PUSAT PENELITIAN LINGKUNGAN HIDUP
CENTER FOR ENVIRONMENTAL RESEARCH
INSTITUT PERTANIAN BOGOR

Working Paper No. 16

September 2009

The Behavioral Study of Community to Discard Trash and Management Institutions in Bogor City

Gatot Yulianto
Anna Fatchiya

ISSN 2085-3599
9 772085 359908

CENTER FOR ENVIRONMENTAL RESEARCH
Office address: Gedung PPLH 2-4 Fl., Jl. Lingkar Akademik, Kampus IPB Darmaga, Bogor 16680
Mailing address: PO Box 243 Bogor 16001
Tel: +62-251-8621262,8621085; Fax: +62-251-8622134
E-mail: pplh-ipb@indo.net.id; pplh@ipb.ac.id
Website: www.pplh.ipb.ac.id

PREFACE

Pusat Penelitian Lingkungan *Hidup* - Institut Pertanian *Bogor* (PPLH-IPB) [Center for Environmental Research - Institut Pertanian Bogor (CER-IPB)] was established in 1976. One of the Center's goal is to develop policies and concepts for natural resources and environmental management based on ecosystem characteristics, community participation, local community tradition, economic justice, and global environmental change.

Paper published in this Working Paper edition is the output of selected research activities funded by the Osaka Gas Foundation of International Cultural Exchange (OGFICE),Japan for the fiscal year 2007-2008.

We are pleased to publish Gatot Yulianto and Anna Fatchiya's paper **The Behavioral Study of Community to Discard Trash and Management Institutions in Bogor City.** We also express our gratitude and appreciation to Mr. Hendi Satrio Aji, Dr. Lilik Budi Prasetyo, and Ellyn K. Damayanti, Ph.D.Agr. for their cooperation in proof-reading and lay-outing the manuscript.

Finally, we hope this publication will be valuable and beneficial for those who have interest in Indonesia's natural resource and environmental management.

September 2009,

Kukuh Murtilaksono

Director

CONTENTS

List of Tables

The Behavioral Study of Community to Discard Trash and Management Institutions in Bogor City

Gatot Yulianto
Center for Environmental Research-IPB

Anna Fatchiya
Department of Communication and Community Development

ABSTRACT

Trash or domestic waste are important to be managed in order not to cause negative impacts. Unfortunately, people's awareness to discard trash is low relatively. It showed that many households discard the trash into rivers and actually the actions are influenced some aspects. This study is important to be done to know some factors that influential to household decisions to discard trash and to know willingness to pay of households to manage the trash in order not to discard the trash into the rivers anymore. The collected data both primary and secundary analyzed by descriptive statistics and inference statistics. Proccesing data is by using a program Minitab 13 For Windows. Result of this study shown that (1) The institution of trash management could be seen two aspects, namely institutiona on the community level and institution-policy on goverment level. The impacts of behavior change are related to river environmental performance (2) The factors influential to people behavior are household income, the distance between house and river and sufficiency trash facilities. Willingness to pay of households for managing trash in order not to discard trash to the river are lower because of influencial factors, namely amount of running trash payment and household income. Finally, the output of this study will take form as a management analysis that will inform to community, firms and government

1. INTRODUCTION

1.1. Background

The river has an important role to arrange water system from upstream until to downstream. It is stated by Bandiyono et all *(1988)* that the river has many functions for collecting, saving and distributing waters through net system of river from upstream at mountain until to downstream at the lake or the sea. And Sunarto *(1997)* stated also that the river is a nature waters system that arranging flow waters until to the lake or the sea, because of the river flow waters through a variety of rocklike and a variety of topography, so that the river has a fertility that to be needed by plant, animal and people, so the river is as source of living.

Many importance of many sectors and people activities around Ciliwung from upstream to downstream influence the river, i.e. agricultural, fishery (i.e. fish culture on cage), tourism, transportation, industry, market, and housing. Actually, the many activities cause negative and positive impacts to the river. One of the negative impacts to the river is domestic waste of civilized households both at modern housing, illegal housing or urban housing at around river flood plain. Household domestic waste that not to be managed well and to be discarded to the river cause river are water pollution, easy flood, emerging infect disease, sea waters pollution, and actually it will impact community their self, fish resources and economics activities.

