

Environmental Management System (EMS) in An Eco-living Community (Case Study: Jambangan Kampong, City of Surabaya)

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ABSTRACT

Parable to a biological organism, a metabolism process occurs in a city. City excretes metabolism waste. A research was aimed to study how city waste managed in a sustainable way at an eco-living based kampong in a metropolis. Such EMS has been practiced in a housing area on Jambangan Kampong, City of Surabaya. The objectives of this study were to describe open green space as a component of eco-living system at community level; to analyze waste management in 3R (reduce, reuse, recycle) ways and composing concepts practiced by community; to evaluate the level of community to participate in EMS. A survey and observation were conducted in random sampling. Data were analyzed with chi-square and principal component analysis. The result showed that Jambangan Village was on the good level of eco-living practices (53%) with some factors affects i.e. marital status, age, education, income, jobs, member of family, status of housing. The positive factors for participation are women, age above 45 years, low education and low income, household wife. EMS has been worked properly and make Jambangan Kampong achieved cleaner status, but it still need more massive external education effort to maintain activities.

Keywords: eco-living, EMS, environmental management system, kampong, metropolis, 3R waste management.

1. INTRODUCTION

Environment is very complex problems lately such as lack of environmental awareness, management of natural resources that are not wise used, use of goods that are not environmentally friendly, the pattern of production and excessive consumption, the weak of legal policy of environment, increased levels of pollution, industrial and domestic waste, sanitation and decrease the quality of the environment, and the decreasing availability of green open space which have caused great damage to the environment itself. Those problems can impact arising from the damage of pollution may occur directly to the influence of environmental destruction in the surrounding culture and can be overcome with the management of environmental sustainability and environmental friendly.

Environmental management system (EMS) refers to the management of an organization's environmental programs in a comprehensive, systematic, planned and documented manner. It includes the organizational structure, planning and resources for developing, implementing and maintaining policy for environmental protection. An Environmental Management System (EMS) is to (1) Serves as a tool to improve environmental performance, (2) Provides a systematic way of managing an organization's environmental affairs, (3) Is the aspect of the organization's overall management structure that addresses immediate and long-term impacts of its products, (4) services and processes on the environment, (5) Gives order and consistency for organizations to address environmental concerns through the allocation of resources, assignment of responsibility and ongoing evaluation of practices, procedures and processes, (6) Focuses on continual improvement of the system.

This EMS shown more useful in an ecoliving community. That can make the environment better, such as the creation of a healthy, comfortable environment, improve welfare, reduce pollution, improve health, increased quality of the environment and the quality of natural resources (Seo, 2001).

This concept begins from daily life of home environment and needs support by every member of the family / home of a consciously participate and take part in environmental activities in their homes. Maintain cleanliness and make every corner of the house need to be to create a healthy home.

The objectives of this study were to describe open green space as a component of eco-living system at community level; to analyze waste management in 3R (reduce, reuse, recycle) ways and composing concepts practiced by community; to evaluate the level of community to participate in EMS

Jambangan village is one of the villages that are trying to apply the concept of environmentally friendly (ecoliving) with a view factor needs like Green Open Space (RTH), waste management - the concept of 3R, and community participation that will reduce the damage to the environment and environmental management system itself is supported by City Council, Tunas Green NGO, and Unilever Company.

2. MATERIALS AND METHODS

Time and Place Research

Research was conducted in the Village Jambangan, District Jambangan Surabaya, East Java. Located at 070 21 'and the LS 1120 36' - 1120 54 'BT administrative boundary with the north and east is Kelurahan Tartar, Kelurahan Kebonsari the south, and west of Surabaya River. Jambangan village has knowledgeable 72,732 ha and a population of 5369 people by the number of men and women respectively 2531 and 2838 people. There are 23 neighborhood and 5 RW in the district Jambangan (1158 Head of family). This research carried out from July 2006 until August 2007, including time for preparation, licensing and creating a proposal, and the final task.

Research design

This study uses survey techniques (non-experimental) with the correlation test between waste management with the 3R concept, the availability of Green Open Space (RTH), and community participation in community life Jambangan village level in order to be eco-friendly living that leads to the good environment.

This research is divided into four main phases (1) preparation (determining the location of research, the initial survey), (2) data collection (primary data, secondary data), (3) data processing (data analysis results of the observation), and (4) evaluate the implementation of eco-living) (Figure 3). At the direction of this research describes the research of the sample will be taken.

