

# Required environmental education in junior high school for pro-environmental behavior in Indonesia: a perspective on parents' household sanitation situations and teachers' awareness of environmental education

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## Abstract

Indonesia faces pressing environmental issues, many of which are related to citizens' lifestyles. Therefore, community-based environmental education is needed to encourage pro-environmental behavior. We examined parents' perspectives on their household sanitation situations and teachers' awareness of environmental education in junior high school in Indonesia to consider what types of environmental education are needed to promote pro-environmental behavior. We conducted a cross-sectional study among 350 parents and 17 junior high school teachers in Makassar City, Indonesia. We administered a questionnaire on household sanitation situations to the parents and conducted semi-structured interviews with the teachers. The analysis indicated that 95.9% of the parents were interested in environmental issues, and 90.2% were aware of water pollution. Although 35.3% sorted their garbage regularly, they did so in a diverse range of ways. Moreover, the number of parents with a low level of education that answered "no specific reason" as their reason for sorting their garbage was higher than among those with higher levels of education. In addition, only 42.1% of parents performed adequate oil disposal. Two categories were extracted based on Mayring's content analysis: 1) necessity of symbiosis within the community; and 2) education as people concerned with the environment. A small percentage of parents exhibited pro-environmental behavior, and teachers mentioned some problems regarding environmental education. Therefore, it was considered that the household sanitation and environmental education of junior high school students were not adequate. Teachers of subjects unrelated to environmental education also teach environmental education in their lessons. To promote pro-environmental behaviors in junior high school students, it is necessary to provide environmental education for students and their parents, and environmental education materials that all teachers can use to teach environmental education.

## KEY WORDS

pro-environmental behavior, environmental education, household sanitation, junior high school, parent and teacher

## Introduction

Economic development was one of the facets emphasized in the development assistance provided to developing

countries in the 1980s; however, the various types of assistance offered were insufficient to drive growth and reduce poverty in these developing countries. Thus, eight

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goals were codified in the Millennium Development Goals (MDGs) to resolve the environmental issues and health problems in developing countries, including reducing child mortality and improving maternal health. The seventh goal, which is to ensure environmental sustainability, aims to halve the number of people who lack access to safe drinking water and sanitary facilities by 2015<sup>1</sup>). However, many of the targets were not accomplished by this date, and have continued as part of the “17 Sustainable Development Goals of the 2030 Agenda.”

The major environmental issues in the Republic of Indonesia relate to air pollution in urban areas caused by automobile exhaust fumes, the low levels of sewage system maintenance, and the pollution of rivers and groundwater due to industrial waste and household effluents<sup>2</sup>). Water pollution causes health problems such as dermatologic disorders, diarrhea, and infection because inhabitants use the water directly for drinking and farming<sup>3</sup>). Indonesia’s Ministry of Environment has collaborated with local municipalities to implement a number of approaches for curbing environmental pollution through the Clean River Program (PROKASIH), evaluating and rating business entities through the Environment Control Agency (PROPER), and ensuring cleaner production (CP) in small- and medium-sized companies<sup>4</sup>). However, most of these are measures against industrial waste, and little attention has been given to household effluents. The sewage system across the country was constructed at a mere 3.0% level, and most areas lack such a system<sup>5</sup>).

Household effluents cause 60–70% of Indonesia’s water pollution<sup>2</sup>). Still, people dispose their garbage in bare feet and by hand, and nude children play in surrounding dirty rivers; the risk of health hazards from interacting with this contaminated environment is high<sup>6</sup>). Household effluents are not the only factor contributing to water pollution, but the cause of water pollution is largely associated with the local people’s lifestyle; therefore, changing people’s awareness is essential to addressing water pollution.

According to a 2001 study on the awareness of 537 men aged 30–49 years in Jakarta, the educated group of university workers had knowledge of environmental issues, whereas the group of community members lacked the same knowledge<sup>7</sup>). A few subsequent studies have examined adult awareness. In 2013, university students underwent environmental education to increase their knowledge of environmental issues; however, it was difficult

for them to take action to solve the related problems<sup>8</sup>). Therefore, implementation of environmental education from childhood is necessary to promote pro-environmental behavior.

