

Waste Management

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1 The Legal Institutional Model of Community-Based Waste Management to Reinforce 2 Multi-Stakeholder Collaboration in Indonesia

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4 Abstract

5 Community participation is a strategic environmental law issue. The policy and legal
6 basis for community participation in waste management in Indonesia are regulated in Law No.
7 18 Year 2008 on Waste Management and Law No. 32 Year 2009 on Environmental Protection
8 and Management. Moreover, the President Decision No. 97 Year 2012 regulated the National
9 Policy and Strategy for the Management of Household Waste and Household-like Waste.
10 However, the problem of household waste remains unsolved. Handling waste responsibility
11 completely given to the community is not a simple policy, especially when associated with a
12 low public awareness level of environmental sanitation. In addition, only inadequate number
13 of research focused on legal institutions related to the undertaken community-based household
14 waste management. Banyumas Regency has recently established a pattern of community-based
15 waste management. The problem is related to the community's potentials and challenges in
16 managing the household waste in Kutasari Village and appropriate form of legal institution to
17 accommodate the community in managing the household waste. The - results showed that the
18 commitment of Kutasari Village Government in handling waste was reflected in the
19 Environmental Sanitation Working Program by planning the construction of waste recycling
20 bin and waste sorting warehouses, developing the integrated waste management, constructing
21 the compost production houses, and forming teams/workers/volunteers to handle the village
22 waste management. This research resulted in two conclusions. The first emphasized on the
23 legal status of waste management agency, while the second reinforced the cooperation between
24 waste management elements in the village.

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26

27 **Keywords:** Community, Waste Management, Multi-Stakeholder, Collaboration

28

29 Introduction

30

31 The increasing volume of waste has received the attention from the government to
32 reconsider law on waste management. The evidence shows that a legal approach is not always
33 an effective solution to prevent the environmental damage of waste (Abdel-Shafy & Mansour,
34 2018). In Indonesia, based on the source of 2018 waste pile, household was the largest
35 contributor (62%) followed by traditional market (13%), business center (7%), office (5%),
36 area (4%), public facility (3%), and others (6%) (Tempo, March 6, 2020). This situation points
37 out that the Indonesian environmental laws, such as Law No. 18 Year 2008 on Waste
38 Management, Law No. 32 Year 2009 on Environmental Protection and Management, and
39 President Decision No. 97 Year 2012 on National Policy and Strategy for the Management of

1 Household Waste and Household-like Waste have not significantly contributed to the problem
2 of waste solution.

3 The ineffectiveness of environmental laws regulating household waste is mainly caused
4 by the weak law enforcement and unclear waste management measures (Carisma, 2009;
5 Mmereki *et al.*, 2016). In addition, the capacity of administrators responsible for waste
6 management is also found insufficient to reduce the negative impacts of unmanaged waste. The
7 unclear division of responsibilities between the local government agencies in waste
8 management is also one reason for weak environmental law enforcement (Mmereki *et al.*,
9 2016).

10 Household waste management also remains a big challenge at village level. Several
11 studies show that waste is not well managed in the rural areas (Rachman *et al.*, 2016; Wang *et al.*, 2018; Ferronato & Torretta, 2019). Some obstacles to waste management found in the rural
12 areas are (1) inadequate waste management facilities, (2) insufficient knowledge of residents,
13 and (3) lack of community culture on the environmental cleanliness. As a result, the waste
14 problem is not only found in both urban and rural areas.

15 The volume of waste in Banyumas Regency, Central Java, disposed of into the
16 environment with the potential to cause pollution, is still quite large. This unmanaged waste
17 has reached around 200 tons per day. Based on the survey results by the Environment Agency
18 (DLH), each person in Banyumas produces around 0.3 kg of waste per day. If calculated based
19 on the population in Banyumas reaching two million, Banyumas residents will produce 600
20 tons of waste per day. Thus, DLH can only transport about 270 tons of waste to the final
21 disposal site (TPA) per day. Apart from being transported to the TPA, it is estimated that the
22 waste entering the recycling industry or collectors through the waste banks/TPST/the
23 community directly reaches 60 tons per day and is processed into compost around 30 tons per
24 day. The remaining 200 tons are still wasted to the environment (Republika, 2018).