Preparation

The beginning of this research is classified in the descriptive research that can gives information about individuals, groups or specific symptoms. At the first stage of the research conducted a survey in order to obtain secondary data that describe the condition of the location of the research so that it can be assumed that the level of household waste is in a hypothetical. Determining the location of this Jambangan based on the ability of the Village as a pioneer of environmental services and has implemented eco-friendly living. Samples taken at random (random sampling), which means that the sampling techniques to provide the same opportunities to all members of the population to be selected as members of the sample with the number of 128 people.

Data Collection

- a. Collecting primary data are:
 - (i) The field survey carried out in order to gain insight directly the current (existing condition)
 - (ii) Interviews are conducted using a list of questions that have been prepared (questioner). Information collected from respondents include: (1) household characteristics (gender, age, education), (2) Marital, the number of family members, home ownership status, wide yards, employment, and income), (3) the indicator RTH (RTH function, area, number and type of plant, RTH priorities, implementation of family medicine plants (gown)), (4) the indicator with 3R processing waste (the amount of waste per day, separator removed before the waste, the 3R, the implementation of reduce, reuse, recycle, making compost, and the amount of compost produced) and (5) participation indicator (waste separator, 3R knowledge, the needs of Green open Space (RTH), medicinal plant family, the type of separator waste, attend the meeting readiness, willingness to become cadres environment).
 - (iii) Observation on the amount and type of plant, and the qualitative assessment of the 3R (reduce, reuse, recycle)
- b. Secondary data collection:
 - (i) Data from related agencies, such as the Environment Agency, the Office of Hygiene and gardens on the hygiene environment (pollution, health, green open space, water pollution)
 - (ii) to study the literature: the print media articles, journals, press releases, government documents, materials and seminars.

Data Processing

Data will be processed in a way tabulation, and then analyzed with the (chi square - X^2) (Sugiyono, 2001) and Main component analysis (Mattjik and Sumertajaya., 2002). Chi Square - X^2 conducted to determine the influence of each variable-free household characteristics (gender, age, education, Marital, the number of family members, home ownership status, wide yards, employment, and income) with no free variables (level availability Green Open Space (RTH)), level of waste management, community-level participation) and the correlation test between third level is the level of implementation of environmentally friendly (eco-friendly living). Determination based on analysis of data which is determined directly scoring factors of each eco-living to levels where the availability of Green Open Space (RTH) (> 10 poor, 11-14 moderate, > 14 well), the management-level waste (<10 poor, 11-19 moderate, > 25 well), level of community participation (<5 bad, 5-8 moderate, > 8 good).

Main component analysis is used in this research aims to determine the factors that influence the level of life from conception environmental factors on the level of support the availability of Green Open Space (RTH), with the 3R level of processing waste and level of community participation as non free factor and the home characteristic as free factors..

3. RESULTS

Environmental Conditions Jambangan Village

Jambangan village is one of the villages who have created the environmental hygiene of Surabaya with a variety of activities that have in it. The activities that have been made are the sanitation program, greenery, separated waste, and cadre and have been held for six years starting in 2001 until now. This activity is supported by City Government of Surabaya, Tunas Green NGO and Unilever Company and is often called the program concerned with the environment (Green and Clean). Before the existence of this program the Village

Jambangan looks less good in terms of the cleanliness of a low, low sanitation, increased pollution, increased pollution, wasted / Green Open Space (RTH) less availability, and patterns of life are low (the trash is not in place, use of goods that are not environmentally friendly) . This program is run with both increased 70%, from the ability of the community in creating a clean environment quality in line with the pattern of health and community life better. The ability of this village, especially keeping the environment to stay healthy is very clearly visible, especially in the case of household waste, greenery / Green Open Space availability of adequate, pollution of the water decreases, more air feels fresh.

Community Participation

Forms of community participation that has been running well (59%) in the management of the environment such as waste generated into two parts, namely inorganic (56.19%) and organic (44.81%), participate in counseling (37%), meetings on the management of the environment (77%), environment cadre (81%) that most are women. Cadres environment that can provide referrals to the people around were also done by Unilever Company so that the environment is beautiful. This Cadrerisation is sponsored by an environmental shield that so far have produced 57 cadres of the environment consists of 10 men and 47 women.

Domestic Waste Management

Waste management of domestic / household waste that is in the Village Jambangan largely conducted independently although there is still some waste disposed to place a temporary (TPS), which will then be brought to the final shelter (TPA). Types of waste that is highly varied include paper, plastic, glass, cloth, food everyday and more. Results inorganic waste is very large in number (56.19%) compared with the organic waste (44.81%) is due to consumption of public goods to the day-to-day made of plastic, cans, paper, and so forth are still high (Tauleka, 2003).

