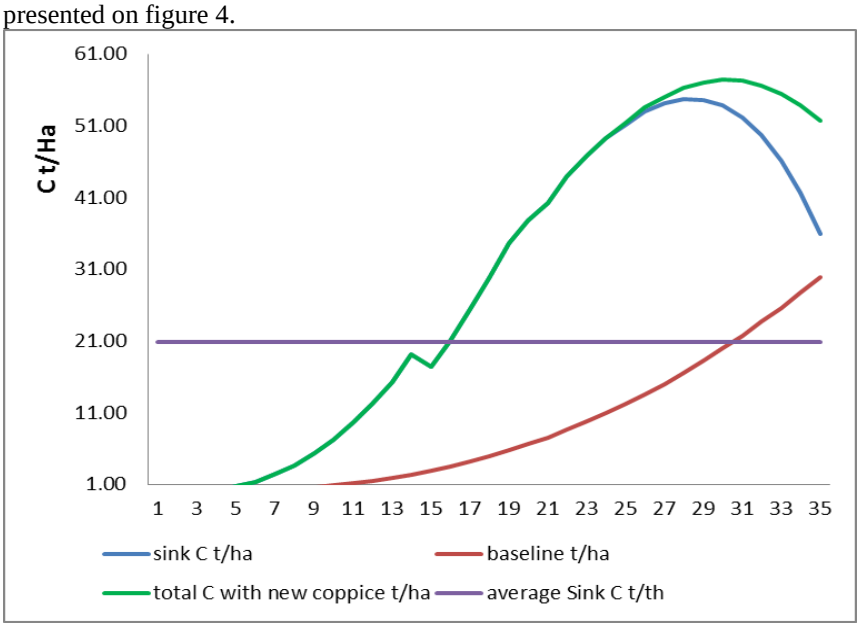

Figure 4. Graphic of trend of carbon change of teak management at UPHR "Kare Lestari".

Based on carbon reserve graphic trend and carbon change in the next 30 years and considered maximum teak cycle, so that can be simulated total carbon pool in sink C form is 311,335 ton/hectare with baseline 44,698 ton/hectare and expectation of C buffer is 30 % so carbon potential that can be traded is 186,644 ton per hectare that will able to absorb CO_2 684, 9903 ton per hectare per year. The complete detail is presented on table 11.

Table 11. Sequestration of CO_2 at UPHR Kare Lestari per year

Tree species	Sink C (t/ha)	Baseline C (t/ha)	Net C t/ha	Buffer 30%	Trade C t/ha	Trade CO_2 (t/ha)	Extent (ha)
Teak (0-35th)	267,003	38,53	228,473	68,5419	159,931	586,9471	406.16
Mahogany (0-20th)	25,850	4,613	21,237	6,3711	14,865	54,5578	135,40
Acasia (0-10th)	13,020	1,322	11,698	3,5094	8,188	30,0521	54,73
Albizia (0-10th)	5,462	0,233	5,229	1,5687	3,660	13,4333	29,53

Total	311,335	44,698	266,637	79,9911	186,644	684.9903	625,82

4. CONCLUSION

Conclusion.

Measurement model of carbon reservation at right forest that already has SVLK certificate is in form of carbon absorption and carbon change in next 30 years, considered maximum teak cycle, so that can be simulated total carbon reserve (carbon pool) in sink C form is 311,335 ton/hectare with baseline 44,698 ton/hectare and expectation of C buffer is 30 % so carbon potential that can be traded is 186,644 ton per hectare that will able to absorb CO_2 684, 9903 ton per hectare per year.

Suggestion.

The suggestion resulted based on this activity analysis is for right forest development planning on tread estimated point's level needed to support with information data from this result in form of spatial indicative distribution Karee's right forest areal. This data can be used as reference for estimate right forest carbon absorption potential that can be offered through voluntary carbon market scheme

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EFFECT OF LEAD ACETATE ON THE CONCENTRATION AND SPERM MORPHOLOGY IN MICE BALB/C (MUS MUSCULUS)

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Abstract: Air pollution is mostly dominated by motor vehicle exhaust gas. Lead is one of motor vehicle exhaust gas that is one of toxic heavy metal, one of which is a toxicant for sperm. This study was aimed to demonstrate effect of lead acetate on the concentration and sperm morphology in mice. Mice (Mus musculus) Balb/c divided into 2 groups. K group was the control group, P group was given with lead acetate 0.075 g/Kg BW 1x/day orally for 35 days. Result, all data were normally distributed and homogeneus, then analyzed using One Way Anova test. Result showed significant difference in sperm concentration and normal-shaped sperm morphology. In conclusion, lead acetate can significant reduce sperm concentration and normal-shaped sperm morphology in mice Balb/c (Mus musculus).

Keywords: Lead acetate, sperm concentration, sperm morphology

1. Introduction

Air pollution in Indonesia is increasing because with increasing traffic volume growth, which reached 15% per year (The World Bank Country Study, 1994). The largest air pollution is dominated by motor vehicle exhaust. Lead is one of the results of motor vehicle exhaust (Kusminingrum and Gunawan, 2008) that are toxic to the male reproductive system, especially in spermatozoa (Sokol et al, 2002).

Several studies on the toxicity of lead has been done. Common effects seen in men include: reduced libido, abnormal spermatogenesis (reduced motility and number), chromosomal damage, infertility, abnormal prostatic function and changes in serum testosterone (Flora et al, 2012). Animal studies, administration of lead acetate in mice decreased the number of spermatozoa in the epididymis (dosage 0:25%) and lower sperm concentration at high doses (doses 0.5%) (Wadi and Ahmad, 1999), lower testosterone levels, lower levels of LH and FSH (Hamadouche et al, 2013; Lamia et al 2008), even the administration of lead acetate study in female rats who are breastfeeding decreased testicular weight and volume, as well as a decrease in the diameter of the seminiferous tubules and germinal epithelium in children are breast-fed male rats (Dorostghoal et al, 2011).

Research conducted in humans, men are exposed to the exhaust emissions of motor vehicles obtained an average morphology and sperm concentration is lower if dibandingkankan with men who are not exposed (I'tishom et al, 2008; I'tishom et al, 2011).

This study was aimed to demonstrate effect of lead acetate on the concentration and sperm morphology in mice.

2. Material and Method

Animal: Three months old mice (Mus musculus) Balb/c were used for this study. Mice were housed in controlled rooms temperature and all standard procedures.

Experimental design: Mice (Mus musculus) Balb/c were divided into 2 groups. K group was the control group, P group was given with lead acetate 0.075 g/Kg BW 1x/day orally for 35 days. At the end of the entire study, the mice were sacrificed. Vas deferens were taken for examination of concentration and morphology of the sperm.

Sperm Concentration: Sperm concentration examination steps are 3-5 sperm density estimates in the field of view (magnification 400x), samples sucked with the leukocytes pipette and counted in a Neubauer counting chamber.

Sperm Morphology: The steps of sperm morphology examination are make a smear on a glass object, soak in methanol, safranin solution, wash immersion in phosphate buffer solution, flushing with a phosphate buffer solution, soak in a solution of crystal violet, rinse in distilled water, observe under the microscope with 1000x magnification and oil immersion, calculate sperm in normal-shaped and abnormal-shaped.

Statistical analysis: The results obtained from control and lead-induced animals are expressed as means ± SD. Statistical analysis was use one way Anova test with p value <0.05 was considered significant.

3. Result

Sperm Concentration

Administration of lead acetate reduce mean of sperm concentration. The result of one way Anova test showed significant decrease ($p<0.05$) sperm concentration (table 1).

Table 1 Effect of lead acetate on sperm concentration

Variable	K group (Mean±SD)	P group (Mean±SD)
Sperm Concentration	14.45±4.6	7.77±3.58*

*$p<0.05$

Sperm Morphology

Administration of lead acetate also reduce mean of normal-shaped sperm morphology. The result of one way Anova test showed significant decrease ($p<0.05$) normal-shaped sperm morphology (table 2).

Table 2 Effect of lead acetate on sperm morphology

Variable	K group (Mean±SD)	P group (Mean±SD)
Normal-shaped Sperm Morphology	86.33±3.08	61.67±7.81**

**$p<0.01$

4. Discussion

Induction of lead acetate in this study led to a decrease in sperm concentration and a decrease in normal-shaped sperm morphology in lead acetate-induced group compared with the control group . The same results lead acetate administration to lower the concentration of spermatozoa of mice significantly (Wang et al, 2008). The high concentration of lead in the cement can reduce sperm count significantly (Wu et al, 2012).

These results indicate that the induction of lead acetate also cause a decrease in normal-shaped sperm morphology significantly. Granting 0.5% lead acetate in drinking water for 6 weeks also showed a decrease in the percentage of motile spermatozoa, increase the percentage of abnormal sperm in the epididymis (Wadi and Ahmad, 1999). The same result, namely the provision of lead acetate 100 mg / KgBW increased abnormal sperm shape (Acharya et al, 2003).

Lead is a toxin that is common and persistent environment that can damage cell components and alter the cell's genetic. Lead can increase the production of free radicals and lower the antioxidant reserves in response to damage (Patrick, 2006). Lead in the blood of approximately 95-99% is carried by red blood cells, and binds to hemoglobin. Heaps of lead in the red blood cells and soft tissue allegedly most responsible for the toxic effects to the body (Patocka and Cemy, 2003).

Lead toxicity is able to increase the production of reactive oxygen species (ROS). The mechanism of the toxicity of lead in an increase in ROS through two ways: increase the production of ROS and lower antioxidant reserves. Increased ROS will cause lipid peroxidation, protein peroxidation and DNA oxidation nucleic acids (Ercal et al, 2001). Oxidative stress with the accumulation of ROS, especially $O2^{-}$ and H2O2 thought to contribute to cell damage, apoptosis, and cell death (Handy et al, 2009). Apoptosis that occurs in germ cells in the testes resulting in reduced germ cells resulting in a decrease in the concentration of sperm. As well as the resulting cell damage sperm abnormalities in cell shapes.

Lead can get into the brain resulting in decreased brain weight of mice significantly, increased residual lead in the rat brain, degenerative changes and hypertrophy of the endocrine cells of the pituitary gland, atrophy of the seminiferous tubules, decreased the number of Sertoli cells and Leydig, and a decrease in LH and testosterone in significant (Hamadouche et al, 2013) which resulted in the disruption of the process of spermatogenesis and steroidogenesis in the testes.

5. Conclusion

a. Lead acetate can significant reduce sperm concentration
b. Lead acetate can significant reduce normal-shaped sperm morphology

6. Recommendations

Researcher: Need further research to calculate the Sertoli and Leydig cells, spermatogonia, spermatocytes and spermatids. Measuring the production of LH, FSH, ROS, antioxidants, and MDA as biomarkers of lipid peroxidation.

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4 ECONOMIC

BACKWARD BENDING SUPPLY AND SUBSISTENCE ON-FARM HOUSEHOLD OF PADDY-CASH CROP

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Abstract : Ghatak and Ingersent (1984) state that the response of the agricultural labor market in developing country with underdeveloped agriculture is assumed to happen backward bending supply. Wolf (1983) states that farm production produced by understated farmer (peasant) is used to fulfill family needs. Scott (1983) states that subsistence is a unity between production and consumption. Based on those statements, the objectives of this study were to know whether there was a backward bending supply on-farm household of paddy-cash crop and to determine whether the subsistence was the cause of backward bending supply. Backward bending supply implies that an increase of wage is responded by reduction of work hour offered. This study was conducted in 2013 to 2014 in Sepanyul Village. The respondent of this study is 90 farm households of paddy-cash crop which were divided into three strata based on land area (small, medium and large). Multiple regression analysis was used to test the backward bending supply. In-depth interviews technique was used to find out the cause of backward bending supply to three farm households of paddy-cash crop consisting a small landowner, a medium landowner and a large landowner. The result shows that the labor supply on paddy-cash crop farm has happened backward bending supply. Backward bending supply happened is caused by farm households of paddy-cash crop are subsistence farmers on paddy farm. Farmers are as a producer and at once as a consumer.

Keywords: Backward bending supply, on-farm wage, subsistence.

1. Introduction

Indonesia is a developing country with underdeveloped agriculture. The economic structure of Indonesia is an agricultural country, because the majority of the Indonesian population work in the agricultural sector. Indonesia is categorized as a traditional agrarian country. (Rintuh C, 1995). It can be seen from the simplicity of the technology used by farmers, especially in sub-sector of food crops. Ghatak and Ingersent (1984) state that the response of agricultural labor in underdeveloped agriculture countries are assumed to occur backward bending supply. Backward bending supply may be indicated by the presence of a negative relationship between the wage to the amount of working hours, ie the higher the wage offered, the smaller the working hours offered, or the greater the leisure used.

The farm of food crop in Indonesia is still managed in a simple way. According to Soekartawi (2002), a farm should be managed by farmers such as managing a company. Farmer should allocate existing resources appropriately and efficiently in order to get a profit. To manage the farm effectively and efficiently is not an easy case, because farm relates to the process of plant life that is influenced by nature. The great risks on-farm makes farmers can't rely the farm to fulfil his life needs, so that the other income source is needed to support family life. It is appropriate with the opinion of Hart (1980) who states that smallholder works either on-farm activity or of-farm activity. Employment opportunities for the farmer to work at off-farm or non-farm activities is relatively large. It is because the work day on-farm is very short compared to the work hour which is available in a year, therefore the employment opportunity become relatively smaller, while the day-to-day living needs must be fulfilled.

Based on the objective in farming, Wolf (1983) classifies farmers into two, namely earthy farmer (peasant) and a modern farmer. Earthy farmer (peasant) is the farmer who is still dependent on nature, because of the low levels of knowledge and technology that they have mastered. Farm production is more destined to support his family life and not as a business enterprise to get the profit (profit-oriented). Modern peasant (farmer or agricultural entrepreneur) is a farmer whose business is intended to gain profits by using technology and modern management system.

The farm production which is more intended to fullfil the needs of famil is called subsistence. Scott (1983) states that subsistence farmer is a unified unit of production and consumption. In order to survive as a single unit, the main thing that must be done by farmer family is to fulfill needs as a subsistence consumer. Smallholder family work hard and long to obtain an additional income even if the income is not great value. According to Chayanov that the maximization of power owned by farmers as the only factor of production are owned abundantly, is referred to as self-exploitation.

Based on Ghatak and Ingersent (1983) statements, interesting to study more deeply whether there is a backwards bending supply on-farm household of paddy-cash crop. It is interesting also to study the cause of the backward bending supply. Whether the statement of Wolf and Scott (1984) who state that the results obtained from farm production is used to fulfill the needs of the family (subsistence) is the cause of backward bending supply. Thus, the purpose of this study was to determine whether the backward bending supply occurs on-farm household of paddy-cash crop and determine the cause of it.

