



# WATER RESOURCE MANAGEMENT IN SOUTHEAST ASIAN REGION

## PROCEEDINGS OF THE 4 KYOTO UNIVERSITY – SOUTHEAST ASIAN FORUM

### Bogor, 23 - 24 January 2009

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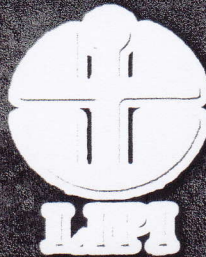
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**Water Run-Up and Inundation Simulations of Storm Surges along the Southern Coast of Java - Nining Sari Ningsih, Marthina Dian Utami, and Safwan Hadi.....63**

**Group C:**

**Land Use Impact to Availability and Water Resource Quality In Watershed - La Ode Alwi and Sitti Marwah.....76**

**Potential Applications of The Swat Model in Integrated Watershed Management and Water Resources Management in Indonesia (Case Study at Cisadane Upper Catchment, West Java, Indonesia) - Nana Mulyana, Yuli Suharnot, and Cecep Kusmana.....86**

**An Investigation on Sediment Related Problems for Watershed Management in The Brantas River Basin, Indonesia - Takeshi Shimizu.....93**

**Supporting Paper**

**The Hydrological Response on Paired Watershed - Hatma Suryatmojo.....103**

**Water Resources Development For Upland Sugarcane Plantation - Putu Sudira and Sukirno.....113**

**The Effects of Climate Change On Water Resources Development - Putu Sudira.....123**

**Identifying Visual Characteristics of Ikonos Image Featuring Aesthetic Quality of Urban Landscape - Andi Gunawan dan Julina Purwaningsih.....131**

**The Effect of Trees Covering and Canopy Forms On Aesthetic Quality of Some Type of Building - Harry Nopiyanto and Andi Gunawan.....135**

**The Effect of Crop Plants Vertical Structure On Aesthetic Quality of Agricultural Landscape - Jimi Stepanus and Andi Gunawan.....140**

**Selection of Lowland Rice Cultivars That Have Potential Tolerance to Water - Flooding Eko Sulistyono, Iskandar Lubis, and Suwarno.....145**

**Role of Vegetation in Forest Hydrology – Cecep Kusmana and Arzyana Sunkar.....153**

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## The Effect of Crop Plants Vertical Structure On Aesthetic Quality of Agricultural Landscape

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### Abstract

Agrotourism become one of government attention especially concerned to "Visit Indonesia Year" government programme. Various agricultural commodity was effort, especially fruits and vegetables, to increase the visiting to the agrotourism object. Yet, the commodity is not enough to impress the visitor. The commodity structuring in spread out can effect the visitor memorability on site. The agricultural commodity has different kind of structure vertically. Good structuring practice can be shown in energy efficient, production and aesthetic that will support the memorability. Therefore, the study was done to analyze agricultural landscape aesthetic quality with various vertical, structure of agriculture's commodity.

This research utilized experimental method with combining various agricultural commodity stands through computerized simulation, the aesthetic quality was measured with Scenic Beauty Estimation (SBE) method. The main parameter is agricultural commodity height level; consist four variable; lowest, lower, upper, highest. The measurement was done for good agricultural landscape whether with single commodity or composite commodity. The control landscape is the landscape with open field without plant commodity.

The research found that the agricultural landscape aesthetic quality was affected by the commodity vertical structure. Agriculture landscape with single commodity show the highest point (SBE = 136) for the lowest level and the control landscape without plant show the lowest aesthetic quality. Openness is the key point of the high agricultural landscape aesthetic quality that usually surrounded by mountain and hill so the plant can be foreground from the back view. The agriculture Landscape with the combining of the vertical structure show various aesthetic quality according to combination of plant commodity.

**Keyword:** agricultural landscape, scenic beauty estimation, aesthetic quality, agrotourism, plant vertical structure

### Introduction

Agrotourism is one of tourism concept base on agricultural was effort by the government to support the development of tourism in Indonesia. Agrotourism means one activities use the agricultural exertion as tourism object aimed to extend the knowledge, experience, recreation and exertion connection in agricultural (Titawinata and Fachrudian, 1999). Agricultural tourism object was the agricultural landscapes that locate not only in rural area but also in urban area.

Agricultural system with mixed plant pattern was the most effective and efficient planting system base on utilization of the sunlight for photosynthesis process. This mixed planting process combine some levels of plant in single land aimed to maintain or improve the yield productively, economically, and sustainable using the management and land utilization appropriate with the local ecological, economical and cultural condition.

Aesthetic quality in agricultural landscape can be materialized from the structuring of plant that can gave comfort ness and joy ness to the owner or people who watched it. Hence, this research

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aimed to analyze the influence kinds of vegetation levels and combinations that can increase the aesthetic quality of agricultural landscape as one important element of agrotourism.