One study found that people who live in countries and regions that have undergone rapid economic development tend to pay attention to the benefits of economic growth, although their awareness of environmental issues is low; this problem is likely to expand<sup>9</sup>). A similar tendency has occurred in Indonesia: 70% of 70 surveyed teachers believed that economic development was more important than environmental conservation<sup>10</sup>). Indonesian people seemingly cannot take appropriate coping and environmental hygiene actions because they face environmental issues routinely, and life in a polluted environment is accepted as the norm<sup>11, 12</sup>). In response to this, an environmental education initiative was started in 1989 among elementary and junior high school students, and the Adiwiyata program was introduced as an environmentally friendly “Green School Program.” The Adiwiyata program aims to produce responsible schoolchildren in the effort to protect and manage the environment through good school governance and support sustainable development. The Indonesian government evaluates schools which participate in the Adiwiyata program, and the schools that achieve high evaluations receive Adiwiyata accreditation. Schools that have achieved Adiwiyata level are responsible for teaching environmental education in other schools and in the community. Nevertheless, most elementary and junior high school students in Makassar City did not follow through with pro-environmental behaviors<sup>13</sup>), suggesting that the schools’ efforts were inadequate. Parents and teachers have an important role in encouraging pro-environmental behavior in children<sup>14-16</sup>). However, there has been no clear research into either the household sanitation practices surrounding children or the awareness of environmental education among teachers.

Consequently, the aim of this study was to examine parents’ perspectives of household sanitation and teachers’ awareness of environmental education for junior high school students in Makassar City in South Sulawesi Province. This research can contribute to consideration of what type of environmental education is needed to promote pro-environmental behaviors by junior high school students.

## **Methods**

### **1. Study design**

This was a cross-sectional study. The examination of parents' perspective on their household sanitation situation was conducted quantitatively, whereas measuring teachers' awareness of environmental education was qualitative to consider what type of environmental education is needed to promote pro-environmental behaviors by children.

### **2. Participants**

#### **1) Parents**

A total of 745 parents of the students in a public junior high school in Makassar City that had achieved Adiwiyata mandiri level were surveyed. We used a purposive sampling method to recruit parents for the study. Makassar City has experienced rapid economic development, including an economic growth rate of 9.88% in 2014<sup>17)</sup>. Those who were not parents of any junior high school students were excluded from the study.

#### **2) Teachers**

A total of 17 teachers in three public junior high schools in South Sulawesi that have achieved Adiwiyata mandiri or nasional level participated in semi-structured interviews. We used a purposive sampling method to recruit teachers for the study. The teaching staff of Hasanuddin University selected the first school from among those that achieved Adiwiyata accreditation in 2013, while the second and third schools were introduced by the administrator of first school. Those who had to teach classes during the interview period of this study were excluded.

### **3. Data collection and procedures**

#### **1) Parents**

This study used a questionnaire that was administered from September 2-5, 2013. The data collection tool was a structured questionnaire based on the literature review<sup>10)</sup>; three independent experts reviewed it, two of whom were experts in children's living environments. This questionnaire included nine questions on parents' demographic characteristics and household sanitation situations. Questions on demographic characteristics included the parents' age, relationship to their children (i.e., mother or father), and educational background. This questionnaire asked the parents about their household sanitation situations, their interest in environmental issues, their knowledge of water pollution, and their practices regarding sorting garbage, disposing of oil, and washing

clothing. The time required to complete the questionnaire was about 15 minutes. This questionnaire was verified by experts in environmental education in Indonesia to ascertain its validity and to ensure that the questions were clear and understandable.

The researchers informed the administrators and teachers of the selected schools of the study's aims and provided them with essential explanations needed to complete the questionnaires. This junior high school achieved Adiwiyata mandiri level in 2013. The teachers then distributed the questionnaires along with letters addressed to the parents, explaining the study to the children and asking them to deliver all of the materials to their parents. The explanation letter asked the parents to complete the questionnaires, enclose them in the envelopes provided, and return them to the teachers via their children within two days.