2. Literature Review

According to Ghatak and Ingersent (1984), in relation to the change of wage level or income, the response of agriculture labor market supply in the developing countries change in supplying of labor in the agricultural sector. Sometimes, it can be assumed that the labor supply curve in a country that is underdeveloped agriculture will result a backward bending supply. Normally, the labor supply curve is expected to increase when the wage rate increases. Backward bending supply curve is shown on OS ". At the point E, the supply curve is normal and after that, the curve become backward bending which indicates the reduction of work hour of labor though the wage increase.

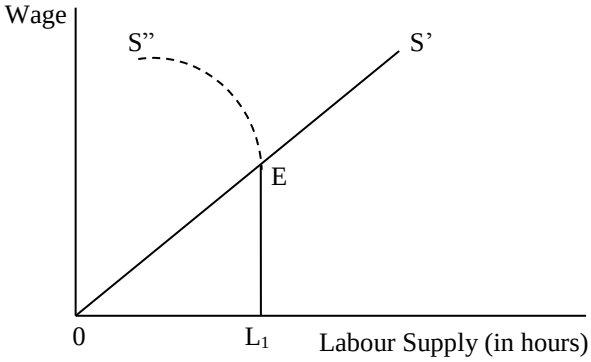

Figure 1. Supply Curve of Labour

Hart (1978) explains about the relationship between leisure time with income and the wage rate. The assumption of it that the labor market is in the perfect competition situation. Landless household, farmer's work hour is fully utilized as a laborer (figure 2), and the remaining is enjoyed as a leisure time. The attempt for getting income additional is done by increasing his work hour. The work hour of smallholder is used for both on-farm and off-farm activities, and the remaining is used to enjoy the leisure time. The activity of small landowner at the on-farm can be conducted on-farm er's land, the rent land or the other farmer's land which is cultivated with certain agreements. Compared to the landless farmer, this household has more opportunities to cultivate their lands and doing off-farm activities.

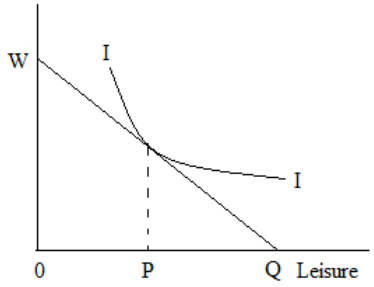

Figure 2. Landless Household

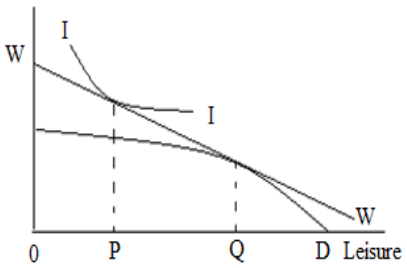

Figure 3. Small Landholding Household

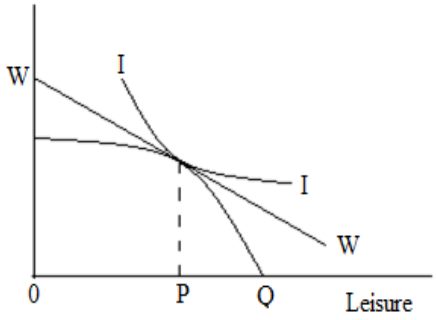

Figure 4. Medium Landholding Household

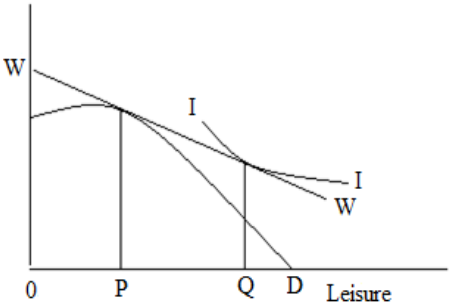

Figure 5. Large Landowning Household

The medium landowner (figure 4), the whole working hours of family is used for on-farm activity and it does not involve farm laborer. The family member is not working as farm laborer on the other farmer. Adequate land area will also produce sufficient income from on-farm activity, so it does not encourage the farmer to find a job from off-farm or non-farm activities. Because the land area is not large enough, the farmer doesn't use farm laborer. Labor requirement on the large landowner household can't be fulfilled from its family, therefore the necessary of labor on-farm activity is fulfilled from farm laborer (figure 5).

According to Clifton R. Wharton, subsistence can be divided into subsistence production and subsistence living. Subsistence production is characterized by a low degree of commercialization, while subsistence life related to the minimum level of life which is only for living. The pure subsistence farming is a unit that can stand on its own that all production is consumed himself and nothing is sold, and no user or producer of goods and services from outside who enters.

The minimalist way of peasant life does not be interpreted that they only plant crops that are consumed by himself because in fact peasant is part of a larger community in modern civilization. Farm is not just to fulfill necessities of life (biological) peasant. They live in socio-cultural life that is costly, therefore they require agricultural surplus to fulfill their social costs. It is appropriate with the opinion of Wolf (1983) which states that agricultural production, in addition to fulfill the necessities of peasant life, it is also for the fund replacements (for example: the means of production), ceremonial and ground rent fund. (Raharjo, 2004)

There are the differences of economic behavior between family subsistence-oriented farmers with capitalist enterprise. Subsistence farming families is a unit of production and consumption. In order to survive as a single unit, the main thing that must be done by a farmer family is subsistence needs as a consumer whose the magnitude depends on the size of the family. Fulfilling of minimum human needs are the main criteria in a way that is as reliable as choosing seeds, farming techniques, timing of planting, crop rotation, etc. Failure for subsistence farmers is a very sad thing, so they prefer the safe things than the advantages that can be gained in the long term. (Scott, 1983)

One of the characteristics done by farmer in farming is not to earn big profit by taking the risks, but trying to avoid the failure which would destroy his life. It is called risk- averse. According to Roumasset, this is a sensible thing if farmers adhere the principle of safety first (survival priority). Farmer prefers to minimize the possibility of disaster than income maximizing. Using of more than one kind of seed and scattered the land used for farm are classical ways to avoid the risks. The attitude of avoiding the risk also explains that farmer prefers to plant subsistence crops rather than another food crops which its harvest is sold. Risk tolerance for farmer family is different. It depends on the nearness of his resources to the subsistence basic needs of family. The family which has large members is in a more difficult position, because the minimum needs required for their livelihoods is bigger anyway. (Scott, 1983)

Hypothesis
Based on the background, the formulation of the problem and the research objectives can be formulated the hypothesis as follows:

1. It's guessed that backward bending supply happens in household farm of paddy-cash crop.
2. It's guessed that subsistence is the cause of backward bending supply

3. Research Method

Research Plan : This research uses explanatory pattern that describes the position and relationship of variables used in the study. (Sugiyono, 2013). For the first purpose is used independent variables, namely : the dependency ratio, the number of working household member, the total income of farm household, the on-farm wage, the off-farm wage, the age of marriage, the education and the land area. The dependent variable is work hour on-farm household of paddy-cash crop.The second purpose, namely analyzing the cause of the backward bending supply is a descriptive study and more emphasis on process rather than product or outcome. In the qualitative research, the researcher is a key instrument.

Research Location : Study location is selected purposively in Jombang Regency, Province of East Java, Indonesia, because Jombang is one of the largest paddy producers in East Java. The strata determination of the land area is executed by using the criteria as follows:

Strata 1 (one) is the small landowner : $< (\bar{x} - \frac{1}{2} SD) = < 0{,}378$ Ha.
Strata 2 (two) is the medium landowner : $(\bar{x} - \frac{1}{2} SD)$ up to $(\bar{x} + \frac{1}{2} SD) = 0{,}378$ Ha - 0,834 Ha
Strata 3 (three) is the large landowner : $> (\bar{x} - \frac{1}{2} SD) = >$ 0,834 Ha

Sample Selection : The determination of sample is conducted by multistage sampling method, namely the method of sample collection done gradually which is then followed by using stratified random sampling method. The sampling

with this method conducted by making the layers (strata), and then from each layer is taken a number of respondents randomly. The number of respondents of each layer (strata) is the study sample. The number of respondents in this study are 90 farm households of paddy- cash crop which are divided into three strata based on size of land area and each strata has 30 respondents. It is used 3 farm households of paddy-cash crop as informants to find out the cause of the backward bending supply.

Data Collection Technique and Data Types : Data used in this study are primary and secondary data. The primary data sourced directly from farm household of paddy-cash crop related to the study variables. Primary data were collected through interviews using a questionnaire as well as direct observation in the field. In-depth interview up to data becomes saturated used to determine the cause of the backward bending supply. Secondary data are sourced from formal institutions and formal non related using the method of study documentation, namely a technique of collecting data obtained from the written heritage in the form of archives related to the research problem (Hadari, 2005).

Limitation and Measurement of Variables

1. The dependency ratio
   is the ratio between the number of household members who have not been productive and unproductive with the number of household member are productive.
   The productive member of the household is a household member aged at least 10 and older and not attending school
2. The number of working household member
   is the total number of household members (husband, wife and other household members) who work both on-farm and off- farm/non- farm activities.
3. The Total Income of Farm Household
   is the whole revenue earned from on-farm , off-farm or non-farm activities
4. The On-Farm Wage
   is income earned from on-farm activity divided by the amount of work hour for one year in farm activity.
5. The Off-Farm Wage
   is is income earned both off-farm and non-farm activities are divided by the number of work hours from off-farm and non-farm activities in a year
6. The Age of Marriage
   is the length of the marriage age of farm household
7. The Education
   is the length of formal education ever be taken by the head of the household (unit : year)
8. The Land Area
   is the area of paddy field cultivated by the head of the farm-household (unit: ha)
9. The Work hour on-farm household of paddy-cash crop
   is the work hour of farm household on-farm activity

Method of Analysis: The first hypotheses is tested using multiple linear regression analysis with OLS. The second hypotheses used four-stages method, namely data collection, data reduction, data display and making conclusions. Data have been collected through in-depth interviews by the process of sorting and reduction focused on simplification. Reduction may be performed since data collection began in order to eliminate irrelevant data. The next stage is displaying of data by describing the information that has been structured so that it can be drawn to a conclusion. The last step is to interpret the data that has been compiled and processed into a meaningful information. (Bungin B, 2003)

4. Discussion

The results of statistical test of the whole farm household of paddy-cash crop is intended to determine the factors that affect work hour on-farm household of paddy-cash crop (Y). Using dummy in multiple linear regression is intended to determine the magnitude of difference in work hour on-farm household based on land area (strata) for small landowner, medium landowner and large landowner.

Based on the result of statistical test is obtained multiple linear regression model as follows:

$$Y = a + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6 + b_7X_7 + b_8X_8 + b_9D_1 + b_{10}D_2 + u$$

$$Y = 65.864 - 17.274\ X_1 - 29.192\ X_2 + 3.989E\text{-}6\ X_3 - .005\ X_4 + .000\ X_5 + 1.764\ X_6 + 4.534\ X_7 + 1261.239\ X_8 + 94.649\ D_1 + 839.723\ D_2 + u$$

The results of the analysis work hour of the whole farm-household of paddy-cash crop have F-test 289, 220 with 100% confidence level. It means that the independent variables, namely: X1 (the dependency ratio), X2 (the number of working household member), X3 (the total income of farm household), X4 (the on-farm wage), X5 (the off-farm wage), X6 (the age of marriage), X7 (the education) and X8 (the land area) simultaneously have a significant effect to the work hour of farm-households of paddy-cash crop. R2 which is resulted from statistical test is 97.3% which indicates that the

independent variables used in multiple linear regression model have the opportunity 97.3 % to explain dependent variable (work hour of on-farm activity), while the remaining 2,7% is influenced by other variables not included in the model.

To determine the factors that significantly affect to the work hour of farm households on-farm activity (partial testing) used the t-test. The work hour of farm household on-farm activity is significantly affected by the number of working farm-household member (X2), the total income of farm household (X3), the on-farm wage (X4), the off-farm wage (X5), and the land area (X8).

The number of working household member (X2) has a significant effect to work hour on-farm of paddy-cash crop with a confidence level of 90.5% and its relationship direction is negative. This implies that if there is an increasing a member of household who works, it will reduce the contribution to the work hours of farm-household amounted to 29.192 hours / year. This is because most of the farm-household members work on the off-farm or non-farm activities.

The on-farm wage (X4) has a highly significant effect to work hour on-farm household of paddy-cash crop with 100% confidence level and has a negative relationship direction. This is because the farm-household in Sepanyul Village is the subsistence farm household, namely, the most of farm household products are used for their own consumption, and the remaining is used as a capital for the next growing season, and therefore the farm-household doesn't interested with the increasing of the on-farm wage. Thus it can be stated that the labor supply response of all farm households on-farm activity occur backward bending supply.

The off-farm wage (X5) has a significant effect to work hour on-farm household of paddy-cash crop with a 95.6% confidence level and has a negative relationship direction. This means that if there is an increasing of off-farm wage, the farm household will reduce its work hour of on-farm activity assuming that the other factor is constant. This is because an increasing of the off-farm wage causes the farm household is interested to increase their work hour.

The land area (X8) has a highly significant effect to the work hour of farm household of paddy-cash crop with 100% confidence level. The direction relationship between the land area and the work hour on-farm activity is positive. It means that the larger the land area, the greater necessity for work hour of farm household on-farm activity (assuming that other factors are constant) and required the assistance of farm laborer either individually or using the wholesale system. It is appropriate with the opinion of Hart (1980) which states that labor requirement on large landowner households can not fulfilled by member of their family.
The dependency ratio (X1) does not significantly affect to the work hour on-farm household of paddy-cash crop because the number of household members who have worked are relatively little.

The age of marriage refers to other household member, in this case is children. The older of marriage, the more mature the age of the children anyway, which expected to assist the farm household head at the on-farm activity. The age of marriage (X6) doesn't effect significantly to work hour on-farm household of paddy-cash crop. This is because the household member in working age does not work at the on-farm activity, but they work on off-farm activity or going to school.

The education of household head (X7) does not affect significantly to work hour of farm household of paddy-cash crop. It is because the on-farm activity is a work which can learned hereditarily from their parents, so it is not overly demanding a high level of education.

Both of dummy indicate a real difference toward the work hour of farm-household between strata with a level of confidence 90.3% and 98.6%.

Based on the results of in-depth interviews be obtained the cause of the backward bending supply on-farm households of paddy-cash crop in the village Sepanyul, Gudo District, Jombang Regency, East Java Province, that they are subsistence farmers who behave as producers and at once as consumers especially on paddy farm. The option to be subsistence farmer is because farmers avoid the risk (risk-averse), scarcity of rice and adheres to the principle of safety first (prioritize survivors) to ensure the availability of family food. The rice produced from paddy farm which is cultivated by farmers selves making farmers feel more secure and comfortable, because the whole activity of paddy farm are done wholeheartedly so farmers know exactly the quality of rice consumed by farmers and their family. If the rice is sold overall, farmers worry that they can not afford to buy rice in the market with the price of rice is more expensive, so that the safety of the family to fulfill their basic needs are not fulfilled.

5. Conclusion

1. There is backward bending supply on-farm household of paddy-cash crop

2. The cause of the backward bending supply on-farm household of paddy-cash crop in village Sepanyul District Gudo, Jombang, is that the farmers are subsistence farmers who acts as producer and at once as a consumer especially on paddy farm.