### Methodology

This research done at the agricultural area that located in Bogor, West Java. The method that was descriptive, simulation and Scenic Beauty Estimation (SBE) method which explained by Daniel and Boster (1976). The parameter that observe was the beauty quality of the vertical structure of agricultural plant. The vertical structure consist 4 (four) level that is groundcover, lower level, upper level and top level. The plant that used in the groundcover was sweet potato, the lower level was using corn, the upper level using papaya tree and for the top level was using the coconut tree. The treatment on this research includes the influence of agricultural plant in that four level and the combinations (Table 1). Landscape without plant was the landscape control. The landscape control planted with four kind of tree as mentioned before as treatment with combination that can be seen in table 1. The four planted tree landscape was not treat as treatment, because too close ecologically. The planting of the landscape done by computerized simulation.

Table 1. Treatment of agricultural landscape with the vertical structure of agricultural plant

		Coconut				
		A		NA		
Sweet Potato		NA	Papaya		Corn	
			NA	A	NA	A
Sweet Potato	NA	NA	✓	✓	✓	✓
		A	✓	✓	✓	✓
	A	NA	✓	✓	✓	✓
		A	✓	✓	✓	✓

Note: A = Available, NA = Not Available

The result of the simulations arranges in presentation slide then broadcast it and evaluated by 45 respondents. The number of slide from the simulation was fifteen slides. Scoring was done to every slide by given score 1-10. Score 1 was explain that the respondent "very dislikes" the landscape, score 10 explain that the respondent "very like" the landscape.

The result of respondent estimation tabulate statistically with the z normal spread. The z score yielded was use to estimate the SBE (Scenic Beauty Estimation) with formula:

$$SBE_x = (Z_i - Z_L) \times 100$$

where  $SBE_x$  was SBE score landscape x,  $Z_L$  was Z means score landscape x, and  $Z_L$  was the average landscape Z standard. The SBE score yielded classify into 3 (three) category base on Daniel and Boster classification (1976) that is, high, medium, and low aesthetic quality.

## Results and Discussion

Generally, this research shows the influence of vegetation structure towards aesthetic quality of agricultural landscape with various score. Every vegetation treatment has different score of aesthetic. SBE score vary with the lowest score was 0 and the highest score was 136. Landscape without vegetation or landscape control scored the lowest (SBE = 0). The highest SBE score was on the agricultural landscape with sweet potatoes as the covering land vegetation (SBE = 136). The detail can be seen in Fig. 1.

This sweet potato becomes part of agricultural landscape that covers the land surface. The landscape was very open without any barrier to watch the background that is mountain blue around it. Some of treatment photograph can be seen in figure 2. The vegetation structure of this plant was cover crop that crawls in the land surface so gave the liberated, free and relieved impressions. Backgrounds also become the main element in landscape that contribute to establish the quality of landscape, the domination of mountain background probably has cause this landscape become the most liked. In addition, agronomically, open field will gave big space for air movement, water vapor, and sunlight to enter this landscape. Light was very establish to increase the effectiveness and rate photosynthesis process of plant for its growth and development. Ground cover not only gave variation to the land surface but also decrease the weeds growth so that will minimize the maintenance (Ingels, 2004).

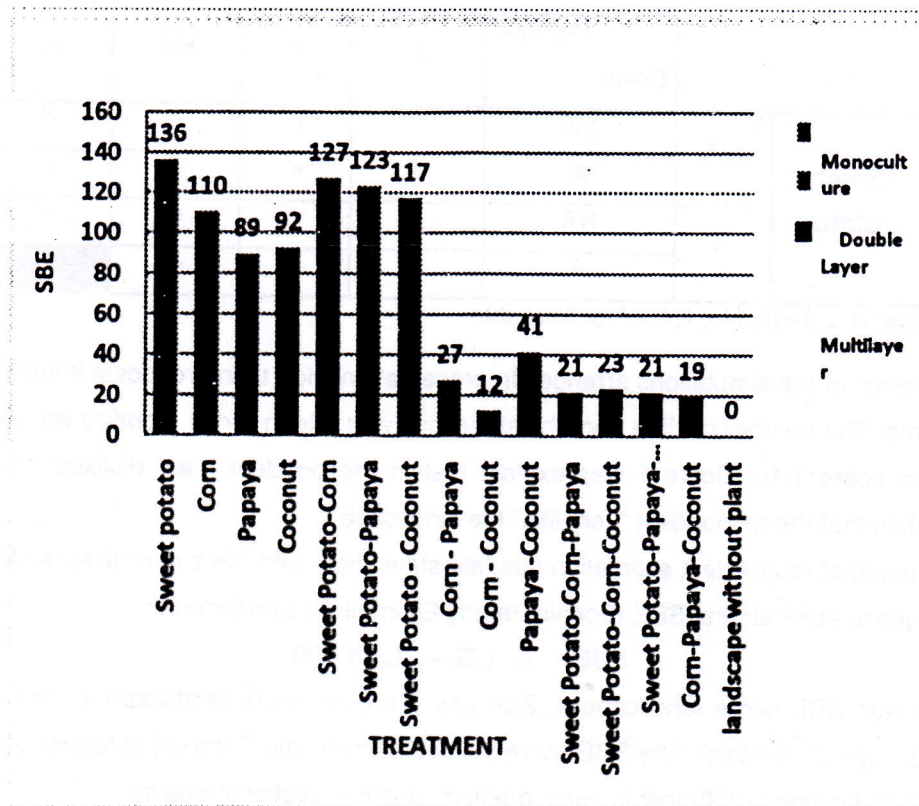


Figure 1. Agricultural Landscape SBE Value on Various Vegetation Structures.