As the urban region and to be passed through by two big rivers, i.e. Ciliwung and Ciapus, The Bogor City face some trash problems. The trashes are shown at any locations like at housing, market, terminal, office, school and streets. One of the trash problems at Bogor City is the trash that coming from civilized community around river. There are some people throw away the trash into the rivers still. Regarding the importance of river for people living, so do research about community behavior that throw away the trash to the river is important.

Many activities daily including discard trash to the river are often influenced by informal rules and formal rules related to trash management institutions. So, it will be met many actions about discarding the trash whether the actions are suitable or not depend on available institutions in a system of living. The households are in a RW (a group of community) having a different preference to manage the trash. A socio-economic condition, environmental condition (i.e. drainage), and available institution to manage the trash on a household level and a community level will influence behavioral household throwing away the trash. This study is aimed to analysis behavioral household discarding the trash and trash management institutions.

1.2. Objectives and Expected Outputs

This study is aimed : (1) to know the existing trash management institution, (2) to analyze the factors influencing household decision to discard the trash to the river, (3) to analyze the willingness to pay of households to participate on trash management institution in order not to discard the trash to the river anymore.

The output of this study will take form as a management analysis that will inform to community, firms and government.

2. METHODOLOGY

2.1. Location Study

This location as case study carried out at Administrative Village Babakan Pasar, Sub District Bogor Tengah, Bogor City-West Java. This location is taken by purposive with considering : (a) density of people are high (b) many houses next to River Ciliwung where some people throw away trash to the river still (c) City Governemnet did trash management by giving some trash facilities.

2.2. Research Method

2.2.1. Collecting Data

This study used a survey method that collected data are cross section data. The collected data consist of primary data and secondary data. Primary data are took by interview with respondent based on list question and direct observation. The secondary data are took by collecting from Environmental and Clean Office, Administrative Village Office and others reference. Population is households staying at Ciliwung river side, namely the households stay at RW 01, RW 04, RW 08,dan RW 09. By simple random sampling, 79 samples (respondents)are taken.

2.2.3. Data Analysis

The collected data analyzed by descriptive statistics and inference statistics. Proccesing data is by using a program Minitab 13 For Windows. Quantitative analysis based on :

1. Logit Linear Model Analysis and this model is used to know decision households (probability)discarding trash to the river or not. The formula is :

$$\mathbf{DTrT = a + b1\ HInc + b2\ HEdu + b3\ LStan + b4\ HAge + b5\ WEdu + b6\ TraV + b3\ DRiv + D_{11}\ DSta + D_2{}^2\ TFac}$$

Where,
DTrT = decision households to discard trash to the river or not
DTrT = 1; if households discard trash to the River Ciliwung
DTrT = 0, if households do not discard trash to the River Ciliwung
HInc = Household Income (Rp/month)
Hedu = Husband Education (years)
LStan = The length of stay (years)
Hage = Husband Age (years)
WEdu = Wife Education (years)
DRiv = Distance between house and river (meters)
TraV = Trash Volume (cm^3)
DSta = Demography Status

$DSta_0$ = *0*, if households are legitimate inhabitant.
$DSta_1$ = **1**, if households are *unlegitimate* inhabitant.
TFac = Sufficiency trash facilities
$TFac_0$ = *0* ; if trash facilities are enough
$TFac_1$ = **1**; if trash facilities are not enough

2. Multiple Regression Analysis and this model is used to know willingness to pay of households who discard trash to the river in order that households participate on the trash management

$$WTP = a + b1\,InsP + b2\,HInc + b3\,DRiv + D_2\,TFac$$

Where,
WTP = *Williness* to pay *(Rupiah/month)*
InsP = trash payment (InsP*);*
HInc = Household Income (Rp/month)
DRiv = Distance between house and river (meters)
D_2 TFac = Sufficiency trash facilities
$TFac_0$ = 0 ; if trash facilities are enough
$TFac_1$ = 1; if trash facilities are not enough

3. RESULTS AND DISCUSSION

3.1 General Conditions of Location

Administrative Village Babakan Pasar, Sub District Bogor Tengah, Bogor City has region area 42 ha and the topography level are at 247 meters from sea hight level. Babakan Pasar consist of 9 RW (community group) dan 39 RT (group of neighbor) and one of the region next to River Ciliwung. There are 4 RW, namely RW 01, RW 04, RW 08 and RW 09 next to River Ciliwung.