6. Recommendation

Because the farm household of paddy-cash crop is subsistence farmer, and in order to fulfill the basic needs of food for them, namely: rice, the government can increase the intensity of agricultural extension so that failure on-farm especially on paddy, can be avoided. Giving the support to the off-farm activity also should be done, especially the activities that can accommodate the surplus of work hour on-farm household, for example, rural industries, so that both on-farm and off-farm activities can be executed hand in hand in order to improve the welfare of farmer.

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THE EFFECT OF PROFITABILITY ON CORPORATE VALUE USING MODAL STRUCTURE AND DIVIDEND POLICY ON GO PUBLIC MANUFACTURING IN 2013 STOCK EXCHANGE OF INDONESIA

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Abstract: This research is aimed to test and analyze profitability effect toward company value with company value and dividend policy as intervening variable towards manufacturing company which has gone public in Indonesian Stock Exchange in 2013. This research used secondary data with purposive sampling. Data analysis technique use Partial Least Square Path Analysis. In this research, the first result of the analysis of profitability have a positive impact and significant towards company value, the second profitability affect negatively and significantly towards capital structure, the third profitability have a positive effect and significant towards the company value, the fourth company value affects positively and significantly towards company value, the fifth dividend policy affect positively but not significant towards company value, profitability have direct impact towards company value and not through capital structure and dividend policy as intervening variable.

Keyword: profitability, company value, capital structure, dividend policy

1. Introduction

Profitability decides company values in the eyes of the investor. The better the company value, more investors would likely to invest into the company's capital. With growing capital, company can increase product's marketability. Profitability is company's ability in generating profit during certain period (Herry, 2012). Profitability ratio is ratio which depict company's ability in generating profit through all ability and resources that a company has, which is originated from selling activity, asset utilization, and capital utilization.

Capital structure is funding proportion through company's debt (debt financing) which is company's leverage ratio. Debt is capital structure's element. Capital structure is productivity and company's performance key fixer. Structure capital structure explain that company's financial policy in deciding capital structure (mixture of equity and debt) aimed to optimize company value (value of the firm).

Dividend is profit allocation towards the owner of the limited liability company (Soemarso, 2001 in Nofrita, 2013). Dividend policy basically is deciding the proportion of profit allocation which will be given to shareholder. If the company decide to distribute the profit as dividend, the profit reduction would be held. Next affect would be to reduce internal resource's ability, and vice versa when the company chose to hold the profit, it would strengthen and enlarge the internal fund.

Therefore, in this research, we use capital structure and dividend policy as intervening variable which mediates profitability relation towards company value.

Review of related literature

Profitability is the company's ability to generate profits for a certain period (Herrera, 2015). Profitability ratios showed a picture of the effectiveness of management of the company to generate profits (Kamaludin & Indriani, 2012). This ratio as a measure of whether the owner or shareholder can obtain a reasonable rate of return on their investment. Profitability ratios depending on the accounting information taken from financial statements. Because profitability in the context of ratio analysis, measuring the income according to the Income statement in the book value of the investment. Values greater profitability than the interest rate applicable Bank, then the business should be developed because it can generate profits (Riyanto, 2001).

Capital structure is a consideration or comparison between the number of long-term debt with its own capital. Capital structure measured by debt-to-equity ratio (DER). This ratio shows the composition or structure of the capital of the total capital of the company. The higher the DER shows the composition of total debt (short-term and long-term) greater than the total capital itself, thus impacting the greater the burden on companies to outsiders (creditors). Dividend return is one of the most awaited by investors as well as a signal that the company is at a high level of profitability. Dividend policy is include a decision on whether earnings will be distributed to shareholders or will be retained for reinvestment in the company (Kamaludin & Indriani, 2012). Brigham (2001) explains that profitability is a major determinant as consideration of dividend payments. The higher profitability indicates better management in running the company's operations. Companies with high profits can afford to pay higher dividends.

Hypotheses and Analysis Model

1.Profitability towards company value

The better growth prospects for the company's profitability in the future means getting better assessed as well, meaning the better the company's value in the eyes of investors. Profitability is the company's ability to generate profits for a certain period (Herrera, 2015). Will affect the profitability of a company policy of the investors on the investment made. The company's ability to generate profits will be able to influence the policy of the investors to invest their funds in order to expand its business (Husnan 2001 in Nofrita, 2013) .:

H1: Profitability affect the value of the company.

2.The effect of profitability towards capital structure

Profitability is the company's ability to generate profits for a certain period (Herrera, 2015). Capital structure is a consideration or comparison between the number of long-term debt with its own capital. The use of external funds (debt) can give rise to a fixed cost ie interest costs. High profit can be used for interest payments and principal repayments in installments, in order to obtain tax benefits.

H2: Profitability affect the capital structure

3.The effect of profitability towards dividend policy

Dividends are the distribution of profits to the owners of a limited liability company (Soemarso, 2005). Companies with high profits can afford to pay a higher dividend (Brigham, 2001: 24) in Nofrita (2013) .Kebijakan dividend is include a decision on whether earnings will be distributed to shareholders or will be retained for reinvestment in the company (Kamaludin & Indriani 2012). Dividend payments to investors is a signal that the company has a high profit.

H3: Profitability affect the dividend policy

4.The effect of capital structure towards company value

Modigliani and Miller's approach (1958) in Hermuningsih (2012) with the income tax argued that companies that have debts will have a higher value when compared to companies with no debt. The increase in the value of the company occur due to interest payments on debt are tax reductions therefore received investor operating profit will be greater. Subsequent impact due to greater profits received, the value of the company will also be larger (Kamaludin & Indriani, 2012).

H4: The effect on the capital structure of the Company Value

5.Dividend policy towards company value

Dividend return is one of the most awaited by investors as well as a signal that the company is at the level of high profitability. Company with high income can afford to pay a higher dividend (Brigham, 2001: 24).

If the company chooses to divide the profit as dividend, it will reduce the profits to be detained. Impact will further reduce the ability of internal resources, and vice versa if the company chooses retained earnings, it will strengthen or increase internal funds. Thus the dividend policy will be related to the value of the company.

H5: Dividend policy affect the value of the Company.

6.Profitability towards company value utilize with Capital structure as intervening variable

The use of debt will increase, but only on the value of the company up to a certain point. After that point, the use of debt actually reduce the value of the company. In the trade-off, companies that pay high taxes should use more debt than companies that pay low taxes.

H6: Profitability effect on the Company's Capital Structure Value as an intervening variable.

7.Profitability towards company value through dividend policy as intervening variable

Profitability ratios showed a picture of the effectiveness of management of the company to generate profits (Kamaludin & Indriani, 2012). Dividend policy is include a decision on whether earnings will be distributed to shareholders or will be retained for reinvestment in the company. Companies with high profits can afford to pay a higher dividend (Brigham, 2001: 24) .The company can distribute dividends to shareholders will increase the value of the company. If high corporate profits, the dividends received rose. Companies that are able to distribute cash dividends in accordance with the dividend policy is a signal that the company has a good profit.

H7: Profitability effect on the Company's Dividend Policy Value as an intervening variable

2. Research Method

Population and sample

Population in this research is all company in manufacturing sector which is listed in Indonesian Stock Exchange (BEI) in 2013. While as sampling is done with purposive sampling. Population which will be chosen as sample is the population which has specific criteria, which are:

1. Manufacturing company which includes basic industrial and chemistry sectoral, various industrial sectoral, consumption product sectoral.
2. Sample company is manufacturing company which distributes cash dividend in 2013.
3. Financial report production completely (income statement, balance report, with end period per December 31 of 2013 and company's financial report that has no loss.
4. Financial report is stated in Rupiah (Rp).

Type and Data Source

Data type applied in this research is documentary data which are reports as owned by the manufacturing company listed in Indonesian Stock Exchange BEI) in 2013. Data source used in this research is secondary data obtained from

manufacturing company listed in BEI year 2013 and 2014 to know the final dividend given proportionally for the enidng year of 2013.

Operational Definition

The research used 3 variables, which independent variable, dependent variable, and intervening variable.

1.Dependent Variable

Dependent variable in this research is the company value as measured by the ratio of the market is the price book value (PBV). According to Weston and Brigham (2001), the formula for calculating the price to book value is shown by the following formula:

$$PBV = \frac{\text{share price}}{\text{The book value of stock}}$$

Stock market price used is the daily closing price (closing price) averaged per year. While the book value of shares obtained by using the following formula:

$$\text{The book value of shares} = \frac{\text{Total equity}}{\text{Total shares outstanding}}$$

2.Independent Variable

Independent variables in this study were Profitability as measured by ROE (Return On Equity). According to Herrera (2015) formula used to calculate the return on equity:

$$ROE = \frac{\text{Net income}}{\text{Total equity}} \times 100\%$$

3.Intervening Variable

An intervening variable in this study there are two capital structure and dividend policy. According to Herrera (2015) formula with the capital structure of the balance sheet approach is:

$$\text{Structure of Capital} = \frac{\text{Total long-term debt}}{\text{Total equity}} \times 100\%$$

Dividend Policy in this study was measured by (Herrera, 2015):

$$\text{Dividend Payout Ratio (DPR)} = \frac{\text{Cash dividends per share}}{\text{Earnings per share}} \times 100\%$$

Data Analysis Technique

PLS (Partial Least Square)

PLS analysis also apply two important phases, which is the measurement model and structural model. Data in measurement model evaluated for deciding validity and reliability. The part of measurement model phase including:

1.Inidvidual loading of every question item
2.Internal composite reliability (ICR)
3.Average variance extracted (AVE)
4.Discriminant validity (Chin, et al, 2010)

If data has fulfilled the requirement in measurement model, the next phase is evaluating structural model. In structural model test the hypotheses in which the results would show through significancy of:

1.Path coefficients
2.T-statistics
3.R-squared value (Chin et al, 2010)

In this research, hypotheses testing applied partial least square analysis with SmartPLS program version 2.0 M3.

1.Model evaluation

Relation model of all latent variable in PLS composed of 3 measurement, which are:

a. Inner model, specify latent variable relation (structural model) which depict latent variable rekation based on substantive theory.
b. Outer Model specify latent variable with indikator or manifesting variable (measurement model), outer model is also called as outer relation which defined how every indikator block relating to othe latent variable.
c. Estimation of latent variable (weight relation). Relation model can be assumed as latent bariabel and indicator or manifest variable in zero mean scale and variance unit (standaridsed value) so location parameter (constant parameter) can be removed in model without affecting generalization value. Parametric technique for significancy paramater is not needed because PLS does not assume the existence of certain distribution for estimation of the parameter (Chin et al, 2010).

The reason the researcher chose and applied PLS is:

1. The total of the path in the research is more than one.
2. The sample is less than 100.

Research results and discussion

1. Descriptive Analysis

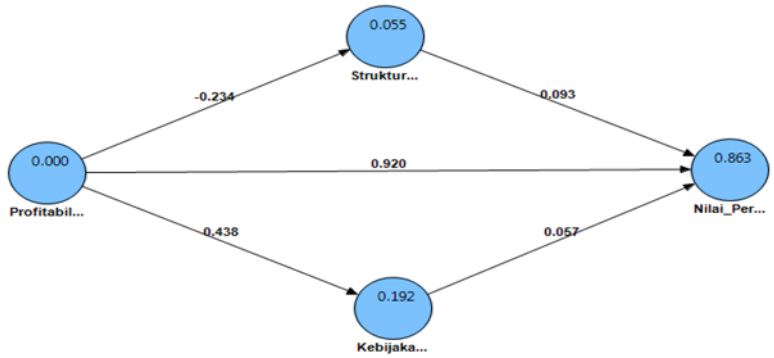
table 4.1
Description of Research Data

	N	Minimum	Maximum	Mean	Std. Deviation
Profitabilitas	48	2.1020	118.6020	21.161729	19.0812228
Struktur Modal	48	.0500	168.1530	23.392271	37.7119819
Kebijakan Deviden	48	6.0850	165.2640	41.511521	30.7397066
Nilai Perusahaan	48	.2910	25.6030	3.654938	4.6800079
Valid N (listwise)	48				

2. Path Analysis

To test the hypothesis of the study used analysis Partial Least Square (PLS) with SmartPLS program. Structural drawings to look at the relationship between variables in this study are as follows:

Figure 4.1
Structural framework with PLS Path Analysis



3. Inner Model Evaluation Through PLS

a. The value of R-Square

The first evaluation of the inner workings of the model seen from the value of R-Square or determinasi.Berdasarkan coefficient data processing with PLS, resulting value of R-Square as follows:

Tabel 4.2
Nilai R-Square

	R Square
Capital Structure	0.055
Dividend Policy	0.192
Company Value	0.863

The value of R-Square for the capital structure is equal to 0.055 means that the percentage of the magnitude of the effect of profitability on the capital structure is 5.5% while the rest is explained by other variables.

R-square value of the dividend policy is of 0.192 means that the percentage of the effect of the dividend policy tehadap dalah profitability at 19.2% while the rest is explained by other variables.

R-square value for the company's value is equal to 0.863 means that the percentage of the magnitude of the effect of profitability, capital structure and dividend policy on the value of the company amounted to 86.3% while the rest is explained by other variables.

In the PLS model, goodness of fit known assessment of the value of Q2. Value Q2 has the same meaning as the coefficient of determination (R-Square) on regression analysis, where the higher the R-Square, then the model can be said to be more fit to the data. From Table 4.2 Q2 values can be calculated as follows:

Value Q2 = 1 - (1- 0.055) x1- 0.192) 0.863 x1-)
= 0.896

From the results of calculations known value of Q2 amounted to 0.896, meaning that the magnitude of the diversity of the research data that can be explained by the structural model developed in this study was of 89.6%.

b. Hypothesis testing with Inner Weight
Research hypothesis testing using PLS analysis performed using inner table weight. The research hypothesis is acceptable if the value of t (t-statistic) ≥ t table at an error rate (α) of 5% is 1.96. Here is the path coefficient value (original sample estimate) and nilait count (t-statistic) on the inner models:
Tabel 4.3
Hasil Nilai Koefisien Path dan t-hitung

	Path Coefficient	T Calculate
Profitability-> Company Value	0.920	14.362
Profitability -> Capital Structure	-0.234	4.151
Profitability -> Dividend Policy	0.438	6.376
Capital Structure-> Company Value	0.093	2.471
Dividend Policy -> Company Value	0.057	0.849

From table 4.3 proven research hypothesis is as follows:
1. The coefficient of path influences the profitability of the company's value is 0.920 to 14.362 t greater than t table. This shows there is positive and significant correlation between the profitability of the company's value, so the higher the value the higher the profitability of the company.
2. The path coefficient effect of profitability on the capital structure is -0.234 to 4.151 t greater than t table. This shows there is a negative and significant influence between the profitability of the capital structure, so the higher profitability of the more rendahstruktur capital.
3. The path coefficient value influence the profitability of the dividend policy is 0.438 to 6.376 t greater than t table. This shows there is positive and significant correlation between the profitability of the dividend policy, so the higher profitability of the higher dividend policy.
4. The path coefficient influence of capital structure to the company's value is 0.093 with 2.471 t greater than t table. This shows there is positive and significant correlation between capital structure to the company's value, so the higher the capital structure the higher the value of the company.
5. The path coefficient influence on the value of the dividend policy of the company is 0.057 to 0.849 t less than t table. This shows there is positive but not significant between the dividend policy on firm value.
The test results of direct and indirect effect is presented in the Table below:
Table 4.4
Results Effect of Direct and Indirect

	Direct Effect	Indirect Effect of Capital Structure	Indirect Effect Through Dividend Policy
Profitability -> Value Company	0.920	-0.021	0.024
Profitability -> Capital Structure	-0.234		
Profitability -> Dividend Policy	0.438		
Capital Structure -> Company Value	0.093		
Dividend Policy -> Company Value	0.057		

Based on the table above, it can be known that:
1. The value of indirect effect on the profitability of the company's value through its capital structure -0021 <from the direct effect of 0.920 means that the capital structure is not an intervening variable of profitability to the firm value.
2. The indirect effect on the profitability of the company's value through dividend policy for 0024 <from the direct effect of 0.920 means that the dividend policy is not an intervening variable of profitability to the firm value.