#### **2) Teachers**

This study conducted semi-structured interviews from August 30-September 2, 2014. The researchers formulated an interview guide from previous study<sup>13)</sup> and used it with junior high school teachers who had agreed to participate. Junior high schools which achieved Adiwiyata mandiri or nasional level in 2013 were selected. The teachers were asked about their "perception of environmental education," their perceptions of the "relationship between environmental issues and health," and what "behaviors were needed to improve environmental issues." Interviews were conducted by three researchers who had a good understanding of this study, and one teacher was interviewed by a researcher with interpreter who was proficient in Indonesian and English. After every interview, the researchers confirmed with the interpreter whether the translation from Indonesian to English was accurate.

The interview sites were private rooms in the junior high schools, guaranteeing an environment with the privacy to speak freely, a low level of sound, good lighting, and a comfortable room temperature. Consent was obtained from the teachers. The interviews were recorded using a digital voice recorder, and the recorded interviews were later transcribed for data analysis.

### **3. Analysis**

With respect to the survey questionnaire, all statistical analyses were performed using IBM SPSS for Windows version 24.0 (IBM Corp, Armonk, NY, USA). Indonesia has three standards for school education; basic (elementary

and junior high school), middle (senior high school), and high (diploma level and higher). In this study, parental educational background was categorized into high (diploma level and higher) and low (lower than diploma school) levels. A chi-square or Fisher exact test was used to explore the associations between educational background and household sanitation situations. P-values < 0.05 were considered to be statistically significant.

Mayring's methodology for qualitative content analysis<sup>18)</sup> was used to analyze the teachers' interview data; this includes summarizing, explicating, and structuring the interview content. Mayring's methodology was used to extract codes through explicative content analysis; then, the content analysis was summarized to develop categories and subcategories. The analysis theme was the types of education needed to promote pro-environmental behavior. However, structured content analysis was not utilized because of its inapplicability to overall research schemes. Throughout these analytical processes, an experienced supervisor repeatedly collated the generated codes and then categorized and subcategorized the verbatim data to ensure their validity.

#### 4. Ethical considerations

Kanazawa University Medical Ethics Committee, Japan approved this study (Approval Number 460). The government of South Sulawesi Province and the Educational Office of Makassar City also approved this study. Participation was voluntary, and informed consent obtained when the anonymous questionnaires were returned. All participants were informed of the anonymity and confidentiality of the data, and they were told that they could withdraw from the study at any time without consequences. The researchers were notified immediately of any problems or questions that emerged.

## Results

### 1. Participants

A total of 379 questionnaire responses out of the initial 745 that were distributed were returned (response rate: 50.9%); the final number of participants was 350 (191 mothers and 159 fathers, valid response rate: 92.3%). The average age of the mothers was  $40.9 \pm 5.3$  years, fathers was  $45.0 \pm 6.8$  years. The percentage of parents with a high level of education was 60.6% ( $n = 212$ ); the percentage of parents with a low level of education was 39.4% ( $n = 138$ ). A total of 17 teachers participated in

the semi-structured interviews (male: 3, female: 14). The average age of the teachers was  $44.0 \pm 8.3$  years; the mean number of years teaching was  $19.5 \pm 7.8$ . There were five science teachers, three teachers of Indonesian, two teachers each from Social Studies and Health and Physical Education, and five teachers of other subjects including Arts and Crafts (Table 1).

### 2. Household sanitation situation

Table 2 shows the sanitation situation for each household based on educational level attained. Those with a high level of education showed interest in environmental issues (98.1%) and had knowledge of water pollution (94.3%); this was significantly higher than those with a low level of education 92.7% and 83.9%, respectively. Parents' garbage sorting at home was as follows: 38.0% and 31.0% of those with high and low levels of education, respectively, regularly separated garbage at home; 29.6% and 38.0% of those with high and low levels of education, respectively, sometimes separated garbage at home; and 37.6% and 31.0% of those with high and low levels of education, respectively, did not separate garbage. Thus, there was a significant difference in garbage sorting practices based on educational level ( $p = 0.030$ ). The reasons given for sorting garbage did not reveal any differences based on high or low educational level, as for both groups, "bad for the environment" was the most common reason (57.9% vs. 53.4%, respectively), followed by "dirty" (37.3% vs. 38.6%, respectively). However, 14.3% of parents with a high level of education and 25.0% of those with a low level of education responded with "no specific reason"; here, a significant difference in educational level was noted ( $p = 0.048$ ). For both groups, the most common method used to separate garbage was "dry and wet garbage," followed by "organic and inorganic garbage." Meanwhile, many parents were unclear about their garbage separation method, and several did not respond to the question about garbage separation method at all. The reason given for not separating garbage was "there is no garbage bin for separation" for both groups, although less common responses included "too much work" and "no one told me to." Other open response comments included "even if I separated garbage, the garbage truck won't keep them separated," and "the government doesn't specify one method of garbage separation." Those who properly treated oil comprised 42.1% of the total, and 3.8% of the parents responded that they washed their clothes in wells.