The Use of 3R Concept

Results of household waste divided into two parts, namely organic waste (compost) with the number of > 0.5kg (34.4%), 1kg (31.3%) and > 1kg (34.4%) and inorganic (3R material) with a number of less than 5 kg (96.9 %) and 10 kg (3.1%) per day have been made by citizens at home before each collected first. This inorganic waste divided into three parts, which can still be used again (reuse), the recycling (recycle), the reduction is done (reduce). Actions reuse (65.7%) can be indicated using goods that have been used are used again as an example using the bottles used for drinking, plastic bag used for shopping, bottles used for kitchen spices, reduce (68.8%) can make a paper to be second paper with pace, like refill product, take a drink / food from home, use of the bag, while the recycle (56.30%) can be done with a table cloth to create a table of used straw, paper pulp, decoration / creatives.

This regular domestic waste divided by the mother (12.5%), children (3.1%) and those who are good at home father, mother, children, and other (84.4%). This reflects that the domestic divided waste automatically have been running well does not need to be glued to the only person who can do so in separate garbage according to the function and category. Waste that can be derived from the recycle of aluminum cans, steel, food and aerosol cans, plastic bottles, glass bottles, tople, of cardboard, newspapers, magazines, multiplex, plastic pipe; reuse can be derived from duplex board, glass bottles, plastic bottles, fabric used, the former plastic; reduce can come from not using the food / drink containing preservative, water sparingly, electricity sparingly.

Waste Management with Compost Based

Management of organic waste that has been running well (91%) consists of three (3) model that is first to use the magic method takakura home (Pusdakota, 2005) that can be used day-to-day process of food waste (garbage new vegetable, waste vegetable casserole, rice, the remaining food morning, noon, night, fruit waste, trash fish, and meat). This box

can absorb organic waste of a family (4-6 family members) up to 1 month for full mejadi and change into compost as much as 0.5kg and can be used repeatedly until a matter of years. Second, model using both the scale composter household (aerob composter) where the material that is inserted in the barrel as the organic material does not need anything added to the leaf from the yard containing waste leaved banana, peeling vegetables, and fruits can be harvested 8 months up to 1 year as much as 5 kg. Removed to a third model of communal TPS and be treated so that the burning of dry compost. This model takes time for 3 months to harvest the compost.

Availability of Green Open Space

Availability of RTH Method using Cross Tabulation (chi-square) to find out the relationship between household karateristik with aspects of the availability of Green Open Space. Relationship is obtained in terms of factors (1) function RTH, (2) area of RTH, (3) the number of types of plants, (4) priority RTH, and (5) the application of the gown (Slamet, 2003).

Level Life conception Environment

Assessment of the three factors that support a conception of life to both the environment (53%) this was the desire of the community in improving the environment is influenced by the availability Clean and Green program and support Pemkot Green Tunas and NGOs to create a conception of the environment.

Main Components Analysis

The results of the analysis component of the main factors explaining household characteristics that affect the level of waste management with the 3R concept, level of community participation, and level of availability of RTH. Household characteristics is divided into nine sections, namely sex, age, education, Marital, the number of family members, home ownership status, wide pages, employment, and income. Each character is divided into sub-sections according to the criteria of character. For the characters of sex were divided into two, namely men and women, age was divided into three parts, namely teenagers (<35 years), adults 35-45 years, older (> 45 years), education is divided into three, ie, low education (<SMA), are (SMA-D3), high (> D3); Marital divided into three, ie, not married, married, widow / widower; number of family members divided into three parts, namely a few (<5 people), are (5 people), many (> 5 soul); the status of home ownership is divided into three, namely the property itself, a rent, owned by the parents; the work is divided into four, that is not working, retired, employed, housewives, and the income is divided into three, namely low (<Rp.500.000, -), moderate (IDR 500,000, - - Rp. 1.000.000, -), high (> Rp. 1.000.000, -). Factors that affect the participation of the community waste management and 3R positively with the number of families is high (> 5jiwa), elderly (> 45tahun), low-educated (<high school), low-income (<Rp. 500.000, -), have their own home and property parents, the negative is a high (> high school), number of families are (5 people), and does not work. Factors that affect the availability of RTH is positively respondents who work and housewives, teenagers (<35 years) and adults (35-45 years), high income (> Rp. 1.000.000, -) and current income (IDR 500,000, --Rp. 1.000.000, -), are married, women, are educated (high school-D3), the family has more than 5 people, the status of a house to rent / contract, and the factors that negatively affect the respondents who are not married, retirees, and men. That is positively housewife, this because of the housewives have more time to participate in and run this program hygiene.