3. Discussion

1. Effect of Profitability of the Company's Value
In this study the profitability of positive and significant impact on the value perusahaan.Sesuai with the purpose and benefits of profitability ratio (Herrera, 2015) which measures the company's ability to generate profits for a certain period, assess earnings growth over time. The better the significant profitability growth in the future prospects of the company assessed the better as well, meaning the better the company's value in the eyes of investors. These results are consistent with studies conducted Ikbal, et al (2011) also states bahwaprofitabilitas positive and significant effect on firm value.
2. Profitability Effect on Capital Structure
The second hypothesis is based on the analysis of research THAT profitability suspect has an influence on the capital structure can be accepted and proven true. In this study the profitability of a significant negative effect on the capital structure. The higher profitability of the lower capital structure. The higher the income earned the company the ratio of long-term debt to equity lower. Because the company will be more use of internal funding sources compared to using external funding sources (debt). These results are consistent with studies conducted by Hermuningsih, Sri (2012) also stated that profitability significantly and negatively.
3. Effect on Profitability Dividend Policy
Based on the analysis of profitability and significant positive effect on dividend policy. Brigham (2001) explains that profitability is a major determinant as consideration of dividend payments. The higher profitability indicates better management in running the company's operations. Companies that have high profitability will usually also distribute high dividends to investors. Large and small percentage of dividends distributed depends on the profit earned by the company. When experiencing a loss then no dividends are distributed. These results differ from the results Nofrita (2013) which states no significant impact profitability positively to the dividend policy.
4. Effect of Capital Structure on Corporate Value
Based on the analysis of capital structure and significant positive effect on firm value. The better the capital structure the better the value of the company.
5. Effect of Dividend Policy of the Company's Value
Based on the analysis of dividend policy but not significant positive effect on firm value. These results are consistent with the theory According to MM dividend payout ratio will not affect shareholder value. The company's value is determined solely by profitability (earning power), or investment policy. MM assumes perfect capital markets, the capital market is perfect dilution and imbalance in the market, including the stock price is only short-term, long-term mechanism to make the stock market over-value or under value will return to the equilibrium price. These results together with the results of research conducted by Ikbal, et al (2011) stating that the dividend policy and no significant positive effect on firm value.
6. Effect of Profitability of the Company with a value of Capital Structure as an intervening variable
Based on the analysis of hypothesis sixth unacceptable and unsubstantiated. According to the MM value is determined solely by the power company profit (earning power), or investment policy. Profitability will affect the value of the company directly without capital structure as a mediating variable. Investment policy of the most major investors is the level of profits from the company measured by profitability ratios would make investors more eager to invest in the company.
7. Effect of Profitability of the Company with a value Dividend Policy as an intervening variable
Based on the results of the analysis of the seventh hypothesis can not be accepted and proven kebenarannya.Menurut MM dividend payout ratio will not affect shareholder value. The company's value is determined solely by profitability (earning power), or investment policy. MM assumes perfect capital markets. In a perfect market dilution and imbalance in the market, including the stock price is only short-term, long-term mechanism to make the stock market over-value or under value will return to the equilibrium price. MM suggests that the effect of the dividend payment to shareholders wealth will be offset by the same amount by way of purchase or fulfillment of any other fund. In investment decisions given situation, then, if the company paid dividends to shareholders, the company must issue new shares in lieu of the dividend payment amount. Thus the increase in income from dividend payments will be offset by a decrease in share prices as a result of the sale of new shares. Therefore, if the dividend is divided or detained does not affect the prosperity of both saham.Semakin holder means prospects for corporate profitability growth in the future assessed better as well, meaning the better the company's value in the eyes of investors

4. Conclusion

1. Conclusion

Based on the analysis and hypothesis testing described it can be concluded as follows:
1. Profitability positive effect on firm value.er
2. Profitability negative and significant effect on the capital structure.
3. Profitability positive and significant effect on dividend policy.
4. capital structure and significant positive effect on firm value. The better the capital structure the better the value of the company.
5. The dividend policy but not significant positive effect on firm value.

6. The result of a direct influence on the profitability of larger enterprise value (0.920) than the indirect effect with variable capital structure as a mediator (-0021).
7. The result of a direct influence on the profitability of larger enterprise value (0.920) than the indirect effect with variable dividend policy as a mediator (0024).

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EFFECT ON THE STRUCTURE OF EXPERIENCE AND KNOWLEDGE AUDITOR TRAINING OF FRAUD (STUDY IN OFFICE OF PUBLIC ACCOUNTANTS IN EAST JAVA)

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Abstract: According to Ashton (2001) that: (1) possession of special knowledge is decisive expertise, (2) an expert knowledge gained through work experience over the years. Furthermore, it can be said that in order to achieve expertise, an auditor must have a high knowledge in the field of auditing. This knowledge can be obtained from formal education to the level of professional education expanded and supplemented, among others through auditor training and experiences in the practice of auditing.
Experience more will generate more knowledge (Christ, 2003). Someone who did the work according to their knowledge will provide better results than those who do not have sufficient knowledge of his duty.
Crimes committed in the world of financial services is due to the increasing acts of fraud / error disclosure of financial statements is intentional (fraud), which raises fears for the business world.
Studies on Public Accountant Auditor or that are in the public accounting firm in East Java as many as 53 companies public accounting firm with the sample criteria is auditor as partner positions, supervisors, and assistant auditor has S1 Accounting education, experience working in the firm for 2 years.
The analysis technique used by using multiple regression with dependent variable structure Auditor knowledge about fraud, while as an independent variable is Experience Auditor and auditor training.

Key words: Experience, knowledge, Exercise, Fraud

1. Introduction

Background of the problem

With the competition and all efforts for the development of each company it will not be separated from the development of technology that requires qualified human resources more than ever . Economic policy makers , businesses and communities are challenged to immediately make the therapy according to their respective areas of business so that economic development and its existence is not hampered by issues that arise barn . (Ridwan Simanjuntak , 2007)

According to Ashton (2001) that: (1) possession of special knowledge is decisive expertise, (2) an expert knowledge gained through work experience over the years. Furthermore, it can be said that in order to achieve expertise, an auditor must have a high knowledge in the field of auditing. This knowledge can be obtained from formal education to the level of professional education expanded and supplemented, among others through auditor training and experiences in the practice of auditing.

Experience more will generate more knowledge (Christ, 2003). Someone who did the work according to their knowledge will provide better results than those who do not have sufficient knowledge of his duty.

Crimes committed in the world of financial services is due to the increasing acts of fraud / error disclosure of financial statements is intentional (fraud), which raises fears for the business world.

From some description above , the researchers took the title " Experiences Influence And Training Of Knowledge Structure Auditor About Fraud . "

Formulation of the problem

How does Experience And Training Of Knowledge Structure auditor About Fraud ?

Research purposes

To demonstrate empirically how the influence of experience and training of auditors About Knowledge Structures Against Fraud .

2. LITERATURE REVIEW

The concept of error and fraud

Indonesian Institute of Accountants (IAI) " in the Public Accountants Professional Standards (SPAP) provides a definition of errors and irregularities as the following (IAI, 1994: 316.2 & 3).

Cheating / fraud was misstatement or loss amounts or disclosures in the financial statements were intentional. Irregularities include fraudulent financial reporting that is done to present financial statements that are misleading, and often referred to management fraud, and abuse of assets that are often referred to with the element of embezzlement. Fraud can consist of the following actions.

a. Deeds that contain elements of manipulation, falsification or alteration of accounting records or supporting documents that is the source for the preparation of financial statements.

b. Presentation of false or deliberate omission of events, transactions or significant others.

Knowledge Auditor

According Bhen et al (1997) there was a trend-party renderers financial statements will hide errors and irregularities that occur. Many errors discovered by accident or through complaints (complaints) from the other reports.
The auditor's knowledge in the memory is frequently used as one of the key work effectiveness. Previous knowledge about the fallacy useful to plot the probability of error conditions (Nelson et al., 2005). In auditing, the knowledge of how the various patterns associated with the possibility of error in the financial statements is essential for effective planning (Christ, 2003).

Experience Conducting Audits

Audit quality attributes were recommended by Bhen et. al (1997) is
In conducting the audit until a statement of opinion, the auditor shall act as an expert in the field of accounting and auditing. Achievement of these skills begins with formal education are extended through further experiences in the practice of auditing, (SPAP, SA Section 210, 2001). Experience in auditing practices are also required to junior assistant, assistant junior, who had entered into a career auditing should obtain professional experience with adequate supervision and review of work of more experienced superiors.
Experience is an important attribute possessed by the auditor, it is proved by the level of mistakes made by the auditors were not experienced much more than an experienced auditor (Ashton 1991). Results of research conducted by the Christ (1993) found evidence that use of attributes of experience with respect to quality based on the assumption that the task of providing feedback that is useful to how things are done better, which is needed by decision-makers to improve performance (christ, 2003 in Murtanto and Gudono, 2000). On the other hand, Nelson, et al (2005) say that an experienced auditor will have advantages in terms of 1) detecting the error, 2) understanding the mistakes accurately, and 3) look for the cause of the error. Through these advantages would be beneficial for the client to make improvements and clients will be satisfied.

Expertise Conduct Audit

Training is an activity that aims to improve the employability of participants who eventually will lead to changes in the cognitive aspects of behavior, skills and attitudes (Hamalik, 2000).
According Bhen et. al (1997) Expertise is Precautionary professionals require auditors to fulfill their professional responsibilities with competence and diligence. This implies that members have an obligation to carry out professional services as well as possible in accordance with their capabilities, and the ability to be sharpened by increasing their knowledge through professional training training Audit (Ridwan, 2002). Errors can be detected if the auditor has the expertise and precision. Experts interpreted as an accounting and auditing, Professional Standards of Certified Public Accountants / SPAP (2001) and a careful emphasis on finding the types of errors that may exist through caution (Mautz and Sharaf, 1961) with prudence this will give satisfaction for clients.

Hypothesis

The influence of experience on the structure of the auditor's knowledge of the mistake.
According to. Hayes-Roth, and Hutchinson, and Murphy and Wright in Hartoko et al. (1997) suggest that someone with more experience in a particular field have more items stored in memory. This is supported by research and Tromant Choo (1991) which states that experienced auditors will be given more types. items rather than items that are similar, while the more experienced auditors were not given similar items. Another case with Ashton (1991), in his research on the relationship of experience and knowledge as a determinant of the level of expertise of audit concluded that the difference in the experience of auditors can not explain differences in the level of knowledge possessed by the auditor. Auditor with the same level of experience may show great differences in the level of knowledge. According to research Tubbs (1992) concluded that the accretion of experience will improve the auditor's attention to the violation of the purpose of controlling if an error occurs.
H1: auditor experience effect on the structure of knowledge of Fraud

Effect of training of auditors penfgetahuan structure of error.
Training is an activity that aims to improve the employability of participants who eventually will lead to changes in the cognitive aspects of behavior, skills and attitudes (Hamalik, 2000).
According to research Tubbs (1992) concluded that increased training Improved knowledge of the audit profession is formally very similar effect to that obtained from the increase in experience.
Based on these descriptions, associated with the structure of the auditor's knowledge, the hypothesis can be stated as follows
H2: auditor training effect on the auditor's knowledge about the structure of Fraud

3. RESEARCH METHODS

Samples and data collection methods

The population in this study is that working in the Company's Auditor public accountant's office in East Java is good for KAP Big Four and Non Big Four in East Java. According to the Directory IAI- KAP 2012 the number of public accounting firm in East Java as many as 53 public accountant's office until 2013. The sampling method used in this study is a random sampling with consideration of the number of its small population and the low level of response rate.

To obtain the necessary data, questionnaires sent to respondents by post or email, or directly to the Auditor in KAP in East Java.
Sampling criteria for Auditor or Certified Public Accountants is having S 1 Accounting education, experience working in KAP East Java region at least 2 years in a position as a partner, supervisor, and Assistant Auditor

Identification and Measurement Techniques variable

Independent Variables

Variable experience are the main indicator is the knowledge and experience of the auditor for an auditor. Experience is an important attribute possessed by the auditor, it is proved by the level of mistakes made by the auditors were not experienced much more than an experienced auditor (Ashton 1991).
Training variables as independent variables to two with as an indicator of the amount of auditor training program. Training here can be-on activities, such as seminars, symposia, workshops, briefings were given. by a senior auditor to auditor starters (junior) could also be considered as a form of training
The instrument experience and training will be filed questionnaire is above the auditors and asked to express their opinions in a Likert format with five alternative options that begin with the choice Likert scale with five alternatives, namely: (1) STS = strongly disagree; (2) TS = disagree; (3) RR = doubtful; (4) S = agree, and (5) SS = strongly agree.
To give an idea of the research variables (Audit quality, client satisfaction) used regression analysis that aims to make the estimation or prediction of the value of the independent variable (X) is based on the value of the dependent variable (Y) specific.
Variable Bound: Structure Auditor knowledge about Fraud
Variables: Experience and Training
Equation Hypothesis Testing
Y = a + b1xl + b2x2 + e

4. Discussion

Research result

The distribution of questionnaires that have been made, resulting in a viable research data used as many as 72.
On average Respondents Against Variable
Experience, training and knowledge structure auditor of Fraud
Variable N Mean72 3,828 experience Training 72 3.944
The structure of the auditor's knowledge of Fraud 72 3,900
The average score of each of the above variables can be described as follows:
1. Experience (X1)
The average score of respondents to variable experience amounted to 3.828 This shows that the average respondent to respond not agree to the statements contained in the variable experience.
2. Training (X2)
The average score for the variable responder training is equal to 3.944 This shows that the average respondent to respond not agree to the statements contained in the variable training.
3. Structure of the auditor's knowledge of fraud (Y)
The average score of respondents to the variable structure of the auditor's knowledge of the fraud amounted to 3.900 This shows that the average respondent to respond not agree to the statements contained in fraud detection variables.