Table 1. Characteristic of teachers

ID	Age	Gender	Years of experience	Educational background	Subjects
A	49	Female	29	Undergraduate	Mathematics
B	53	Female	31	Undergraduate	Social Study
C	37	Female	14	Undergraduate	Science
D	55	Female	28	Undergraduate	Indonesian
E	44	Female	23	Undergraduate	English
F	43	Female	17	Undergraduate	Science
G	36	Male	10	Undergraduate	Science
H	43	Female	22	Undergraduate	Indonesian
I	55	Male	14	Undergraduate	Health and Physical Education
J	44	Female	21	Undergraduate	Science
K	43	Female	18	Postgraduate	Health and Physical Education
L	35	Female	9	Unknown	Social Study
M	43	Female	19	Postgraduate	Art and Craft
N	40	Female	15	Postgraduate	Religion
O	52	Male	30	Postgraduate	Science
P	24	Female	5	Undergraduate	Computer Science
Q	52	Female	26	Undergraduate	Indonesian

### 3. Awareness of environmental education among teachers

#### 1) Categories overview

Mayring's content analysis was performed according to "type of education necessary to promote pro-environmental behavior in children"; 130 contexts were extracted with 16 codes, two categories, and five subcategories. The categories and subcategories were extracted by summarizing the content analysis. Codes were extracted through an explicative content analysis. Categories are expressed using [ ]; subcategories, < >; codes, { }; and speech, " ".

#### 2) Explanation of categories

##### (1) [Necessity of symbiosis within the community]

Forty-seven contexts were classified under the category of [Necessity of symbiosis within the community]. This category consists of two subcategories: <necessity for cooperative system for home and community on environmental education> and <necessity for environmental education system in schools>. Teachers feel that {parental participation in environmental education

is necessary}; "since children spend more time at home than at school, parents need to continue educating their children as in school," and "I also hope parents would take time every day to control their children in keeping a clean environment." Teachers also feel that {there is a shortage of materials for environmental education in school}; "Preparing some supporting materials for environmental education, more trashcans, and more plants."

##### (2) [Education as people concerned with the environment]

Forty-seven contexts were classified under the category [Education as people concerned with the environment]. This category featured two subcategories: <education to improve familiar environment> and <education to recognize issues of living environment as one's own problem>. Some of the responses {recommend planting a large number of plants}; "Plants are the lungs of the world. The more plants, the greater benefits we get," and "Plants planted by the students can reduce dust." A number of teachers were encouraging the students to {consider global warming as one's own problem}; "The school provides environmental education to the students with regard to

Table 2. Household sanitation system via junior high school students' parents (N = 350)