25 26 27 *Problem Statement*

28 The waste management handled by the government is considered no longer effective in
29 overcoming the waste problem. Alternatively, waste regulations should consider the
30 community participation in handling the waste management. Several studies have documented
31 the importance of community participation in waste management (Amarachi, Christopher,
32 Ijeoma, 2016; Youngquist, 2015; Zakianis *et al.*, 2018; and Ma, Hipel, & Hanson, 2017).
33 However, only inadequate number of research focused on legal institutions related to the
34 community-based household waste management has been undertaken; even though the

1 existence of this legal institution is greatly important to open space for public participation in
2 waste management. Research conducted by Aryantie and Hidayat (2019) found that areas that
3 do not have a strong legal institution in waste management tend to generate low public
4 participation. Thus, the objectives of this research are (1) to identify the potential and
5 challenges of community in managing the household waste, and (2) to formulate a legal
6 institutional model in community-based household waste management. The argument is that
7 the existence of a community-based legal institution will provide space for public participation
8 in environmental management. With the existence of legal institutions, collaboration between
9 the community and the government will be well developed in overcoming various challenges
10 in waste management.

11 **Literature Review**

12 **Concept of Community-Based Waste Management**

13 Community-based waste management is an involvement of community participation
14 and local culture in decision making and implementation to overcome the problems of waste
15 in their environment (Gafur *et al.*, 2017). By involving the community in waste management,
16 public knowledge, and awareness of environment will be better. Local culture provides
17 knowledge and traditional institutions as a source of social cohesion (Vasconcellos & Sobrinho,
18 2014). The role of local culture in the community-based waste management is to unite the
19 community feelings and local identities. Evidence has shown that waste management based on
20 local culture can encourage pro-environmental behavior (Crociana, Agovino, & Sacco, 2015;
21 Mehra, 2017; Roberts & Okereke, 2017). Thus, the involvement of local knowledge and culture
22 is needed to strengthen the community-based waste management.

23 According to Muller *et al.* (2002), there are two models of community-based household
24 waste management:

25 (1) Door-to-door waste collection. The door-to-door waste collection model is a
26 collaboration between the local government and the community. In this case, the government
27 facilitates the waste collection containers, then the community uses them to dispose of waste
28 at the containers provided. When the containers are full of rubbish, the government then
29 transports the trash and dumps it in the designated place.

30 (2) Waste management committee. The waste management committee model is a waste
31 management system driven by a waste management committee to collect the household waste.
32 In this model, households are motivated to collect and sort the waste.

Legal Institutional Approach to Community-Waste Management

According to Viet *et al.* (2009), a legal approach in waste management is applied to reduce the negative impacts of modernization and industrialization. The increased waste production is one negative effect of modernization and industrialization. With a legal approach, it is expected that the behavior of industry and society can create incentives and discrimination for environmental protection. However, a number of regulations involving several agencies responsible for waste management failed to make waste management efficient and effective. However, what has happened is an overlapping authority. Therefore, they suggest that the collaboration between government and society is greatly required to increase the effectiveness of waste management system.

The experience of a legal approach in Indonesia also shows the ineffectiveness of Law No. 18 year 2008 has too excessive role to the local governments, but limits the community participation in waste management (Nizar *et al.*, 2018). Some challenges faced in implementing the waste law are low budget allocation, low public awareness, lack of infrastructure support, and no policy support, specifically regulating the alternative waste management systems.

With the implementation of law biased towards the role of government, greater involvement of community in waste management is an alternative. Besides, the reality of waste problem developing rapidly and dynamically, is increasingly various and complex, so without the community involvement, it will be difficult for the government to deal with the waste problem. Strengthening the community participation requires a legal institutional framework ensuring the stakeholder collaboration to improve the effectiveness of waste management system (Awuah-Gyawu, Larbi, & Addai, 2018; Nasrulhaq, 2015).

Methodology

This research used both legal and qualitative study with a case study approach. The research location was in Kutasari Village, Baturraden District, Banyumas Regency, Indonesia. The research location was selected based on the consideration that Kutasari Village faced the legal institutional problems in the household waste management.