Variabel	***Unstandardized Coefficient* (B)**	***Standardized Coefficients* (Beta)**	**$T_{Account}$**	**Sig**
(Constant)	0,790	-	-	-
Experience	0,351	0,362	3,330	0,001
Training	0,448	0,438	4,039	0,000
R = 0,727 **R^2 = 0,528** **Adjusted R square = 0,515** α = 0,05				

Source: Appendix
Y = 0.790 + 0,351X1 + 0,448X2 + e
From the regression equation can be seen that:
1. Constant of 0.790 indicates that if the experience (X1) and training (X2) = 0 or does not exist, then the structure of the auditor's knowledge of the fraud will at 0.790.
2. Regression coefficients for the variables of experience (X1) of 0.351. Positive coefficient indicates that the variable X1 has a unidirectional relationship with the auditor's knowledge about the structure of Fraud (Y). This means that if the experience (X1) increased by one-unit structure will be followed with increasing the auditor's knowledge of the fraud amounted to 0.351 assuming other variables in a constant state.

3. The regression coefficient for the variable training (X2) of 0.448. Positive coefficient indicates that the variable X2 has a unidirectional relationship with the auditor's knowledge about the structure of Fraud (Y). That is when the training (X2) increased by one-unit structure will be followed with increasing the auditor's knowledge of the fraud amounted to 0.448 assuming other variables in a constant state.

From the analysis of the data also showed that the coefficient of determination or R square of 0.528 . This means the contribution of independent variables namely experience (X1) and training (X2) together amounted to 52.8% of the dependent variable the auditor's knowledge about the structure of Fraud . While the remaining 47.2 % is influenced by other variables not included in the multiple linear regression model .

Explanation	Score	Sig.
F Account	38,665	0,000

From the table above it can be seen that the count equal to 38.665 F is also supported with a significance level of 0.000, which value is smaller than 0.05 or 5 % . So that experience (X1) and training (X2) has a significant effect simultaneously on the structure of the auditor's knowledge of the fraud

Variabel	***Unstandardized Coefficient* (B)**	***Standardized Coefficients* (Beta)**	**$T_{Account}$**	**Sig**
Experience	0,351	0,362	3,330	0,001
Training	0,448	0,438	4,039	0,000

From the above it can be seen that t to variable experience (X1) of 3.330 is also supported with a significance level of 0.001 <0.05 or 5%. So we can say that the experience variable (X1) has a significant influence partially on the structure of the auditor's knowledge of the fraud.
For training variable (X2) has a t value of 4.039 is supported also by the level of significance level of 0.000 is smaller than the significance level of 0.05 or 5%. So it can be said that the training variables (X2) has significant influence partially on the auditor's knowledge about the structure of Fraud

Experience influence on the structure of the auditor's knowledge of the fraud indicates a positive direction. Results of testing the effect of these variables obtained t of 3.330 with a significance of 0.001 with a positive direction. Thus the significance value less than 0.05. It can be concluded that the experience had a positive influence on the structure of the auditor's knowledge of the fraud. In other words, it can be concluded that the poor condition of the larger corporate clients will provide fraud detection higher management. This means that Hypothesis 1 is accepted.

Effect of training on fraud detection showed a positive direction. Results of testing the effect of these variables obtained t of 4.039 with a significance of 0.000 with a positive direction. Thus the significance value less than 0.05. It can be concluded that the training has a positive influence on the detection of fraud. In other words, it can be concluded that the motivation of the management to act fraudulently high will increase the detection of fraud committed by management. This means that Hypothesis 2 is accepted.

5. Conclusion

Based on the results of research and hypothesis testing can be concluded that:
1. That the experience had a positive influence on the structure of the auditor's knowledge of the fraud. In other words, the auditor will enhance the experience am, a structure of the auditor's knowledge of the fraud.
2. That training has a positive influence on the structure of the auditor's knowledge of the fraud. In other words, am, a training conducted by the auditors will improve the structure of the auditor's knowledge of the fraud.

6. Suggestion

1. The results of this study demonstrated experience and training influence on the structure of the auditor's knowledge of the fraud. These results have implications for the auditor assignment pattern on pattern assignment of auditor in auditing. Audit should be conducted by an auditor who is experienced and seen as having adequate knowledge. This can be done by senior auditor or partner. Auditing can also be given to the junior auditors but must be accompanied by a minimum of senior auditor. This assignment pattern such as efforts to maintain the quality of the audit so that the credibility of the results of the audit in the eyes of the users of the financial statements information can be maintained.
2. It is expected that further research can expand the coverage area of more KAP and not only in the East Java region only, in order to obtain the results of research higher degree of generalization.

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5 MANAGEMENT

ALOE VERA BEING FAMILY BUSINESS OPPORTUNITIES

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Abstract: Aloe vera is a plant that has been recognized by public, although its use is limited as fertilizer hair without any processing. On the other hand there are many housewives who do not have economically productive activities that can sustain their household income. Both of these can be seen as the local potential to be driving force for implementation of Community Services are oriented to develop housewives self-reliance through Aloe vera entrepreneurship. Implementation of community services used PRRA (Participatory Rapid Rural Appraisal) and RRA (Rapid and Rural Appraisal) methods, with the target area is Wonoanti Village District of Gandusari Trenggalek. With this method, starting from the activities of planning, organizing, actuating, monitoring and evaluating, involve all stakeholders in the implementation of this program. So this method can foster greater sense of belonging from target communities and supporting of the relevant agencies. Program's activities such as counseling on develop entrepreneurial spirit, business management, cultivation techniques and processing of Aloe vera. Besides, it is also practical activities and mentoring the cultivation and processing of Aloe vera. Outcomes of community service activities are: mastery of cultivation technique and processing technology of Aloe vera. Processing technology of Aloe vera to produce some products namely: stick, cocktail, syrup, jam and tea Aloe vera that was develop as an entrepreneurial activity that is profitable and sustainable by the target groups, namely PKK RT 06 and PKK RT 09 Wonoanti Village District of Gandusari Trenggalek.

Keywords: Cultivation, Processing, Entrepreneur, Aloe Vera

1. Introduction

Wonoanti Village at Gandusari is one of the villages in the Trenggalek District. The village location is quite far from the district capital is about 10 km. Wonoanti Village has a total area of 6,700 km consisting of 26 Neighborhood (RT) with a total population of 4,510 inhabitants. Among the total population of 1,700 people (37.7%) are residents who belonged to the beneficiaries or disadvantaged economically. That is because the narrowness of agricultural land holdings (< 0.17 Ha). With the limited arable land, the lot of human resources, especially the women who are less empowered optimally. This group was subjected to this IbM activities. On the other side of the *Aloe vera* plant are often found in the Wonoanti Village as a wild plant that grows at houses yard.

Determination *Aloe vera* commodity became the object of Community Services implementation is the result of consultation between the IbM team with the PKK Chairman along Wonoanti Village Head and other officials. Reason for IbM team to carry out community service in this village is the Wonoanti Village never received assistance or guidance of a technical nature and oriented to increase the participation of women farmers as PKK members to participate in increased the family economy.

Through the implementation of Science and Technology for Community (IbM) the willingness of local communities to increase their household income and welfare through sustainable entrepreneurial activity can be realized. IbM activities include counseling, training and mentoring utilization of vacant land and courtyard houses for *Aloe vera* cultivation and processing became *Aloe vera* products that have economic value.

2. Method

Methods of Implementation

Science and Technology Program for Community (IbM) in the Wonoanti Village Gandusari Trenggalek District used PRRA (Participatory Rapid Rural Appraisal) and RRA (Rapid and Rural Appraisal) methods. This method means the target group, namely PKK, as well as university and Village Officials involved in synergy ranging from the activity of preparation, planning, organizing, actuating, monitoring and evaluating. This method can foster greater sense of belonging from target communities and supporting of the relevant agencies, so that would be given possibility of achievement of this program.

IbM activities planned by university from socialize this program to target groups, planning activity, to technical assistance and sustainable monitoring. The details of activities planned include: (1) Training of entrepreneurial

motivation, (2) Training of marketing, (3) Management and technique training of *Aloe vera* cultivation, and (4) Management and technical training of *Aloe vera* processing.

Problem Solving Framework
Problem solving framework of program activities is explained by the flow chart of problem solving framework as shown in Figure 1.

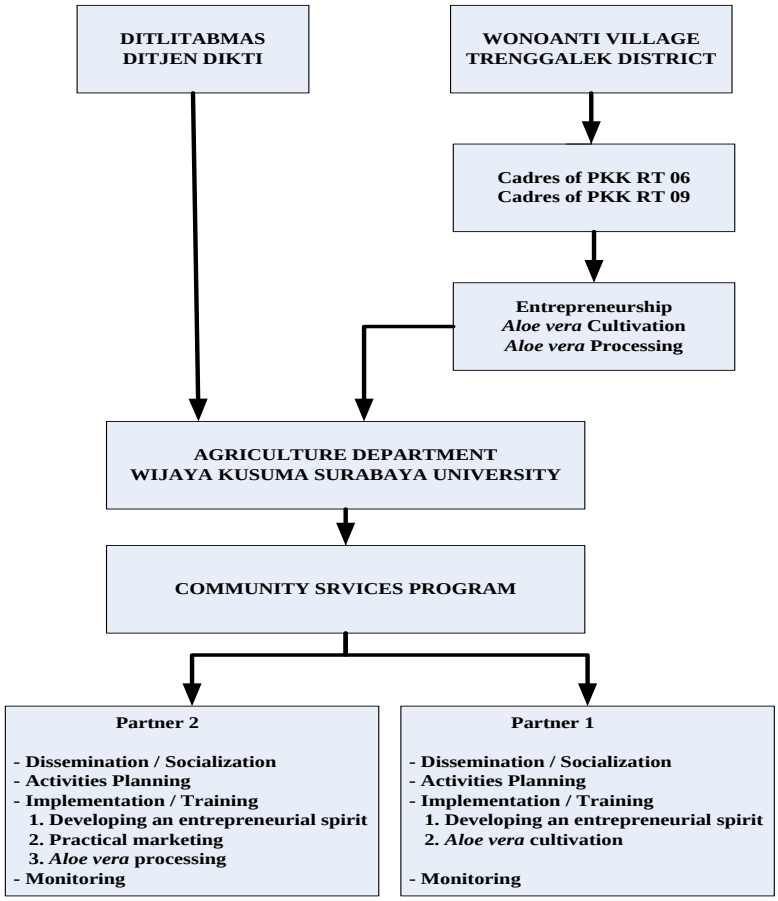

Figure 1. Flowchart of Problem Solving

Partner Participation
Persuasive-educative preliminary approach by university cause implementation of IbM program for target groups namely PKK RT 06 and PKK RT 09 at Wonoanti Village Gandusari Trenggalek District get a positive response. This is because the essence of this program support the program announced by the government to boost the empowerment of women, especially housewives, so they have the technical and management capabilities to manage the environment with the cultivation and processing of agricultural products such as *Aloe vera* plant.
Partner participation shown by the appointment of 10 volunteers who enthusiastically attend each meeting actively, also realized by voluntary providing most of the material needs and the tools necessary to carry out the cultivation and processing activities, such as provision of soil as a growing medium, chaff, manure and cooking tools appliances.
Activities

Working Group Establishment
The working group was formed intended to streamline activities. As for the personnel working group can be seen in Table 1. Each group leader has the task of coordinating the activities carried out in its territory, both concerning the cultivation and maintenance until the harvesting and processing activities, and coordination with the IbM executive team. Photos of Aloe vera cadres with executive Team is shown in Figure 2.

Table 1. List of Working Group IbM *Aloe vera* in Wonoanti Village Gandusari Trenggalek District

Working Group	Chairman	Member

1	Mrs. Endang Rahayu	Mrs. Siti Tuslihah
		Ms. Shela As.
		Mrs. Sutilah
		Mrs. Ike
2	Mrs. Sukanti	Mrs. Rillo M.A
		Mrs. Susilo Rini
		Mrs. Kulsum
		Mrs. Sutarmi

Figure 2. *Aloe vera* Cadres With IbM Executive Team

Counseling to PKK Cadres

Outreach activities were first advanced by the implementation team is matter of growing entrepreneurial spirit. It is intended for the understanding of the need and importance of entrepreneurship will motivate volunteers to be excited, serious and focused in IbM conducting.

Prior to implementation in the field with the practice of cultivation and processing of *Aloe vera*, cadres appointed obtain material briefing on entrepreneurship, the ins and outs of the *Aloe vera* plant, description, benefits and cultivation. In addition, also get counseling about *Aloe vera* processing techniques into some food products such as tea, cocktail, syrup, stick and jam. Counseling activity to the PKK cadres are shown in Figure 3.

Figure 3. Counseling Activity to the PKK Cadres

***Aloe Vera* Cultivation Technology**

Adhering to the philosophy of Learning by Doing, knowledge of the technology cultivation of *Aloe vera* is given to the target. So not only through the direct transfer of knowledge but to apply it in the field by allowing the target to immediately try and practice it. Thus cadres directly have experience and be able to measure its ability to later do improvements to the still not correct or not perfect in doing the cultivation of *Aloe vera*. Activities include the selection of good seeds, the use of means of agricultural production effectively and efficiently, good land management techniques and techniques of planting up by way of maintenance and harvesting crops.

Because there are many people who adhered to the philosophy of Seeing is Because there are many people who adhered to the philosophy of Seeing is Believing and do not dare to risk failure in adopting a technology, then the pilot is considered an effective method. Therefore the pilot land for cultivation of *Aloe vera* plant is intentionally selected in the yard of Wonoanti Village Head with consideration its range is quite adequate, it is strategically located, organizationally have close links with targets (PKK) as a cadre responsible for subsequent maintenance.

- **Production Facility Procurement**
  Chaff and land acquisition as a growing medium obtained from the cadres. This reflects the good cooperation and positive response. Production facilities used in this program can be seen in Figure 4.

Figure 4. Production Facilities

- **Land Preparation**
  Land preparation is done beforehand by mixing the soil as a growing medium with chaff and manure. After becoming a mixture of soil and fertilizer is used as a growing medium, as shown in Figure 5.

Figure 5. Growing Medium Preparation

- **Cultivation**
  Planting is done in polybags. This is done with consideration, the first since planting in polybags easier for the target group to do and place it on the sidelines of the existing plants in their homes. In addition, due to the lack of proper season where appropriate season for planting of *Aloe vera* is the rainy season, whereas at the moment it is IbM implemented on dry season so that by planting the polybag will minimize the risk of growth failure. Cultivation activity shown in Figure 6.

Figure 6. Cultivation Activity

- **Maintenance**
  Maintenance done by watering the plants twice a day. This activity is carried out by cadres, accompanied alternately by students and under the supervision of the IbM executive team. After 2 weeks from the time of planting, fertilizing is done using goat manure.