Amount of the people until April 2008 are 11.317 persons consist of 5.775 man dan 5.542 women. Sex ratio is 105 and dependency ratio is 39. Based on level education, the people are 29,76 % graduated and drop out from elementary school, 22,43% graduated and drop out from junior high school and 32,38% graduated and drop out from senior high school. Based on the jobs, the people have work at small enterprenuer are 39,94%, at private and goverment company 31.85 %, at service sectors 19.93 % and others *8.28* %

Most of the house type are permanent and semi permanent. The house are next to each other and many house are on the Ciliwung River side. There are many small street among of the house for the people walking. Drainage system are fluent, but some time are seen a few trash. Most the people use clean waters are from Goverment Water Company. Until now, Ciliwung waters is used by people for washing, bathing, defecate, cage fish culture and discarding trash.

3.2 Trash Management Institution

The importance to understanding about trash management institution is able to predict impact as a result from behavior change of the community regarding throw away trash to the river. The impacts of behavior change are related to river environmental performance. The existance of institution is expected to be able to change behavior of community in order not to throw away trash to the river. The institution could be seen two aspects, namely institutiona on the community level and institution-policy on goverment level.

3.2.1. Institution on the Community Level

Generally the first step implementing the role of trash management is started on household level by collecting the trash on the plastic bundle (pocket) which capacity between 3300 - 13.500 cm^3 per bundle. The household produce the trash average is 6.677 cm^3 per day. Collected trash on the plastic bundle are discarded to trash can or picked up by trash worker daily in the morning or in the afternoon. Households usually put the bundle of trash in front of their house. By using trash cart the worker carry and discard the trash at Temporary Trush Place (TPS) and then the trash are carried by truck to the Last Place (TPA) and be managed.

Wage for the trash worker are from trash payment that paid daily by community when the worker collecting the trash. Amount of trash payment are depend on charity household and volume of the trash. After the City Government gave some trash facility, the mechanism of collection the trash are better and trash payment are fluent. The present of the trash worker make the household easily to manage trash and reduce activities to discard trash to the river as a bad habit.

3.2.2. City Government Policy

The Office of Environmental and Clean on behalf of City Government has a program to overcome environmental problems and the one of the program is to handle trash problems at the river by giving some aids like trash can, trash cart and giving some information in order to the people not throw away the trash to the river. The targets of goals are community at the river side. Expectations of the program are able to decrease and minimize people's habit to discard the trash to the river.

The government program regarding with managing the trash such away have strengthened trash management institutions on the level community by repairing mechanism of collecting and discarding the trash, recovery trash cost payment and growing up their self help.

3.3. Community Attitude

The attitude in this case are community attitude to cleanliness norms, trash economics values, many activities regarding throwing away the trash to the river, management institutions and kinds of handling the trash. Generally, community attitude to the aspects are positive that shown at table 3.1.

Table 3.1. Community Attitude to the Objects

No	Statements	Attitude					
		Positive		Neutral		Negative	
		n_1	%	n_2	%	n_3	%
1	We have to take care river environmental because of trash problems	79	100	0	0.00	0	0.00
2	We have to throw away the trash on the right place.	78	98.73	1	1.27	0	0.00
3	Cleanliness is a part of belief	78	98.73	1	1.27	0	0.00
4	The trash can cause health problems1disease	77	97.47	0	0.00	2	2.53
5	River is a certain place where the people can discard the trash easily and cheaper.	36	36	5	6.33	38	48.10
6	Discarding the trash such away to the river cause water pollution	78	98.73	1	1.27	0	0.00
7	Discarding the trash such away to the river cause flood	78	98.73	0	0.00	1	1.27
8	Trash problems are government obligation	17	21.52	1	1.27	61	77.22
9	Trash problems are community obligation	27	34.18	2	2.53	50	63.29
10	Trash problems are both community and government obligation	78	98.73	1	1.27	0	0.00
11	Throw away trash to the river should beprohibited	68	86.08	0	0.00	11	13.92
12	Trash collector /jobs can reduce trash volume that discarded to the river	75	94.94	3	3.80	1	1.27
14	Trash collector /jobs can break trash collected on plastic pocket	67	84.81	1	1.27	11	13.92
15	Trash has a economic values	72	91.14	6	7.59	1	1.27
16	Trash can be managed at first step by doing separation at household level	70	88.61	4	5.06	5	6.33
17	Making compost from the trash is one of kind to overcome the trash problems	73	92.41	3	3.80	3	3.80