The selection of informants was conducted using a purposive sampling technique. Purposive technique is to select informants meeting the required criteria, or unique from something to find (Harrison, 2007:26). The research informants were the representatives of village governments, village councils, youth leaders, waste bank managers, Self-Assisting Groups, and community leaders from various groups of each subvillage in Kutasari Village.

Indepth-interviews were conducted to select ten informants representing the village government (1 actor), village council (1 actor), youth leaders (2 actors), waste bank manager (1 actor), Self-Assisting Groups (2 actors), and community leaders (3 actors). The focus of these indept-interviews was related to the potentials and challenges of community in managing the household waste, and proper formulation of a legal institutional model in the community-based household waste management. To completely provide the facts, this study combined the in-depth interviews with observatory research, focus group discussion, and document studies.

Processing and analyzing the research data were conducted through the development of analytic categories and data coding. In the analytical category stage, the researcher performed a conformity study related to the research aims and objectives. Data coding was critically performed (Silbergh, 1994: 173-175). This study used a source triangulation technique, involving data examined from multiple sources to establish the mutually reinforcing confirmation and ensure the data validity.

Results and Discussion

The potentials and challenges of community in managing the household waste

The waste potential to damage the environment will continue to exist because the amount of waste will always increase along with the increasing amount of household waste. Kutasari is a village which has the potential to manage the waste. The waste management unit in Kutasari Village consists of various elements including the elements of community, community Self-Assisting Groups, and village government. These various elements still manage the waste independently without collaboration or linkage between one and the other.

Waste administators from the people of Kutasari Village are in subvillage 1 and subvillage 3. The administrators in subvillage 1 are Rawan, Udin, and Puri Langen, while those in subvillage 3 are Darto, Dilam, Slamet, Katam, Karsan, and Watim. However, there are only 2 (two) waste administrators in the form of groups in Kutasari Village: Inyong Wastewaste Bank in subvillage 1 and ASRI Self-Assisting Group (KSM) in subvillage 2.

The waste handling activities performed by the community in Kutasari Village have significantly reduced the volume of waste. However, by looking at the model or method as well as the quantity and quality of handling, it still leaves problems requiring serious, planned, and sustainable handling.

The Village Government as the administrator and policy maker has compiled a strategic plan to deal with the waste:

- 1 1. Forming a waste task force to educate the public.
- 2 2. Forming a Disaster Risk Reduction Volunteer Team, later providing education to the
- 3 community through real actions, such as cleaning rivers, cleanup-day campaign.
- 4 3. Creating a waste management business unit through *BUMDes* (Village-owned Enterprise)
- 5 supported with adequate facilities and infrastructure, such as waste management house,
- 6 waste burner, and chopper machine.

7 The aforementioned policies have not been optimally running. There are plans which
8 have not been realized, such as forming a waste task force. The non-optimal implementation
9 of waste management program in Kutasari village shows that the problem of handling waste is
10 a complex problem and requires careful management planning involving all elements of
11 society.

12 The waste collection community already existing in Kutasari Village, both
13 independently and in groups, is actually an embryo of potential waste management to be
14 possibly grown and developed. Optimization really requires the participation or involvement
15 of all stakeholders in the village, such as Neighborhood Unit (*RT*), *Community Unit (RW)*, and
16 other community organizations in the village.

17 With the existence of waste administrators in Kutasari Village, the village has the
18 potential to form a household waste management community by combining each existing
19 element. The waste management community can be created in the form of a village-owned
20 enterprise (*BUMDes*) unit, so that there is a basis for implementing the waste management
21 which should be properly coordinated. In addition, various KSMs (Self-Assisting Groups) from
22 the village law (*Perdes*) on waste management can be formed to create the environmental
23 management performance generally in the cleanliness aspect.

24 The village government must issue the regulations on the household waste management
25 community in the form of Village-Owned Enterprise (*BUMDes*) and Self-Assisting Group
26 (*KSM*) units, so that waste management can be well coordinated. The policy is conducted to
27 regulate the waste administrators to run in an organized manner without violating each party's
28 interests.