3. Processing

Determination of products processed from *Aloe vera* is done through consultation between the executive team with cadres. With the Bottom Up method is intended to further foster a sense of belonging or a sense of ownership by the PKK as a cadre, so it creates a sense of responsibility for the success of this program and its sustainability. Based on the meeting results obtained a general consensus that the type of products that will be developed into entrepreneurial activity, namely: tea, stick, Cocktail, syrup, jam *Aloe vera*. Activities of Aloe vera processing shown in Figure 7.

Figure 7. *Aloe vera* Processing Activities

Outcome

- **Tangible Outcome**
  Increasing the skills of PKK cadres both in terms of cultivation of *Aloe vera* and apply appropriate technologies in processing of *Aloe vera* into sticks, cocktail, syrup, jam and tea .

- **Intangible Outcome**
  Intangible outcomes is the growth of an entrepreneurial spirit in the partners group are detailed as follows:
  a. Increased awareness for trying to be economically independent.
  b. The realization that economic independence can be done with entrepreneurship.
  c. Increased insight and understanding of the group of PKK cadres against importance of processing agricultural products in order to provide financial added value.
  d. Development of agriculture faculty to be able to act as an incubator of agribusiness for the general public, especially people around campus.

From processing activities have generated some kind of processed *Aloe vera* products that have been packed with the product name is LIBUKU meaning my *Aloe vera*. *Aloe vera* products produced by partners is shown in Figure 7.

Figure 7. *Aloe vera* Products

The outcome of IbM activities is bazaar. The spirit of the cadres to entrepreneurship with business Aloe vera processed is shown by the participation in the activities of bazaar organized by the Cooperative Department Trenggalek in commemoration of Cooperative Day. Therefore the first cadre of Aloe Vera is proclaimed to form SME with the SME name is SRIKANDI WONOANTI. Logo of Srikandi Wonoanti SME shown in Figure 8 and bazaar activity shown in Figure 9.

Figure 8. Srikandi Wonoanti SME Logo

Figure 9. Cooperative Day Bazaar Activity in Trenggalek

4. Conclusion

Science and Technology for Community Activities with title: Independent Economic Non-productive Group Through Aloe Vera Management (In Wonoanti Village, Gandusari Trenggalek District) intended to empower the economic non-productive group into independent and income groups with *Aloe vera* entrepreneurs getting tremendous response both of cadres as well as partners target and Wonoanti community widely.

5. Recommendations

Necessary assistance can transfer an ongoing basis to the development of science and technology related to the cultivation and processing of *Aloe vera* that a group of economic non-productive can truly independent life and sustainable through entrepreneurship plant and products of *Aloe vera*.

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MARKETING OF LIBRARY AFFECT TO IMAGE ARCHIVES AND LIBRARIES BODIES SURABAYA CITY

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Abstract: Successfull organizations are able to design and manage their information and the supporting technologies as a strategic weapon as well as an information utility. This requires information to be readily available on an as-needed basis to staff, management, customers, suppliers and other stakeholders. Archives and Libraries Bodies Surabaya City use the strategic marketing to disseminate information resources at their disposal. The purpose of this research is to analyze the marketing of library affect to image Archives and Libraries Bodies Surabaya City. The statistical population of the research comprises the number of visitors 24.654 per week. Questionnaires were utilized to collect information concerning marketing of library and library image from the number of sampel which use Slovin methode is 248 and there can be used the research were 202. The reliably of the questionnaire was calculated to be between 0,788 and 0,718 using the Cronbach's Alpha. The analysis Kolmogorov-Smirnov Test is Significant score 0,331 that mean each variable were normal distribution. The grafics Normal Probablitity Plot shows that data follow normal distribution pattern. Hyphotesis test shows α (0,05) > Significancy (0,000) were significant relationship and simultan. Analysis Correlation Cooeficient using Product Moment Correlations was score r = 0,691 with significant ρ = 0,000 < α = 0,05 were medium correlations. Correlations Significant Test t_{count} score 13,501 and t_{table} at significantion 0,05 with dk 201 score 1,971 (R^2) = 0,477 were positif correlation and significant between marketing of library and library image.

Keywords : Marketing Library, Image, Public Library

1. Introduction

Marketing is done initially to meet human needs which later evolved into the human desire to meet. The process of the fulfillment of human needs and desires that is the marketing concept. Marketing is not only applicable to business organizations, but can also be applied to non-profit organizations such as the library with the expertise to understand how to plan and manage organizational change associated with library stakeholders. Currently the concept of marketing has become a necessity to be applied to the library to find out the needs and users desires and perform a variety of innovative services in order to meet the needs and users desires. Besides the application of marketing can indirectly affect the image or the image or users impression and the general public about the library.

Starting in 2000 Library and Archive Agency of Surabaya has to improve itself with the current environmental changes that occur in the world. Head of The Archives and Libraries Bodies Surabaya City has been working to develop, renovate and creativity in various fields in the Archieves and Libraries Bodies Surabaya City (BARPUS), such as the improvement and development of organizational structure, management, human resources, acquisition of information resources, public relations, service, filing, infrastructure, budget, until the application of information and communication technology. As for the various development and programs that have been planned and realized by Archives and Library Agency Surabaya result in very large changes to the image that arises in the library. Where in general the image or the image of libraries in Indonesia is still low and even negative in the eyes of the general public. However, the Department has changed the image or a negative image into reverse with evidence has received numerous awards both nationally and internationally since 2003. These awards include 2003, 2006, 2007, 2008, 2009, 2012, 2013 Winner , II and III Library Level Java and National, in 2007 got the certificate of ISO 9001: 2001 from WQA, 2010 received ISO 9001: 2001 from DQS, in 2011 received the Nugra Services Darma Pustaloka, and many awards again, quoted the results of research Maharani, 2014.

The success achieved by the Archieves and Libraries Bodies Surabaya City attracted the interest of researchers to find a marketing concept that has been implemented in the library that will hopefully find a new method for the advancement of the quantity and quality of the libraries in East Java and Indonesia. Recognized that the progress of the library indirectly affect the educational progress of a nation. Educational advancement of a nation is expected to have an impact on the welfare of its people.

2. Literature Review

Theoretical Review

Concept Marketing of Library

There are four (4) basic stages in the marketing plan according to the book Strategic Marketing on The "Marketing @ your library" (in Garoufallou, Emmanouel, et.al, 2013) states:
(1) Customer and market research (customer needs and customer view);
(2) The library Strategic Plan (vision and mission, products and services implementation);
(3) Promotion of the library (messages, vehicles, campaign implementation) and;
(4) Providing products / services (delivery interaction adjustments)

In order to win the competition and win the hearts of consumers or customers in the fields of business, the company tried to combine a variety of marketing tools both in terms of Product, Price, Promotion and Place (4P) which is known as the marketing mix (the four elements discovered by Mc. Carthy, 1964). The concept of marketing mix continues to evolve into 7P namely Product, Price, Promotion, Place, People, Process and Physical Evidence. (Arief, 2006, p. 88). The seventh element can be applied in accordance with the results of the research library of Garoufallou, Emmanouel, et.al, 2013, can be seen in the following table:

No.	7P The Elements of *Marketing Mix*	Adjusted to a Library Environment
1	*Product*	*The services, the resources and programs offered; e.g. (a) reference services* *(b) loans* *(c) opening hours* *(d) websites* *(e) books* *(f) journal collections* *(g) e-resources* *(h) databases* *(i) printers* *(j) training* *(k) seminars*
2	*Price*	*The tangible or intangible price or cost paid to use the library services, resources and programmes; e.g.* *(a) Tangible: taxes, fees* *(b) Intangible: indirect costs, time spent to find specific information, the kind of experience when using the library* *Library could adopt a pricing policy for different types of services.*
3	*Place*	*Where and how are the services made available and the users are served; e.g.* *(a) At a library departement* *(b) By telephone* *(c) Online from the library's website or* *(d) Online from a digital library*
4	*Promotion*	*The way in which a library advertises its services and the methods-tools used to inform the public.* *Promotion include:* *(a) Public relations* *(b) Advertising* *(c) Publicity* *(d) Personal communications* *Additional tools can be used such as:* *(a) Brochures* *(b) Leaflets* *(c) Posters* *(d) Newsletters* *(e) User orientation seminars* *(f) Book presentations/ exhibitions*

		(g) Announcements on press and local media
5	*People*	*The library staff (reference departement).* *The way in which they:* *(a) Communicate* *(b) Behave and serve users plays a decisive role* *(c) Affects the services quality* *(d) Create positive and negative perceptions towards the library* *Specific attributes of staff behaviour include:* *(a) Educational qualifications* *(b) Proffesional experience* *(c) Appearance* *(d) Polite behaviour* *(e) Willingness to assist* *(f) Communication skills* *(g) Quickness in service delivery* *(h) Efficiency*
6	*Physical evidence*	*The impressions created by the surrounding environment in which services are provided, depend on the specific facilities or virtual library environment attributes; e.g.* *(a) Clean and tidy facilities* *(b) Buildings architecture* *(c) Decoration* *(d) Lighting* *(e) Air-conditioning* *(f) Quiet* *(g) Technological equipment/ accessibility* *(h) Usability* *(i) Operation* *(j) Easy search and navigation performance*
7	*Processes*	*The efficiency and effectiveness of human resources management and library operation to satisfy user needs; e.g.* *(a) Automation of loans and reference services* *(b) Telephone assistance* *(c) Online information services provision (Ask a Librarian)*

Source: Research from Garoufallou, Emmanouel, et.al, 2013 by researcher

Image

Image in Indonesian means Citra. The image can be defined as a person's impression gained by the knowledge and understanding of the facts of reality. Image of a person against a oyek can be seen from his attitude towards the object. Dictionary of Science in 2006 says the image is "description or representation of external objects. Imagery also means imitation or a copy of mental events like the idea, conception, perception, imagination and fantasy". According to Bill Soemirat and Ardianto Canton in 2007 to say that the image is "image: the impression, the feeling, the conception of the which the public has of a company; a concioussly created impression of an object, person or organized". Image by deliberately needs to be created so that is positive. Image itself is one of the most important assets of an organization. Image can also be defined as a person or an individual impression of something that emerged as a result of knowledge and understanding of the facts or the reality which can be positive or negative.

Hypotheses

- There is no significant influence between the variables marketing of library with image libraries.
- There is a significant influence between the variables marketing of library with image libraries

Research Plan: The research was planned by using the variables of Marketing Library with 14 sub variables and Image Library with 5 sub variables.

Population and Sample: Based on data from the Archieves and Libraries Bodies Surabaya City, the number of visitors to the library each week (2013 and 2014) amounting to 24 654 people. The sample used in reference Slovin,

amounting to 248 people. However, after the questionnaires distributed were returned and fit for use as a sample was 202 respondents.

Procedure:

1. Data were collected and obtained from interviews, questionnaires and literature study.
2. Data ProcessingQuantitative, data analysis techniques using Simple Linear Regression Analysis. In this study, the independent variable is the Marketing of Library (X) while the dependent variable is the Image Library (Y) that is used simple linear regression equation with the following formula:
   Y = a + b X
   Where:
   Y = The subjects in the dependent variable predicted
   a = constant (intercept)
   b = Figures direction (regression coefficient) which indicates the number increase or decrease in the dependent variable that is based on changes in the independent variables.
   X = Subject to the independent variables that have a specific value
   Then do the Data Quality Test form Test Validity, Reliability Test, Test and Test Data Normality Hypothesis using SPSS 17 for Windows.
3. Presentation of data as a descriptive research results presented in accordance with the results of calculations using SPSS 17 for Windows and then drafted a new method of marketing concepts that can be applied in the library.

3. Discussion

The process of dissemination or distribution of a questionnaire that has been done in this study at 10 locations spread in 4 regions namely North Surabaya or Central (Central Library Cultural Expression TBM Park, TBM Park Achievement, mobile library Bungkul Park); South Surabaya (Surabaya City Library in Rungkut); East Surabaya (TBM Ex. Semolowaru, TBM Klampis Ngasem, TBM Nginden stilts); and Surabaya West (TBM Pakal and TBM Benowo). The distribution process generate decent data is used as much as 202 questionnaires.

Table 1
The Characteristics of Respondents

Description		Frequency	Persentage
Age	<13 years	17	8,40 %
	13 – 19 years	76	37,60 %
	20 – 24 years	34	16,80 %
	25 – 34 years	46	22,80 %
	35 – 44 years	23	11,40 %
	45 – 55 years	5	2,50 %
	> 55 years	1	0,50 %
Gender	Male	82	40,60 %
	Female	120	59,40 %
Last Education	Elementary School down	18	8,90 %
	Junior High School	49	24,30 %
	High School	79	39,10 %
	D1-D2-D3	8	4,00 %
	S-1	46	22,80 %
	S-2 up	2	1,00 %
The Main Job/ Occupation	PNS/TNI/POLRI	6	3,00 %
	Lecturer/ Teacher	8	4,00 %
	Private employees	42	20,80 %
	Self Employed / Entrepreneur	13	6,40 %
	Student	115	56,90 %
	other	18	8,90 %

Source: Quesionare Respondent Identity, 2015

Level assessment thresholds in each grade category can be grouped as follows:

Table 2
On average Respondents Against Variable
Marketing of Library and Image Library

Variable	N	Mean	Respon
Marketing of Library	202	3,8106	Good
Image Library	202	3,8188	Good

Source: Questionnaire, Data processed Researcher, 2015

Based on calculations with SPSS 17 for Windows obtained the following results:

Table 3
Regression Simple

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.427	.253		1.692	.092
	MEAN.ML	.890	.066	.691	13.501	.000

a. Dependent Variable: Image Library

Source: Data Calculation Results SPSS 17 for Windows

Based on Table 3 obtained by calculation of the following equation:

Y = 0.427 + 0.890 X
The regression equation above can be explained as follows:
a = 0.427 shows that if the constant marketing of library or X = 0, then the image library of 0,427.
b = 0.890 showed that every marketing of library, will raise the image library at 0.890.

Quality Test Data
1. Test Validity

Test the validity of the study conducted on 202 respondents were chosen using SPSS 17 for Windows which is able to present the values of the data entered by the results of the questionnaire answers. How to measure the validity of using internal consistency by using the Pearson product moment correlation which aims to determine the validity of each question in the questionnaire. According Soegiyono (2011: 90) that when the count r> r table, it can be said that an instrument is valid.

The results SPSS 17 for Windows can be seen that the whole point of research variables have the count r > r table at an error rate of 5% (α = 0.05) and obtained r n = 202 0,138 tables, it is known r results of each of the questions > 0,138 so it can be said that the whole point of research variables are valid to be used as an instrument in the study.

2. Test Reliability

Reliability test is intended to measure a questionnaire which is an indicator of the variables. A questionnaire said to be reliable or reliable if someone answers to questions are consistent over time. According Soegiyono (2011: 94) used to test the reliability of Cronbach Alpha technique, in which an instrument can be said Handan (reliable) if you have or alpha reliability coefficient of 0.6 or more. The reliability test results can be seen in Table 5 below:

Based on data in Table 5 it can be said that the value of the variable coefficient is reliable because the marketing of library and image library shows the value Croncbach's Alpha (α)> 0.6. This means that the questions used to be able to obtain consistent data when used again in research, it will produce the same answer.