Variable	n	Total	Educational background		P-value
			High (n = 212; 60.6%)	Low (n = 138; 39.4%)	
Relationship to child	350				.211 †
Mother		191 (54.6)	110 (51.9)	81 (58.7)	
Father		159 (45.4)	102 (48.1)	57 (41.3)	
Interest in environmental issues	345				.013 †
Yes		331 (95.9)	204 (98.1)	127 (92.7)	
No		14 (4.1)	4 (1.9)	10 (7.3)	
Knowledge of water pollution	347				.002 †
Yes		313 (90.2)	198 (94.3)	115 (83.9)	
No		34 (9.8)	12 (5.7)	22 (16.1)	
Separate garbage by type	217				.030 †
Regularly		118 (35.3)	78 (38.0)	40 (31.0)	
Sometimes		99 (29.6)	50 (29.6)	49 (38.0)	
Never		117 (35.0)	77 (37.6)	40 (31.0)	
Reason for separating garbage <sup>a,b</sup>					
Bad for the environment	214	120 (56.1)	73 (57.9)	47 (53.4)	.511 †
Dirty	214	81 (37.9)	47 (37.3)	34 (38.6)	.843 †
Dangerous	214	30 (14.0)	22 (17.5)	8 (9.1)	.083 †
No specific reason	214	40 (18.7)	18 (14.3)	22 (25.0)	.048 †
Methods of separating garbage <sup>b</sup>	217				.319 †
Dry and wet garbage		98 (45.2)	60 (46.9)	38 (42.7)	
Organic and inorganic garbage		46 (21.2)	25 (19.5)	21 (23.6)	
Indistinct		40 (18.4)	20 (15.6)	20 (22.5)	
No answer		33 (15.2)	23 (18.0)	10 (11.2)	
Reason for not separating garbage <sup>a,c</sup>					
There are no cans for separating	116	83 (71.6)	51 (66.2)	32 (82.1)	.074 †
Troublesome	116	23 (19.8)	18 (23.4)	5 (12.8)	.178 †
Nobody told me to	116	10 (8.6)	8 (10.4)	2 (5.1)	.492 ‡
Oil disposal	280				.792 †
Appropriate		118 (42.1)	71 (41.5)	47 (43.1)	
Inappropriate		162 (57.9)	100 (58.5)	62 (56.9)	
Washing clothes location	312				.551 ‡
At home		300 (96.2)	182 (96.8)	118 (95.2)	
At a well		12 (3.8)	6 (3.2)	6 (4.8)	

† Probability using chi-square test, ‡ Probability using Fisher's exact test

n (%)

<sup>a</sup> Multiple answers, the number of "Yes" (%)<sup>b</sup> Object is the parents who answered "I separate garbage regularly," and "I sometimes separate."<sup>c</sup> Object is the parents who answered "I never separate."

Table 3. Awareness of environmental education for junior high school students among teachers

Category	Subcategory	Code	Context number	Teacher's ID
Necessity of symbiosis within the community	Necessity for cooperative system for home and community on environmental education	Parental participation in environmental education is necessary.	13	A,B,C,D, H,L,M,N, O, P, Q
		The government should disseminate information regarding environmental problems and education to the public.	9	A,B,D,H, K,M,N,O, Q
		All schools should conduct environmental education.	5	A,G,M,O, P
		Further developmental measures are necessary for cooperation within the community.	5	G,I,J,L,O
	Necessity for environmental education system in schools	It is important that environmental education involves not just imparting knowledge, but also teaching behavioral measures.	8	D,K,L,M, N,P,Q
		There is a shortage of materials for environmental education in school.	4	A,D,I,Q
		Environmental education is handled as a single subject rather than being disjointedly introduced as a part of various classes.	3	C,D,H
Education as people concerned with the environment	Education to improve familiar environment	Guidance in the use of the appropriate garbage disposal.	28	C,D,F,G,H, I,J,K,L,M, N,O,P,Q
		Recommend planting a large number of plants.	10	A,B,E,F,I, K,O,P
		Do not waste resources.	8	B,D,E,F,I, M,O
	Education to recognize issues of living environment as one's own problem	Consider global warming as one's own problem.	1	I
Difficulties with polluted living environment	There is a lot of garbage in the area.	16	C,D,G,H,I, J,K,L,M, N,O,P,Q	
	Atmospheric pollution causes respiratory problems.	9	C,G,H,I,J,K, L,N,O,Q	
	The water is contaminated and cannot be drunk.	9	D,E,G,H, L,M,Q	
	The soil is contaminated.	1	O	
	Unless the environment changes, it will cause illness.	1	A	

global warming as their own problem.”

(3) <Difficulties with polluted living environment>

There were 36 contexts in this subcategory, which consisted of five codes. The responses described issues, particularly damage to health, caused by the current environment: “Water pollution causes diarrhea because sometimes tap water is polluted and its color is yellow or brown,” and “Too much garbage causes outbreaks of mosquitos, and mosquitos cause dengue fever.” There were concerns that {unless the environment changes, it will continue to cause illnesses}: “The influence of the environment on health is extremely large. A clean environment is good for the health, and dirty surroundings will negatively affect health.”