29

30 *Public Role in Waste Management*

31 Waste management not only requires the role of village government, but also the role
32 of community. The current paradigm of waste management has changed. It used to be the
33 government's concern, but now, it becomes the business of waste-producing communities. The
34 role of government is to supervise and provide sanctions for the violators.

1 Waste affairs that have already become the business of waste-producing communities
2 require people to change their mindset to be aware more related to the environment. There are
3 still people improperly throwing the waste, and burning the waste in their yard. Good and moral
4 waste management can be performed by the community by:

- 5 1. Disposing the waste into its place.
- 6 2. Disposing the waste into the corresponding waste baskets
- 7 3. Saving instead of throwing.
- 8 4. Not burning the waste.
- 9 5. Not throwing the waste into the river / onto roads / other public places.
- 10 6. Reducing waste production.
- 11 7. Recycling the possibly-recycled waste.

12 The waste management in Kutasari Village has been properly made because there are
13 waste administrators from various elements, including individual waste administrators, Self-
14 Assisting Group (*KSM*), waste banks, and village governments. The problem with waste
15 management in Kutasari Village is related to the interest differences of waste administrators
16 which makes them not synergize one another. The vested interest of each waste administrator
17 is to manage the waste to earn income. The vested interest of Self-Assisting Group (*KSM*) is
18 managing the waste for the benefit of the group. The Village Government itself has just issued
19 a village regulation (*Perdes*) on the Environment and has not issued a village law related to the
20 group performing all waste management activities. In addition, waste administrators in
21 Kutasari Village only perform the collection and transportation activities in waste management
22 activities. The existing Self-Assisting Group (*KSM*) only collects, transport and disposes the
23 waste outside the village. The village communities participating as the members of Self-
24 Assisting Group (*KSM*) are few and this indicates that the community participation is still low.

25 Community empowerment is one important factor supporting the implementation of
26 independent waste village. Waste independent village can be realized if the community
27 supports the waste sorting from its source. The community itself as a waste producer, it will be
28 easier for the waste to be sorted from its source. The smallest part of community is the
29 Neighborhood Unit (*RT*). There are 2 (two) types of waste consisting of household waste and
30 household-like waste. The household waste type will be sorted by the household. When you
31 can empower the Neighborhood Unit (*RT*) as waste sorting, waste monitoring and periodic
32 reports can be well performed.

33 Waste is not only generated by activities from households, but also by the community activities,
34 such as shops, food stalls, schools, offices, hotels / inns, health centers / hospitals, and others.

1 Apart from the household, it would be better for the village to also monitor the community
2 activities possibly increase the participation of village community.

3 This periodic report is very useful in calculating the volume of waste generated by the
4 households and community activities. The report is given to waste the administrators or non-
5 governmental organizations performing all waste management activities. Thus, the existing
6 Self-Assisting Groups (*KSMs*) can coordinate with the waste administrators in managing the
7 waste.

8 The purpose of periodic report is that people are ²² aware of the importance of sorting
9 waste and can learn to sort the samples from their sources. The sorting expected to be
10 performed by the community is sorting the household waste divided into organic, inorganic,
11 hazardous, and other waste. This goal must be built by the community's commitment to
12 socialize the importance of sorting waste from its sources.

13 ¹⁷ 14 *The Legal Institution of Community-Based Waste Management*

15 The waste management is initially used to be the government concern. This can be seen
16 from the direction of Law No. 18 Year 2008 on Waste Management, Article 9 paragraph (1)
17 stating that in performing the waste management, the Regency Government of Banyumas has
18 the authority to determine the policies and strategies for waste management based on the
19 national and provincial policies. Government Regulation Directive No. 81 Year 2012 on the
20 Management of Household Waste and Household-like Waste in Article 4 paragraph (3) that
21 the Regency Government has formulated and established the policies and strategies for the
22 Regency waste management based on the national and provincial policies. In addition, the
23 Article 8 paragraph (1) is stipulated based on the Regent regulation.