Normality Test

Normality test aims to test whether a regression model, the independent variables and the dependent variable or both have a normal distribution or not. A good regression model is data distribution normal or nearly normal. Normality test data can be performed by using One Sample Kolmogorov-Smirnov Test in SPSS 17 for Windows. Kolmogorov-Smirnov test is the test of the difference between normality test data with the data standard normal. As in ordinary differential test, if the significance below 0.05 means that there is a significant difference, and if the significance of

above 0.05 then there is no significant difference.

Table 4
Normality Test Results

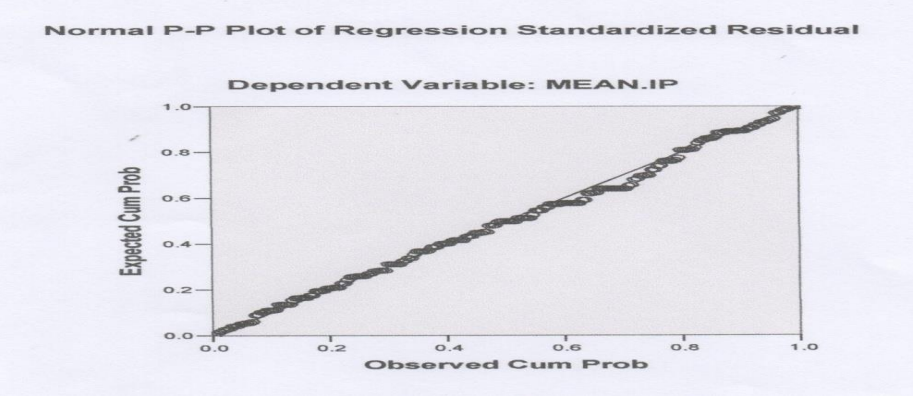
NPar Tests

One-Sample Kolmogorov-Smirnov Test

		Unstandardized Residual
N		202
Normal Parameters[a,b]	Mean	.0000000
	Std. Deviation	.37922001
Most Extreme Differences	Absolute	.067
	Positive	.067
	Negative	-.026
Kolmogorov-Smirnov Z		.947
Asymp. Sig. (2-tailed)		.331

a. Test distribution is Normal.
b. Calculated from data.

Gambar 1
Grafik Hasil Uji Normalitas



Source: Results SPSS 17 for Windows

Based on figures 1 can be seen that the residual distribution of the data has followed a normal distribution pattern. Thus, it can be concluded that the regression model used in this study has been to meet the assumptions of normality.

Hypothesis Test (Test F)

Testing the hypothesis or F test is a test conducted to determine the effect of independent variables on the dependent variables simultaneously.

a) hypothesis formula
   1) H0: There is no significant influence between the variables marketing of library with image libraries
   2) H1: There is a significant influence between the variables marketing of library with image libraries

b) Determine the significance level (α)
   Significance level used was 5% (0.05).

c) Determine the test criteria
   1) H0 accepted (H1 rejected) if the real Taraf α (0.05) < Significancy
   2) H0 rejected (H1 accepted) when Taraf Real α (0.05) > Significancy

d) Conclusion
   Because Taraf Real α (0.05)> Significancy (0,000) then H0 is rejected, meaning that there is significant influence and simultaneously between the marketing of library with the image library. So it can be concluded that the marketing of library have a significant effect or impact on the image of the library in Library and Archive Agency of Surabaya.

1. Test Linearity (Linearity)
   Linearity test is performed to determine whether the two variables have a linear relationship or not significantly. In the test with SPSS 17 for Windows with a significance level of 0.05, the two variables is said to have a linear relationship if the significance (linearity) is less than 0.05, and if the test results show that the significance level is greater than 0.05, then the variable is said does not have a linear relationship. Linearity can be seen from the Scatterplot of Regression Standardized Residual. If the graph obtained from

SPSS output are dots that approach the diagonal line, it can be concluded that the pattern of linear regression model.

2. Coefficient of Determination

This analysis is used to determine the percentage contribution of the influence of the independent variable on the dependent variable. This coefficient shows how much percentage of the independent variables are able to explain the dependent variable.

a. Analysis Correlation Coefficient

To determine the degree of influence of variable X (marketing of library) to variable Y (image library) used analysis of correlation coefficients using the formula Product Moment Correlations. Calculation of correlation coefficient using SPSS 17 for Windows as in table 5 below:

Table 5
Correlation Coefficient

Correlations

		MEAN.IP	MEAN.ML
Pearson Correlation	MEAN.IP	1.000	.691
	MEAN.ML	.691	1.000
Sig. (1-tailed)	MEAN.IP	.	.000
	MEAN.ML	.000	.
N	MEAN.IP	202	202
	MEAN.ML	202	202

Source: Data Calculation Results SPSS 17 for Windows

From Table 5 the results obtained r = 0.691 with a significance level ρ = 0,000 <α = 0.05. This means there is a significant correlation between variable X to variable Y. By looking at benchmarks or criteria established by Akdon, count r value of 0.691 lies in the interval from 0.600 to 0.799 which indicates the level of medium category. This indicates that there is a correlation "Medium" between the marketing of library with the image library.

b. Correlation Significance Test

After knowing the relationship between variables X and Y, further testing the significance of the correlation with the t test. The significance test is to determine whether a significant variable X to variable Y. This test is performed with SPSS 17 for Windows in Table 6 below:

Table 6
Correlation Significance

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	.427	.253		1.692	.092
	MEAN.ML	.890	.066	.691	13.501	.000

Source: Data Calculation Results SPSS 17 for Windows

Based on the calculation, obtained t count equal to 13.501, while t table in the 0.05 with dk 201 turns obtained yield was 1.971 t count (13.501) > than t table (1.971), it can be concluded that there is a positive and significant correlation between the marketing of library with the image library.

c. Analysis of Coefficient of Determination

Having known and significant correlation exists between the variable X with variable Y, next determination analysis was used to determine how much influence the variable X to variable Y that apply to the entire population of the marketing of library in Archive and Libraries Bodies Surabaya City. The coefficient of

determination is calculated using the SPSS 17 for Windows in Table 7 below:

Table 7
Coefficient of Determination

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.691[a]	.477	.474	.38017	1.837

a. Predictors: (Constant), MEAN.ML
b. Dependent Variable: MEAN.IP

Source: Data Calculation Results SPSS 17 for Windows

Table 7 looks coefficient of determination (R2) = 0.477. This shows that 47.70% of the image libraries can be explained by the variable marketing of library, while the rest (100% - 47.70% = 52.30%) is explained or influenced by other factors not examined.

4. Conclusion

1. Based on the research, analysis and discussion that has been done can be seen that the variable marketing of library (X) have influence or affect either simultaneously or partially to the image library (Y) and the effect is positive or unidirectional. It can be said if the constant marketing of library, then the library will be a constant image. If the marketing of library increases then would lead to a rise also to the image or image library. According to the results of calculation software SPSS 17 for Windows that amounted to 47.70% image libraries can be explained by the variable marketing of library, while the rest (100% - 47.70% = 52.30%) is explained or influenced by other factors that are not studied.
2. Based on the marketing of library research can have an impact on the image at the Archieves and Libraries Bodies Surabaya City can be shown that on average respondents to variable marketing of library is at 3.8106 or respond "Good" to services, the attitude of officers, how to marketing and promotion done the Archieves and Libraries Bodies Surabaya City. While respondents to the variable image library is at 3.8188 or respond "Good" to facilities / infrastructure, attitude, behavior, perception of officers in the service, forms and kinds of service, quality and quantity of the collection and image library the Archieves and Libraries Bodies Surabaya City.

   BARPUS Surabaya has implemented 7 P concept of the *marketing mix* in running its vision "To be a source of information and educate people in Surabaya" are *Product, Price, Promotion, Place, People, Process and Physical Evidence*.

   a. *Product* is in the form of various kinds of services, resources and programs the library, such as information services, children's services, reference services, services Membership Card, service Community Library, services Read in flats and environment hut social, service packs, services Bus circumference, OPAC service, internet service, circulation services, collection of books, periodicals, clippings, seminar papers, websites, digital collections, Talk Show, Workshops, Conferences, Training, and the like. According to respondents there were 53.5% said they "Got it" or understand the various forms of services available in BARPUS Surabaya.
   b. *Price* is the cost required to obtain information from BARPUS by the user or the user of the library is free because of the budget comes from the budget of the city of Surabaya. Time to get information by 60.4% of respondents assess the "Just Right" in getting the information it needs.
   c. *Place* is where and how library services can be utilized by users that come to the Central Library Rungkut, Library Youth Center, Bungkul Park, Garden Expression, Parks Achievement, Wildlife Flora, Bus mobile library schools, and hundreds of TBM spread in the city of Surabaya, can through phone or website library. According to 52.5% of respondents expressed a library service available relatively "Comfortable" for them to get information.
   d. *Promotion* has been done is to print media, electronic media, competitions, exhibitions, brochures and pamphlets, travel books, newsletters library, bulletin board, book, training, seminars, workshops and the like, mentoring library, story telling and his library. According to 38.1% of the respondents that the promotional activities carried out BARPUS Surabaya is "Useful / Beneficial" and 31.7% said there are promotional activities "Extremely Useful or Very Helpful" for the sustainability BARPUS Surabaya.
   e. *People* are all over the librarians and library staff about providing services to the users of the library such as how to communicate, attitude and behavior, perception to users, educational background,

work experience, courtesy, speed, accuracy and especially the ability to serve assessed the respondent of 56.4% " Able to "serve the library well.

f. *Physical evidence* that the shape of the building, rooms and facilities are available around the library, including internet facilities, such as a library room that was clean and comfortable, the architecture, decoration, lighting, ease of internet access and the like. According to respondents there are 48% who stated that the facilities available in the city of Surabaya classified BARPUS "Good".

g. *Processes* that human resources management and operation of libraries are efficient and effective in meeting the needs of its users in order to feel satisfied as information services either by phone or online, front office, and the like. According to respondents there are 52% who stated that service to users in BARPUS Surabaya classified as "Good".

5. Recommendations

For Practitioners: In this research, marketing of library can be implemented to other libraries, not just public library but any libraries because If the marketing of library increases then would lead to a rise also to the image library. If the good image of library make more users and useful the resource that library.

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MAPPING OF GOVERMENT PROGRAMS AND CORPORATE SOCIAL RESPONSIBILITY PROGRAMS IN COMMUNITY EMPOWERMENT (STUDIES IN COMMUNITIES IN SURABAYA, SIDOARJO AND GRESIK)

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Abstract: The purpose of this study was to map out CSR programs for community empowerment course of the program according to the needs of society, according to the company's business objectives and do not overlap with the government program This study was made with a qualitative approach with a focus on action research. The research data were taken using key informant interviews in which the government (Bappeda) in Surabaya, Sidoarjo and Gresik. Open questionnaire accompanied by in-depth interviews given to some companies implementing Corporate Social Responsibility Program in Surabaya, Sidoarjo and Gresik. To find out public opinion about the implementation of the CSR program receives conducted in-depth interviews to people representing the village as well as the direct recipient of public funds CSR.
Research results are tabulated in the diagram content is analyzed in a cross-tabulation. The results showed that CSR Mapping Program for Surabaya area that the majority of communities are communities where livelihoods Urban residents are employees of the plant, business services, and merchant. Then this type of empowerment that is possible is the provision of assistance to small and medium enterprises and help improve the quality of education. Whereas the people of Sidoarjo which has characteristics as an agrarian society where the livelihood is farming as well as factory workers. That apparently needs of people in each district is different, then the formation of the committee coordinator for CSR implementation at the district level is not excessive. But becomes problematic if not always in every district there are companies who want to do CSR in the region that need to be evaluated which areas are prioritized areas to fulfill their needs with the aid of CSR.

Keywords: corporate social responsibility, community development programs, mapping CSR program

1. INTRODUCTION

The concept of CSR began hotly discussed in Indonesia since 2001, where many companies and agencies already began to look at CSR as a concept of community empowerment. Until now, the development of the concept and implementation of CSR is increasing, both in terms of quantity and quality. This is evident from the many companies vying to CSR. Implementation was increasingly diverse ranging from a program being implemented, as well as from the side rolled to fund the program. Examples of activities for CSR program under taken by the company include scholarships, direct aid to disaster victims, provision of venture capital, to the development of infrastructure such as the construction of sports facilities, places of worship and other public facilities that can used by the public.

These circumstances give rise to various problems in the implementation of CSR, not to mention on the application in the area often collide with the regional development program, which is the responsibility of local governments in the principle of autonomy region. It must to made an assessment of the implementation of CSR in each region, so that its implementation does not overlapping with the regional development programs by local governments and totally in keeping with the needs of local people and the interests of the company.
The purpose of this study was to map the concepts of community empowerment right from the application of the concept of Corporate Social Responsibility by companies in the area of Surabaya, Sidoarjo and Gresik.Based on the background that has been presented, the research problem is formulated as follows:
1. How to bring value added or new economic activity in the communities that live around the area of Surabaya, Gresik and Sidoarjo?
2. What are the community empowerment program implemented by the local government in the area of Surabaya, Gresik and Sidoarjo?
3. What community empowerment program in Surabaya, Gresik and Sidoarjo that can be monitored by the company because it is a series of the company's business or in accordance with the business of the company organizing CSR?
4. How does the mapping community empowerment programs through the implementation of CSR programs on industries in Surabaya, Gresik and Sidoarjo?

2. LITERATURE REVIEW

The Basic Concept of CSR

There are two types of CSR concepts, ie in the broadest sense and in a narrow sense. CSR in the broad sense, is closely related to the goal of achieving sustainable economic activities (sustainable economic activity). The sustainability of economic activity not only related matter of social responsibility but also of accountability (accountability) companies towards society and the nation as well as internationally.CSR in the narrow sense can be understood from some of the rules and opinions. According Widjaja and Jeremiah (2008) CSR is a form of cooperation between the company (not only the Limited Liability Company) with everything (stake-holders) that directly or indirectly interact with companies to still ensure the existence and survival of the business (sustainability) of the company

Basic Law of CSR Implementation

CSR though still very small but it is set firmly in Indonesia, namely in Law No. 40 of 2007 on Limited Liability Companies Act No. 25 of 2007 on Investment and Regulation of the State Minister for State-Owned Enterprises No. Per-5 / MBU / 2007 on SOE Partnership Program with Small Business and Community Development Program, especially for state-owned companies. After that the corporate social responsibility be included again in the Act No. 40 Year 2007 regarding Limited Liability Company. Article 74 paragraph (1) of the Act states that the company runs its business activities in or relating to the natural resources required to implement social and environmental responsibility.
Paragraph (2) of this section shall be treated as manyatakan liability company costs that the implementation is done with due regard to decency and fairness. Furthermore, paragraph (3) states that the company does not carry out its obligations as specified in paragraph (1) sanction in accordance with the legislation concerned. Then paragraph (4) states further provisions regarding social responsibility and the environment is regulated by the Government.