4. DISCUSSIONS

Community Participation

Referrals and various programs have been implemented in this cadre especially to use the concept of 3R, greenery, composting, and kinship among citizen using the chi-square level of community participation with percentages 59%, moderate 38%, and 3% with a bad component factors such as (1) type of waste management (how the program is implemented by the community), (2) planning and decision-making (the meeting), (3) willingness to become cadres, (4) participation in counseling or training.

Domestic Waste Management

Waste separated in the first houses in order to simplify the process of recycling. Waste is generated as household organic waste and inorganic. Organic and inorganic waste is not disposed to TPS directly but must first be processed by each household. Organic waste will be processed for making good compost daily scale and household as well as the inorganic waste is treated using the concept of 3R (reuse, reduce, recycle).

The concept of the use of 3R

Processing waste 3R concept can also provide additional income for residents than the effect on the social and ecological. Which have separate waste will be collected in the first place in each of the strategic RW for sale. Calculation using the chi-square result of waste management with the 3R is good with percentages 69%, moderate 31%, and 0% bad and 10% decrease from 56.19% to the component factors (1) the amount of waste per day, (2) waste separator removed before, (3) knowledge of 3R, (4) waste separator, (5) reduce the implementation, (6) the implementation of reuse, (7) implementation of the recycle.

Waste Management with Compost Based

Availability of RTH Method using Cross Tabulation (chi-square) to find out the relationship between household karateristik with aspects of the availability of Green Open Space. Relationship is obtained in terms of factors (1) function RTH, (2) area of RTH, (3) the number of types of plants, (4) priority RTH, and (5) the application of the gown (Slamet, 2003). Calculation using the chi-square level of the availability of open green space with a good percentage 53%, moderate 41%, and 6% with the bad component. Can be concluded that the community has provided RTH in the surrounding environment with attention to both the function, number, gown, and the interests of the RTH.

Vailability of Green Open Space

Calculation using the chi-square level of the availability of open green space with a good percentage 53%, moderate 41%, and 6% with the bad component. Can be concluded that the community has provided RTH in the surrounding environment with attention to both the function, number, gown, and the interests of the RTH.

Main Components Analysis

People who have committed to the concept of waste processing and compost 3R directly for participating to the management of the environment but still less in the implementation of RTH is due to the availability of the community has not been compared with RTH waste management that have been seen with the environment. This means that the older the respondents, the lower the per capita income, the more the number of families in the higher level of environmental management based ecoliving with other high-income respondents, and higher education does not work, the men, the widow / widower and retired the rarely involved in the management of the environment around the residence. The more respondents who 3R concept is also the more people who participate in managing the

environment. Respondents who work, housewives, teenagers and adults, are highly educated affect Green Open Space (RTH) requesting the business needs to improve RTH that can be applied to all respondents so that the environment is healthy and comfortable. Improvement can be made full support by the government in accordance with the provisions of Regulation No. 7 / 2002.

Institutional venue that can be used to encourage sustainable management of environment-such as associations of organizations both formal and non-growing and developing in the community, among others, through research, teaching, schools, Youth Community, NGOs, community organizations and other to make this concept more intensive and sustainable for self-reliance in the settlement.

5. CONCLUSIONS

- Village Jambangan in general have made the concept of environment-friendly towards the sustainability of (good), namely 53% with the participation of the community of 59%, availability 53% of RTH and waste management of 78%,
- Level of community participation in environmental management systems are good. Participation is still low in the development of human resources (counseling / training), namely 44%,
- Level of waste management system in the domestic environment is good. Management of this is influence by women (62.5%) because women is the most involved in managing household waste in accordance with the responsibilities for managing waste for the cleanliness in and around the house,
- Level Green Open Space (RTH) availability in the system environment is good. Availability of Green Open Space (RTH) is still less than the available area is where the ability to provide the community area of less than 5m² therefore not fullfil provisions 1.8m²/person,
- Factors that influence the management system is based on the concept ecoliving income, education, marital, age (positive real deal) and employment, the number of families, the status of the home (negative real deal),
- Village Jambangan can be said that residential development because it has made improving the quality of life, improving the quality of human resources, there is sisitem management environment based ecoliving (waste management, participation, and availability of Green Open Space (RTH)).

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