24 The current waste paradigm has changed. Waste as a business of waste-producing
25 community, while the government monitors and provides sanctions for the violators. The
26 President ⁵ Regulation No. 97 Year 2017 on Policies and National Strategies for the Management
27 of Household Waste and Household-like Waste in Article 1 stating that ¹³ Regional Policies and
28 Strategies for Management of Household Waste ⁴ are policy directions and strategies in reducing
29 and handling the household waste and the integrated and sustainable local level household
30 waste.

31 The Kutasari Village Government has made policies in performing the governance
32 related to the waste management. The policy made is due to the Village Regulation Number 4
33 Year 2016 on Environmental Cleanliness. This policy has not been completely regulated every
34 solid waste activity in Kutasari Village. ³

1 Kutasari Village has the potential community participation in waste management.
2 There are several waste administrators in Kutasari Village, known as *Inyong* waste bank, ASRI
3 Self-Assisting Group (*KSM*) and several individual waste administrators. This potential has
4 made the village government issue a policy covering all waste management activities.

5 Village government policies can be made in the form of Village Head Decision on
6 household waste management to regulate:

- 7 1. Coordination mechanism between stakeholders and waste management;
- 8 2. Rights and obligations of stakeholders including those of village government and
9 commitment of village government related to waste management policies in the village.

10 The potential of Kutasari Village is owned by the existing waste administrators. Besides
11 making a Village Head Decision, the village also form a special team to monitor the technical
12 implementation of waste in the village. A special team can be created by forming a village-
13 owned enterprise (*BUMDes*) business unit or a non-governmental organization concerning on
14 the solid waste activities.

15 The role of village government in the management activities is greatly important due to
16 the commitment of village government to issue the policies to regulate the solid waste
17 activities. Thus, the Village Head Decision on the household waste management and special
18 team formation to monitor the implementation of technical waste management in the village
19 can be a policy to encourage the village to become more independent in handling the household
20 waste management.

21 It is necessary to realize a a form of communication forum among the waste
22 administrators, such as Village Government, Neighborhood Unit (*RT*), Community Unit (*RW*),
23 Community Self-Assisting Groups, Village Community Institutions, and independent waste-
24 concerning managing organizations.

25 The Communication Forum for Hygiene Management Administrators in the village can
26 be used as a communication bridge among the existing elements. This forum will later become
27 a means for the deliberation in adopting a planned, coordinated and institutionalized technical
28 policy for waste management in Kutasari Village. Thus, the Communication Forum for waste
29 activists in Kutasari village can run effectively and have the basis to perform its functions in
30 the form of Village Head Decision.

31 The structure of Communication Forum is led by the Chairperson, under the secretariat
32 led by a secretary. The Communication Forum members consist of elements taken from the
33 village government, independent actors, Self-Assisting Group (*KSM*), Waste Bank,
34 representatives of Community Unit (*RW*) and Neighborhood Unit (*RT*) elements, as well as the

1 representatives of village youth organizations. The members' position is equal because the
 2 forum is a place for its members to express their opinions in performing their activities. The
 3 activities performed by this forum are the responsibility of Village Head as the person in charge
 4 and supervisor of the forum. Based on in-depth interviews and FGD results, the elements or
 5 components involved in the Household Waste Management Communication Forum in Kutasari
 6 Village are as follows:

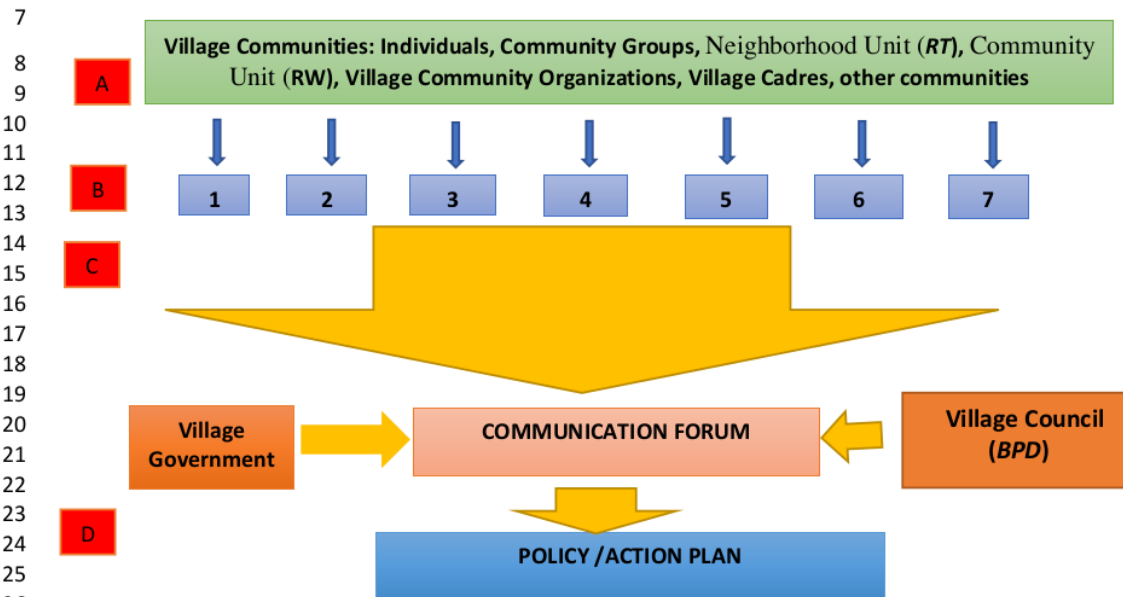


Figure 2: Solid Waste Management Communication Forum Workflow Chart

30 Due to the existence of a legal institution known as the Waste Care Communication
 31 Forum, the coordination through this formal institution will increase and unite the waste
 32 management knowledge from different communities. The related legal institution is the Waste-
 33 care Community Communication Forum formed through the Kutasari Village Head Decision
 34 No. 11b Year 2018, on 7 March 2018. Based on the results of in-depth interviews and FGDs,
 35 the working mechanism of the related communication forum suggested by the informant is as
 36 follows:

A.	Stakeholders in handling the household waste consist of: Village Government, Individual Community Groups, neighborhood unit (<i>RT</i>), Community Unit (<i>RW</i>), Village Community Organization, Family Resilience Agency (<i>PKK</i>), (Family Resilience Cadres (<i>Dasa Wisma</i>), Village Development Cadres, Self-Assisting Groups (<i>KSM</i>) of Waste, Waste Bank, and other communities.
B.	<ol style="list-style-type: none"> 1. The elements considered as the Communication Forum members of the household waste management in Kutasari Village consist of: village government, independent waste management, Self-Assisting Group (<i>KSM</i>), Waste Bank, representatives of Neighborhood Unit, representatives of Village Youth Organization (<i>Karang Taruna</i>), representatives of Village Development Cadres. 2. Individually, the community can contribute directly to the implementation of household waste handling, independent waste management in their respective homes by sorting and destroying the activities in handling the household waste technicalities in one village area in which individuals can provide suggestions and inputs through the Neighborhood Unit institutions represented in the Forum or certain community groups, such as Family Resilience Agency (<i>PKK</i>) and Village Youth Organization (<i>Karang Taruna</i>) as well as Village development cadres or village officials. 3. The Village Government as a government organizer has its representatives in the Communication Forum. Village officials obliged to become the Communication Forum members are the Sub village Head (<i>Kadus</i>) plus 1 (one) another officer based on their main duties in the village government. Village officials as the Communication Forum members act as the communication bridge between the forum and the village government and between the community and the Forum. 4. The communities as the members of organizations or groups in the village, such as the Village Youth Organization (<i>Karang Taruna</i>), Family Resilience Agency (<i>PKK</i>), family resilience cadres as the village development activists or other groups, institutionally can provide advice through group representatives in the Communication Forum. The consequence is that these groups must actively absorb the group members' aspirations or from the community. This mechanism will shorten the distance between the community and group representatives in the Forum.
C.	<ol style="list-style-type: none"> 1. The results of aspirations accommodated by each element are the Communication Forum members to become the materials for the forum discussion. 2. The Chair of Communication Forum schedules a incidental meeting to discuss any input or problem. 3. At this meeting, all members must attend or at least every representative element is presented in the meeting.