The cover crop using show great influence to the aesthetic agricultural landscape score. All of landscape with single vegetation show the high aesthetic quality and decreased with more vegetation. If the available of cover crop in combination with two level, the aesthetic quality become increasing. On the contrary, the unavailability of cover crop would cause the aesthetic quality decreased sharply. The available of cover crop become the softener element and cover the rough and hard impression on the surface. Well regulated vegetation structure, would cause this landscape has high quality for level planting pattern, beside that gradation gradual pattern also establish the landscape attractive to the observer (Fig. 2).

Landscape control become the most dislike landscape because gave barren impression only empty field with rough texture, bright color kontras with the background. On this kind of field the observer would feel heat, empty, and quiet atmosphere. This kinds of site conditions identical with kinds of feeling full of problems. Even the view around it not blocked but not enough to help increasing the landscape aesthetic score. This open field caused the sunlight contacted directly to the land and in the day would dazzled. In addition, it will increased the evaporation, will cause run off, washing and evaporation of fertile element from the land surface.

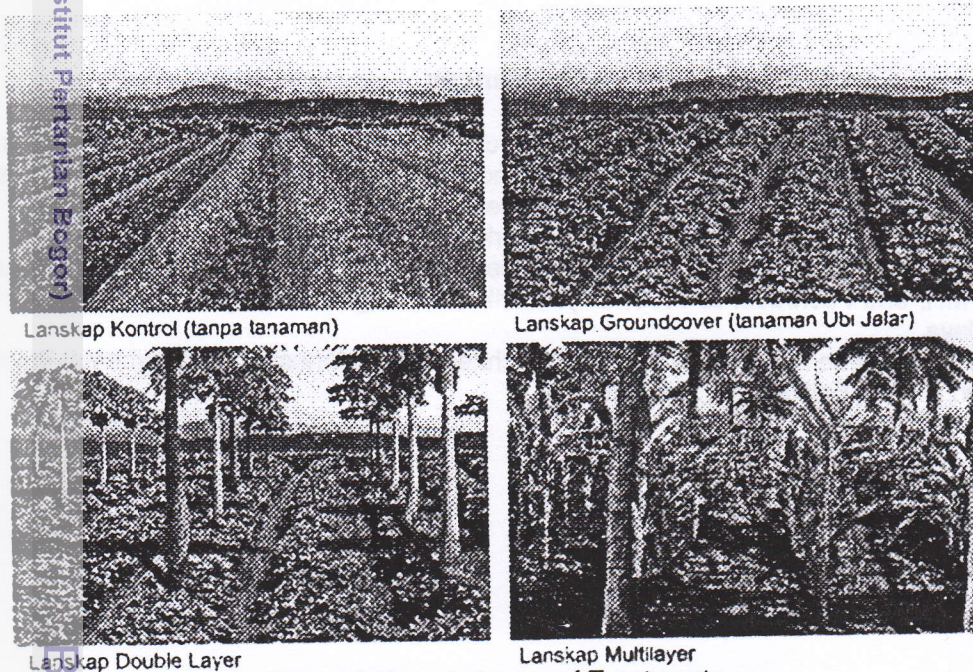


Figure 2. Sample Image of Treatments.

For the landscape with level three vegetation, all of it have the lower aesthetic quality if compared with the single level vegetation and level two landscape which has cover crop. This probably because of the high of vegetation complexity, finally all of it will dominate each other. The domination of vertical structure each vegetation was the focal point that can be its own attractive. However, the existence of lots of focal point with different kind of character on one site can disrupt the attention. Booth (1983) reminds that it better if in one site just only had one focal point.

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Complex things sometimes gave the attractive impression than simple things, but if the complexity is too much the landscape become unattractive anymore. The more combination level of vegetation, the lower quality of agricultural landscape, it guessed that simple structure was more liked, whereas the more complex vegetation structure, the lower the aesthetic quality. Its appropriate with Simonds (2006) that simplicity is beauty. From the agronomy side the close covering will cause the vegetation obstacle to get the sunlight that useful for photosynthesizes and also there will be high competition in reserve of fertile matter, water and sunlight.

### Conclusion

The agricultural landscape has various aesthetic quality equal to its vegetation structure. Agricultural landscapes with open land without plant show the lowest aesthetic quality. The agricultural landscapes with cover crop single vegetation show the very high aesthetic quality. The plant combinations with cover crop show the highest aesthetic quality than the other combination. The multilayer plant combination can decrease the aesthetic quality of the landscape. Thus, the available of vegetation in agricultural landscape can increase the aesthetic quality.

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