3.4. Decision to Discard Trash to River

The behavioral model of household related to discarding trash to the river is be analyzed by using linear probability model that shown by this equation :

DTrT	**=**	**0.446**	**- 0.000122 HInc**	**- 0.0051 HEdu**	**- 0.00540 LStan**
		(0.4794)	**(0.00005745)**	**(0.02238)**	**(0.003324)**
		***t*= 0.93**	**-2.12**	**-0.23**	**-1.62**
			+ 0.00646 HAge	**+ 0.0322 WEdu**	**+ 0.000000 TraV**
			(0.004726)	**(0.02067)**	**(0.0000 1502)**
			1.37	**1.56**	**0.03**
			- 0.00867 DRiv	**- 0.146 DSta**	**- 0.250 TFac**
			(0.003390)	**(0.3738)**	**(0.1089)**
			-2.56	**-0.39**	**-2.30**
			df= 69	**R-Sq = 22.7%**	***R-Sq(adj)* = 12.6%**

Interpretation of the above equation is explained as follows :

1. Influence of the independent variable HIn, HEdu, LStan, HAge, WEdu, TraV, DRiv, DSta and Tfac simultaneously to dependent variable DTrT referring that nol hypothesis is rejected on level of significance 5 % (p<5 %). It means that at least there is an independent variable influential to dependent variable directly. So, the independent variables influential simultaneously to dependent variable.
2. The R^2-value is 22.7 %. It refer that independent variables HIn, HEdu, LStan, HAge, WEdu, TraV, DRiv, DSta and Tfac explain just only 22.7 % to household decision variation to throw away trash to the river, awhile the value 81.3 % can be explained by another factors outside a formed model, namely :
   a. a community habits to discard trash to the river is not easy to be disappeared
   b. There are no role and the games, no sanction for people discarding trash to the river. There are some information, but there are just an appeal information.
3. Constanta value is 0.446; It means that by holding all independent variables HIn, HEdu, LStan, HAge, WEdu, TraV, DRiv, DSta dan TFac are constant, so the probability of household to throw away trash to the river is 44.6 %.
4. The influential factors significantly to household decision to throw away trash to the river are :
   a. Household income (HIn): HLn factor influential at significant level 5 % (p < 5 %) with partial regression coefficient is negative 0.00005745. It means that the household income are Increasing, so they will decrease probability to throw away trash to the river. The critical point of income that the households will throw away the trash, by holding another factors are constant, is Rp 442,623.00 pen

month. It means that households have income less than 442,623.00 pen month, so they will tend to discard trash to the river.

b. Distance between house and river (Driv). Driv factor influential at significant level 5 % ($p < 5$ %) with partial regression coefficient is negative 0.00867. It means that the position their home are so far from the river, so they tend to derease probability to discard trash to the river. The critical point of a distance between house and river where the household will throw away the trash, by holding another factors are constant, is 6.23 meters. It means that households having their house next to the river will tend to discard trash to the river

c. Sufficiency trash facilities (TFac). TFac factor influential at significant level 5 % ($p < 5$ %) with partial regression coefficient is negative 0.250 . It means that there are many difference kinds to view regarding sufficiency trash facilities. By holding another factors are constant, the community that view the trash facilities are not sufficiency they will have probability to discard trash to the river higher 25 % than the community that view'the trash facilities are sufficiency.

5. Another factors are not influential to household decision to discard trash to the river are Husband Education (HEd), The length of stay (LStan), Husband Age (HaG), Wife Education (WEdu), Trash Volume (TraV), and Demography Status (DSta).

3.5. Willingness to Pay for Trash Management

Environmental management in this case is an effort to strengthen trash management institution by developing role and the game and also give trash facility to community in order that household not discard the trash to the river. Therefore, it is important to know willingness to pay and identify some factors influential the household willingness to pay who discard trash to the river still by analyzing amount 23 households or 23/11 % of households as samples. The assumption of willingness to pay related to form trash management institution by implementing and enforcing the new regulation including implementing hard sanction to violator and also buying trash facilities. The willingness to pay of households is reffered by equation :

ATP =	**0.67**	**- 0.287 InsP**	**+ 0.00552 HInc**	**- 0.0273 DRiv**	**+ 0.03 TFac**
	(2.802)	**(0.7 036)**	**(0.00220 1)**	**(0.0 7978)**	**(2.408)**
	***t* = 0.24**	**-2.77**	**2.51**	**-0.35**	**0.01**
		df=18	**R-Sq = 46.8%**	***R-Sq(adj)* = 34.9%**	

Interpretation of the above equation is explained as follows :

1. Influence of the independent variable InsP, HInc, DRiv dan TFac simultaneously to dependent variable DTrT referring that a nol

hypothesis is rejected on level of significance 5 % ($p<5$ %). It means that there is at least an independent variable influential to dependent variable directly. So, the independent variables influential simultaneously to dependent variable.