	<p>4. For specific discussions related to the village policies, the forum meeting may invite the Village Government and/or the village council (<i>BPD</i>).</p> <p>5. In the event that the Communication Forum scheduled a meeting related to the imposition of obligations to the community, either in the form of charging in the form of money or other obligations, the Chair of Communication Forum must invite the Village Government and Village Council (<i>BPD</i>).</p> <p>6. The Village Government as the organizer and person in charge of the village government has the authority to occasionally hold the Communication Forum meetings to request information related to the Communication Forum activities.</p> <p>7. The Communication Forum is obliged to formulate the provisions or procedures to hold meetings.</p>
D.	<p>1. The Communication Forum meeting results can be in the form of a policy or action plan related to the household waste management technicalities.</p> <p>2. The meeting results must be held by all forum members.</p> <p>3. The resulting policy must be informed to all members of Kutasari Village community through a mechanism determined by the Forum.</p>

1

2 Discussion

3 This research shows that the community has participated in waste management. There
4 is a concern from the community to reduce the potential of environmental pollution due to the
5 existing waste. This study found that community participation in protecting the environment is
6 the result of local knowledge and culture highly concerning on the environmental hygiene. The
7 waste management in this research location is conducted properly since there are waste
8 administrators from various elements, such as individual waste administrators, Self-Assisting
9 Group (*KSM*), waste banks, and village governments. Moreover, waste problems have become
10 interesting businesses managed by the community organizations to change the community's
11 logical thinking to be more aware on their own environment. This finding supports the study
12 conducted by Crociata *et al.* (2015), Mehra (2017), and Roberts & Okereke (2017).

13 However, public participation in waste management still faces various challenges
14 including (1) waste management is still partial, (2) waste administrators do not cooperate each
15 other, and (3) there is no institution integrating more effective waste management patterns. Our
16 research findings indicate that various community-based waste management patterns are not
17 supported by a legal institutional framework encouraging collaboration among the waste
18 administrators. Consequently, these separate the social elements to continuously well manage

the waste without any coordination or interaction. The poor implementation of a waste management program in this research location demonstrated that waste management is a complicated issue which should have a good management planning related to all social aspects.

In fact, the stakeholders' collaboration has a positive influence on waste management sustainability (Awuah-Gyawu, Larbi, & Addai, 2018; Nasrulhaq, 2015).

This study also found that a legal institutional model for waste management in the form of communication forum. The absence of collaboration among waste administrators at the community level has resulted in various problems, such as the practice of burning waste causing air pollution, random disposal of waste by the those who are not yet the customers of waste services, the absence of landfills which are far from the residential areas, and lack of education on waste management at the community level. This problem has been long without effective handling, either from the village government or the stakeholders. The formation related to the communication forum is expected to become an institution functioning as a medium to bridge various interests and arising conflicts as a result of the implementation of waste management patterns.

This communication forum institution has the legal force binding the stakeholders under the control of village government. This is consistent with a study conducted by Awuah-Gyawu (2018) mentioning the importance of government to control and administer its role to encourage the stakeholders to collaborate. With the formal authority owned by the government, the communication forum will have strong legitimacy to produce various solutions for the waste management sustainability.

Conclusion

This study concludes that community-based waste management at the village level has developed and resulted in various management patterns. The community concern and awareness for managing the waste proves that the community has the local knowledge and culture supporting the environmental protection. However, the differences in waste management patterns still cause waste management problems. Even though there are laws regarding the village regulations governing the waste management, the managed waste still results in the environmental pollutions. Therefore, this study formulates a legal institutional model for waste management in the form of a waste management communication forum. This model is formulated through the stakeholders' agreement to become a medium to exchange ideas and produce the joint solutions to the waste management problems. Thus, this study

1 contributes to a better understanding on the implementation of laws governing the waste
2 management.

4 **Recommendation**

5 This study suggested that waste management communication forum model should be
6 strengthened by the village regulations to have a strong legitimacy. To encourage the
7 stakeholders' collaboration, the village government is expected to act as a facilitator integrating
8 different interests. For the sake of future studies, it is suggested that the studies should focus
9 on the capacity of legal institutions in influencing the effectiveness of community-based waste
10 management.

12 **Conflict of Interest**

13 There is ²⁶no conflict of interest.

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