### Discussion

#### 1. Junior high school students’ actual household sanitation situations

Despite that 90% or more of parents had an interest in environmental problems and some knowledge of water pollution, the percentages of those who regularly sorted garbage and carried out proper disposal of processed oils were low, at 35.3% and 42.1%, respectively. There was a higher percentage of individuals with knowledge of water pollution than in the results of a 2001 survey<sup>7)</sup> carried out in Jakarta, which may indicate increasing awareness of environmental problems in Indonesia. However, we also identified a low percentage of children practicing garbage separation<sup>13)</sup>. Consequently, we predicted ineffective garbage separation in Makassar City.

Parents with a high educational level constituted 60.6%. This is quite high considering Indonesia’s countrywide university entrance rate of 12.0%<sup>19)</sup>. We believe that this is due to the considerable economic development of Makassar City and the abundance of higher educational institutions, both public and private. In our study, there was a significantly larger number of highly educated parents with awareness of environmental concerns and water pollution than low levels of education. Also, there were a significant number of parents without a high educational level who sorted garbage without a reason compared to those with a high educational level. These findings indicate that individuals with high educational levels live in environments where it is easy to obtain information on environmental problems. However, the results also indicate that the number of parents who

“regularly” sorted waste and properly disposed of oil was low regardless of academic background, and our participants included individuals who did laundry at wells. Additionally, there was no method of garbage separation common to those parents who separated the garbage regularly, and some assumed that garbage separation was ineffective. Previous research found that concerns about environmental issues have an impact on the implementation of pro-environmental behavior<sup>20, 21)</sup>. A new curriculum for environmental education was implemented in Indonesia in 2013<sup>22)</sup>, but many parents did not receive environmental education along with their children. This study found that junior high school students’ household sanitation situations were insufficient.

#### 2. Teachers’ awareness of environmental education and the sanitary environment of junior high school students

In this study, teachers conducting environmental education identified the [necessity of symbiosis within the community] and [education as people concerned with the environment] as being necessary for pro-environmental behavior in children. Also, it became evident that the issue of <difficulties with polluted living environment> existed. It has been reported that the expectations of others have a strong influence on the formation of attitudes in children’s pro-environmental behavior<sup>23)</sup>, and while it has only been a short period since the implementation of the new program for environmental education, teachers play a significant role.

<Necessity for cooperative system for home and community on environmental education> and <necessity for an environmental education system in schools> were associated with the [necessity of symbiosis within the community]. Many subjects teachers mentioned that {parental participation in environmental education is necessary}; however, due to the limited number of parents who undertake appropriate pro-environmental behavior, the sanitary environment surrounding junior high school students is inadequate. Previous research<sup>13)</sup> has shown that while junior high school students are aware and knowledgeable about environmental issues, this does not translate into pro-environmental behavior. Pro-environmental behavior in children is influenced by the pro-environmental behavior of their parents<sup>14)</sup>, and 56% of elementary school children at high grade do not tell their parents what they learned in school about hygiene<sup>24)</sup>. Based on these results, 35.0% of parents did



not separate garbage by type and 57.9% of them did not properly dispose of processed oils. Hence, the parents' did not adequately demonstrate pro-environmental behavior to their children, and we predict that unless both children and parents receive environmental education, pro-environmental behavior outside of school will not be promoted. Furthermore, science, social studies, and health and physical education teachers mentioned {further developmental measures are necessary for cooperation within the community} and it is inferred that taking initiative of environmental education by these subjects teacher carry out successful result in Indonesia.

Teachers felt the <necessity for environmental education system in schools>: {there is a shortage of materials for environmental education in school}, and {environmental education is handled as a single subject rather than being disjointedly introduced as a part of various classes}. Although the Indonesian government recommends integrating Education for Sustainable Development into university curricula, higher education in Indonesia does not include training in Education for Sustainable Development<sup>25</sup>. Many teachers of subjects unrelated to environmental education mentioned <necessity for environmental education system in schools> and there is a possibility that lacking of environmental education and materials including textbooks made teachers feel difficult to teach junior high school students. Not only integrating environmental education into science and other subjects but also to introducing a curriculum and textbook is necessary for effective environmental education<sup>15, 16</sup>. Thus, cooperation between schools and the government and preparation of materials about environmental education is needed.