2. The R^2 -value is 46.8%; It means that by holding all independent variables InsP, HInc, DRiv and TFac explain just only 46.8% to willingness to pay variation, awhile the value 53,23 % can be explained by another factors outside a formed model, namely
   a. Big expectation of the people to City Government to avail trash facilities.
   b. Unsure to regulation of trash management can be implemented and enforced truly.
3. Constanta value is 0.67; It means that by holding all independent variables InsP, HInc, DRiv and TFac are constant, so willingness to pay of households are amount Rp 6.700,00 per month.
4. The influential factors significantly to willingness to pay of household are :
   a. Amount of running trash payment (InsP); The HLn factor influential at significant level 5 % ($p< 5$ %) with partial regression coefficient is negative 0.00552. It means that the amount of running trash payment are increasing, so they will decrease their willingness to pay.
   b. Household income (HIn) : HLn factor influential at significant level 5 % ($p< 5$ %) with partial regression coefficient is negative 0.00552. It means that the household income are increasing average Rp 100.000 per month, so they will increase their willingness to pay Rp 552,00 per month. It is referring that willingness to pay of households for managing trash in order not to discard trash to the river are lower.

Another factors are not influential to willingness to pay in order not to discard trash to the river are distance between house and river (Driv) and Sufficiency trash facilities (TFac).

4. CONCLUSION AND SUGGESTION

4.1. Conclusion

Based on result analysis, the conclusion are :

1. The trash management institution are exist in the community and has been strengthened by Government intervention by giving trash can, trash cart and some information related to trash management. The institution has changed community behavior to reduce their activities to discard trash to the river.

2. Attitude people to the river are positive. The river has to be managed better, but until now some people throw away trash to the river still. The factors influential to people behavior are household income, the distance between house and river and sufficiency trash facilities.
3. Willingness to pay of households for managing trash in order not to discard trash to the river are lower because of influencial factors, namely amount of running trash payment and household income.

4.2. Suggestion

Suggestion of this study as inputs to government regulation are: (1) Form and mechanism regarding trust management should be develop institution also in order that community participation are high. (2) Habits aspect is predicted as a dominant factor that the people discard trash to the river, so the study of sociology, psycology and etics are an important aspect to analysis the habits.

REFERENCES

Eggertsson, T., 1990. Economic *Behavier* and *Institusions*. Cambridge University Press.

Gujarati, D and Sumarno Zain. 1993. Basic Econometrics (translated in Indonesia Language). Erlangga, Jakarta.

Pakpahan, A. 1989. Kerangka Analitik untuk Penelitian Rekayasa Sosial : Perspektif Ekonomi Institusi dalam Prosiding Patanas : Evolusi Kelembagaan Pedesaan di Tengah Perkembangan Teknologi Pertanian. PPAE-Balitbang Pertanian, Departemen Pertanian. Bogor.

Sarwono, SW. 2002. Psikologi Sosial Individu dan Teori-Teori Psikolgi Sosial. Balai Pustaka. Jakarta

Schmid, A.A., 1987. Property, Power and Public Choice. Praeger. New York.

Sears DO, Peplau LA, Freedman JL. Psikologi Sosial. Penerjemah : Soekrisno, S dan Adryanto, M. Ed ke-5. Jilid 1. Erlngga. Jakarta

Sukarni, M. 1989. The House Health and Environmental. Bogor : Institut Pertanian Bogor, Pusat Antar Universitas Pangan dan Giji.

Rustamadji, H. 1994. Penataan Sungai. Himpunan Karangan Ilmiah di Bidang Perkotaan dan Lingkungan.

Walgito, B. 2002. Psikologi Sosial (Suatu Pengantar). Yogyakarta : Andi Yogyakarta.