CSR in Community Empowerment
In view of (Leisinger, 2007) is called the second level of the implementation of CSR that do the right thing, which the company not only to minimize the negative impact of its operations based on the existing rules (legality), but also paying attention to the fulfillment of social rights communities should be politically and economically. The company also has further increased charitable activities (philanthropy) them.
CSR programs in the form of empowerment should be based on real needs (real needs) that is dialogical communicated with the public, government, company, society / NGOs and academics / researchers. Besides the important principle is to respect local empowerment (valuing the local), local knowledge, values, beliefs, skills, processes and resources of a society. Adopting local wisdom that exist to allow people to manage their land in accordance with the way they had been, and provide access to as much as possible of the production resources of the people like water, land, agricultural land, capital, technology, distribution channels and infrastructures supporting something that much more important and direct benefit to the local communities

CSR Based on the interests of the Company and Local Government
There are five stages in conducting CSR that need assessment (needs assessment), plan of treatment (program planning), treatment action (application program), termination (termination of assistance) and evaluation (evaluation) and After Care (Adi, 2007). Each process takes CSR ideal, requiring those who are experts and have the capacity in management, because the CSR program relating to the locality, usefulness, empowerment, mutual relations, and stakeholder interests (Rahmatullah, 2011). Are local governments through regulation of making CSR a nuanced management of mutual funds, isable to guarantee the implementation of these aspects.
CSR should be if the manufacturing regulations not be a 'fever' or cultural bandwagon too far between regions as a form of decentralization, based on the budget math alone, but need to study in depth. Better government through strengthening its authority and control the implementation of the RKL Amdalsos RKP. Do not let Making CSR regulation only useless waste of energy and cost, then canceled by the Interior Ministry because there is no legal reference or collide with the rule of law thereon.

CSR impacts For Company
CSR implementation will provide benefits for both the company that can be felt directly or indirectly benefits. The perceived benefits may include: Improving Corporate Image, Strengthen "Brand" company, Develop Cooperation with Stakeholders, Differentiating Companies with Rival and Produce Innovation and Learning to Improve Corporate Influence

CSR impacts to the Community

CSR will be a positive impact for the community, this will depend on the orientation and the capacity of institutions and other organizations, especially the government. A World Bank study (Howard Fox, 2002) suggests, the role of government related to CSR include the development of a healthy market policy, the participation of resources, political support for CSR actors, create incentives and improved organizational capabilities. For Indonesia,, the implementation of CSR requires the support of local government, legal certainty, and guarantee social order. The government can take without having to perform an important role in the regulation of the legal and political situation of the moment. In the midst of the problems of poverty and underdevelopment experienced by Indonesia, the government must act as coordinator for the handling of the crisis through CSR (Corporate Social Responsibility). In essence CSR benefits to society that can develop themselves and their business to prosper so that the target is reached

3. RESEARCH METHODS

Research approach

This study used a qualitative research approach paradigm , This research is the category of action research (Action Research) , because the policies that will be suggested to the decision maker . (Gunawan , 2013)

Population and Sample

The population in this study is a community in Surabaya , Sidoarjo and Gresik . Industry in the area of Sidoarjo , Surabaya , and Gresik.Teknik sampling in this study using cluster sampling technique with penbagian cluster as follows :

1. The coastal communities with empowerment -based fisheries (Gresik and Surabaya)
2. agrarian society with agriculture-based empowerment (Sidoarjo region)
3. Urban communities with urban -based empowerment (Surabaya)
4. Community -based industry by empowering small trade (Sidoarjo and Gresik)

Unit Analysis

Analysis unit in this research include:

1. Characteristics of the people living around the industrial area of Surabaya, Gresik and Sidoarjo.
2. The community empowerment program implemented by the local government in the area of Surabaya, Gresik and Sidoarjo
3. The business sectors of the company organizing CSR in Surabaya, Gresik and Sidoarjo.
4. Mapping Program community empowerment through implementation of CSR programs in the industry-industridi area of Surabaya, Gresik and Sidoarjo.

Analysis Techniques

This study uses qualitative data analysis techniques. Content analysis is done with the following steps: (Miles, 2002)

1. The interview data were analyzed in the context of the chart that summarizes the results of the identification of response from the public, industry organizers of CSR and community development programs of the government based research cluster
2. Making Matrix check list to check the suitability of the data obtained with the purpose of research
3. Conduct an analysis of cross between the needs of industry, the needs of the community and government programs related to community empowerment.
4. Mapping of CSR program that was suggested to be done by the organizer CSR industry is right on target.

4. DISCUSSION

Implementation of empowerment and implementation of CSR Company In Surabaya

In the implementation of Surabaya city government mapping program for community development programs as well as programs of development and improvement of public facilities. Plan a predetermined program is designed by the city government budget local budget, but the Surabaya City Government took several companies to participate in the activities of these activities contribute. Then the implementation of the program will be coordinated with related work units to cooperate with a company that is willing to help implement the program. Routinely Surabaya city government in this case is the Mayor of Surabaya held a meeting (gathering) informally with the company's corporate business domiciled in the city of Surabaya. In the event unearthed information about the program needs assistance to communities that will enable the company. However, demand from the government is limited to an appeal is not a

requirement because the company usually have a CSR program which has been prioritized by the company based on the proximity of the location, the needs of the surrounding community as well as conformity with the company business.

Tabel 1
CSR programs in coordination Surabaya government

no	Activity	Institution	year	budget
1	Campus Social Responsibility, a mentoring program for children out of school by organizing teaching and learning centers	Social Service Surabaya with students from 19 universities in Surabaya	2014	
2	1 1000 Trees Planting consisting of a tamarind tree, capes and mahogany trees were planted on an area of 75,000 square meters on the east side of the area Juanda International Airport in Surabaya. This is related to the launching of several airports as EcoAirport in line with the concept of Pertamina in environmental conservation through tree planting which aims to tackle the greenhouse effect due to carbon emissions	Pertamina FRMR-V Surabaya, in cooperation with PT Angkasapura I, Ministry of transportation and Juanda airport authority. M SDN involves about 40 students coming from nearby schools operating areas of the company, namely SDN and SDN Sedati Semampir I Gede I.	2013	
3	Giving Natura during Ramadan, social donation to the orphanage, educational assistance	Bank Antar Daerah	Every year	±20 juta
4	Productive Economy Group Formation through integrated waste management and green initiatives	PT Tirta Investama	2013-2015	
5	Bank formation Waste (waste management) in the district of Gunung Anyar	PLN Jawa Timur	2012-2013	

Government assistance programs as well as the company's CSR felt by the public are in accordance with the needs of the community .. People really expect assistance from both government and private companies primarily related to an increase in their economic activities as helping in fishing equipment, to help venture capital trade sekiatar mangrove tours, and others ,
Programs that are already very good, but they require continuous guidance primarily monitoring the implementation of the program, because there is concern that the community enjoyed a program of assistance from other region

Implementation of empowerment and implementation of CSR Company In Sidoarjo Regency

In the district of Sidoarjo has formed a team of program coordinator and Social Responsibility and Corporate Environment (TJSLP) Task Management Coordination Team Work Programs TJSLP in District based Sidoarjo Regent Decree No. 188/1137 / 404.1.3.2 / 2013 on the Establishment of Program Management Coordination Team and Activities TJSLP or Social Responsibility and Corporate Environment in Sub Se Sidoarjo regency is, mapping community needs, coordinating activities and to monitor and report the company's CSR activities in the area of coordination.

Tabel 2
The company's CSR program in Sidoarjo

No.	Sector	Activity	Desccription

	Ekonomy	Activities that encourage the growth of healthy schools in the Sidoarjo district, involving SD / MI in District Wonoayu. A total of 1,200 students from SDN Wonoayu I and II and SDN Semambung	CSR PT. Japfa Comfeed Indonesia Tbk
		Accelerate the growth of micro-scale industries, small and medium enterprises (SMEs) or small medium enterprise (SME) through information technology solutions, launched the SME Indonesia Bisa (SIB).	CSR TELKOM 2014
		Develop Raising catfish in Kalidawir Village, District Tanggulangin. Lapindo	CSR PT. Lapindo Brantas
	infrastrukture	CSR activities iB theme "Sharing iB, iB For All". Sidoarjo been in the area has centers of handicrafts and small industries. Number of recipients of the CSR activities of approximately 1,000 people	Islamic banking community
		PT PTPN X (Persero) disbursed Rp 1.28 billion for the water channel normalization in some villages in Sidoarjo. Water channel normalization is done in 20 villages in six districts, namely Reinforcement, Prambon, Krembung, Krian, Balongbendo and Pull.	PT Perkebunan Nusantara X (Persero)
	HeaLth	PT Japfa Comfeed Indonesia bk (Japfa) invites elementary school students (SD) in District Wonoayu, Sidoarjo regency, East Java, to be more concerned about the health of the principle of "Five S" Japanese style	PT Japfa Comfeed Indonesia Tbk (Japfa)
	Education	2 Build Smart Home Solutions (Rupin) as well as the chemical Tjiwi Rupin II Pull Sidoarjo district and Rupin Colonel Sampoerno Gondang Mojokerto	PT. Tijiwi Kimia
		CSR activities in the village smokehouse fish penatarsewu Tanggulangin up to 8 units, planting teak in the village kebogu which Jabon and 1 set of medical equipment for the village Poskesdes Permisan Jabon	PT Pertaminan gas east Java area

Source : Bappeda Sidoarjo

People of Sidoarjo expect help from the government or the company in which the aid can improve people's ability to earn income other than farming for example in the form of assistance for training Enterprises productive economy, capital support to SMEs, aid working equipment for the cultivation of catfish, skills training support that utilizes cultivation catfish, tool agricultural tool for people who farm grow vegetables, and others that will give added value to the local community.

Implementation of empowerment and implementation of CSR Company in Gresik

Gresik regency government formed CSR Team District Level and in 2013 formed six (6) CSR Team District level. Coordination Team Corporate Social Responsibility / CSR Gresik with SK REGENT Number: 050/398 / HK / 437.12 / 2012. In 2012 the government remains intent coordination activities and more persuasive to the company at the level of the districts, to walk together and coordinate the process of regional and community economic development through their CSR programs. Along running with the communication conditions are getting better and conducive among governments, companies, and society (here represented by the head of the village), there appears a proposal together to form a kind of CSR Communication Forum at the District Level

Tabel 3.
CSR PROGRAMS IN SOME DISTRICT in Gresik

NO	NAME OF INSTITUTION	DISTRICT
1	PT. Bank Jatim	Gresik
2	PT. Pelindo III	Gresik

3	PT. Indonesia Marina Shipyard	Gresik
4	PT. PJB Unit Pembangkit Gresik	Gresik
5	PT. IndobajaPrimamurni	Kebomas
6	PT. Semen Indonesia	Kebomas
7	PT. Varia Usaha	Kebomas
8	PT. Nippon Paint	Kebomas
9	PT. PagarinAnugerah Sejahtera	Manyar
10	PT. SinarSosro	Driyorejo
11	PT. Surabaya Wire	Driyorejo
12	PT. Samator	Driyorejo
13	PT. TitaniAlamSemesta	Driyorejo
14	PT. KIA Kramik Mas	Wringinanom
15	PT. WarnatamaCemerlang	Wringinanom

Sumber : Bappeda Gresik

People consider the assistance provided very useful for meeting the needs of local communities. Average people are employees / factory workers, because the activity is raised or Perdaganagan business services to meet the needs of employees and the local community. For other activities that allow creating new economic activities such as the manufacture of domestic catfish industry, or other processed food industry are made from catfish. Bantuanberupapinjamanuntuk capital catfish processed food industry is expected to be able to create new business for masyarakat.Mereka also expect management assistance to help their businesses.

5. CONCLUSION

Discussion of results of research that has been stated above, it can be concluded as follows:
The added value that can be generated from the Surabaya region as an area of community based urban and coastal In accordance with public expectations of economic development geared to improve the activity-based fisheries and marine tourism. For that assistance in the form of fishing equipment, fish preservation, aquaculture, marine tourism development, development of home-based industries and souvenirs fish for sea tourism . The development of other economic activities that allow raised is stall, another trading business, other business services that support the creation of sea travel.
The added value that can be generated from the Sidoarjo region as an area of community-based agragris and industry is the economic development that can improve people's ability to earn income based on agriculture and also activities other than farming for example in the form of assistance for training Enterprises productive economy, capital support to SMEs, aid work equipment for catfish, skills training support that utilize the results of catfish farming, farm implements tools for the farming community, foster rural cooperative.
The added value that can be generated from Gresik as region-based industrial society is raised is a business activity or trade services to meet the needs of employees and the local community. For other activities that allow creating new economic activities such as domestic industry, the manufacture of catfish, or other processed food industry are made from catfish. Aid in the form of loans to the capital catfish processed food industry is expected to be able to create new business for masyarakat.Mereka also expect management assistance to help their businesses.
The community empowerment program implemented by the government of Surabaya is Surabaya City Government launched a program with the general improvement, for example floating educational facilities, city parks, public facilities and others. The program by the city officials offered to companies that are domiciled in the city of Surabaya in the form of CSR programs.
Community Empowerment Programme implemented by the government of Sidoarjo is related to the economy such as the development of SMEs and cooperatives and help business equipment purchases; such as the health alert village development, development penanggulanagn Posyandu and infectious diseases; education such as providing research assistance and infrastructure development such as road construction shaft village, household sewage, sanitation, clean water facilities, sports fields, playgrounds and environmental security infrastructure and houses of worship.

Community Empowerment Program Gresik district covers conduct guidance and coaching SMEs: aid in the health sector such as cancer treatment, help ambulances and medical devices and automobiles counseling dal free health services.

The community empowerment program in Surabaya, Gresik and Sidoarjo most are programs that are not related to the company business, most companies run on the basis of the needs of people in the local area either obtained from the community itself as well as supporting community empowerment program launched by government.

Mapping of community empowerment programs through the implementation of CSR programs on industry-industry in Surabaya, Gresik and Sidoarjo CSR programs in Surabaya, Sidoarjo and Coarse sand should be implemented in the form of community empowerment program for floating the economic activities of the people who are not Goverment Regions program. So the program is not funded by the regional budget.

The local government gave us a map of problems related to people's economic activities and coordination with the company to implement development programs in the region that has been shown by the local authorities, although not related to the company business.

6. RECOMMENDATION

1. The company should carry out CSR activities in the community with first priority on the environment, and then to other regions wider. Companies should provide programs that besides helping the welfare of society, as well as programs that can invigorate the activities of the local economy.
2. Citizens through coordination team at the district level can inventory the need for increased kesejahteraann and empowerment of local economic activities.
3. The government should be able to bridge between community needs and interests of the company because it is necessary to form a special team consisting of wakilm enterprise, government, and society under the auspices of BAPPEDA coordination that will facilitate synergy between the needs and desires of both parties.

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