<Education to improve familiar environments> and <education to recognize issues of living environment as one's own problem> were associated with [education as people concerned with the environment]. In pro-environmental behavior in students, this is related to being able to obtain outcomes of pro-environmental behavior as well as the existence of strict rules<sup>20, 26, 27</sup>. The Adiwiyata program, which the Indonesian government started in 2006, encourages schools to adopt behaviors that are respectful toward the environment. It is assumed that this made teachers aware of the need to: {recommend planning a large number of plans}, {consider global warming as one's own problem}. As 18.7% of parents sort the garbage

without any particular reason, resulting in inconsistent garbage separation, it is necessary to objectively explain when and in what situations to promote pro-environmental behavior; in other words, {guidance in the use of the appropriate garbage disposal}. In Indonesia, approximately 120,000 people fall ill every year due to inadequate sanitation facilities, and about 50,000 people have died<sup>3</sup> as a result. Therefore, as identified by teachers, <difficulties with polluted living environment> requires a prompt response. In order to reduce health damage caused by environmental problems, we suggest that not only teachers, but also public health centers should raise awareness of environmental issues and provide environmental education for children and parents in collaboration with schools.

### **Limitations**

The parents included in this study were parents of students who attended public junior high school in Makassar City, comprising 1.6% of the total public junior high school population of the city. Surveys of parents and teachers were conducted in different periods, and the government position on environmental issues might have changed. Since surveys were not conducted among illiterate parents and the percentage of high educated parents was higher than the Indonesian average, expansion of the study area, an increased number of subjects, and verification of the results is required. Additionally, the current findings are limited in their generalizability, as the teachers surveyed in this study were selected from junior high schools that received Adiwiyata accreditation in 2013; therefore, the results cannot be applied to junior high school teachers in schools that did not receive Adiwiyata accreditation.

### **Conclusion**

The aim of this study was to consider what type of environmental education was needed to promote pro-environmental behavior among parents and students by examining parents' perspectives on household sanitation situations and junior high school teachers' awareness of environmental education in Makassar City. The following has come to light as the result of our research:

1. A high percentage of parents were interested in environmental issues (95.9%) and had knowledge about water pollution (90.2%). However, only a few families

were engaging in appropriate pro-environmental behavior, such as garbage separation and proper oil disposal.

2. The teachers considered an association of [necessity of symbiosis within the community] and [education as people concerned with the environment] with <difficulties with polluted living environment> to be the type of environmental education needed to promote pro-environmental behavior in

junior high school students.

Based on the above results, we recommend that environmental education be provided to students and also their parents. We further recommend that environmental educational materials which all teachers can teach be provided in order to promote pro-environmental behaviors in junior high school students.

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## インドネシアの中学校における環境配慮行動に必要な環境教育： 親の家庭衛生状況及び教員の環境教育に対する認識

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### 要 旨

インドネシアでは住民の生活様式を原因とする環境問題が発生しており、住民が環境配慮行動を取るには、地域に適した環境教育の実施が必要である。そこで本研究は中学校における環境配慮行動に必要な環境教育を検討するために、中学生の親 350 名と教員 17 名を対象に横断研究を行った。親には家庭の衛生状況について質問紙票調査、教員には半構造化面接を行った。その結果、親の 95.9% が環境問題に対して関心を抱き、90.2% が水質汚染に対して知識を有していた。しかし、ゴミの分別を日頃から行っていた親は 35.3% であり、ゴミの分別を行っている親のゴミの分別方法は親によって異なっていた。また、ゴミを分別する理由を「no specific reason」と回答した親は全体で 18.7% であり、非高学歴に有意に多かった。更に、適切な油の処理を行う親は 42.1% と低かった。教員に対する半構造化面接を内容分析した結果、[地域社会との共生づくりの必要性]、[環境に対する当事者としての教育]の2つのカテゴリーが抽出された。適切な環境配慮行動をとる親の割合は低く、教員は環境教育システムの課題を指摘していたことより、中学生を取り巻く家庭衛生環境や環境教育は整備されていないことが考えられる。また、インドネシアでは環境教育に直接関連のない教科を担当する教員も環境教育を担当しているため、全ての教員が環境教育を実施できるよう教材を導入し、子どもだけではなく親も対象とした環境教育を実施する必要性が示唆された。