

# Regulatory Review of Community-Based Waste Management in Banyumas District, Central Java

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**Abstract.** This study aims to review laws and regulations and regional policies regarding waste management as a basis for building legal arguments for resolving community-based waste management issues. Qualitative research using the content analysis method was used to review legal institutions for household waste management at the community level. The waste management policy, which originally used a collection, transport, and disposal pattern to landfills (TPA), has changed to a pattern of waste management starting from the source. Through this pattern, people are asked to sort out the waste produced by themselves, make use of waste that can be used, and destroy unused waste. Through a review of laws and regulations and regional policies, it was found that both central and local government intervention had facilitated the formation of waste management patterns at the community level. Legal arguments for resolving community-based waste management issues are also clarified through this study.

**Keywords:** community, waste management, local government policy, central government policy

## 1 Introduction

According to the 2019 report of the Ministry of Environment and Forestry (KLHK), the national waste generation had reached 175,000 ton per day or equal to 64 million ton per year with an assumption of waste generation per person daily was 0.7 kg [1]. By composition, the organic waste produced was 50 percent, and plastic and paper wastes contributed 15 and 10 percent respectively. The most dominant by source was domestic waste (48 percent), traditional market (24 percent) and commercial area (9 percent). [1] Therefore, the huge waste production is certainly seriously dealt with by the government and the people so that it would not cause any environmental disaster.

Waste issues at local level have also been a serious concern for the policy makers. In Banyumas Regency, for example, the domestic waste production has reached 535,965 kg per day. Meanwhile, non-domestic waste production has reached 10-15 ton per day. This means that the average waste production in Banyumas Regency has reached 550-600 ton per day. [2]

The government has actually paid great attention to the increasing waste issues in line with increasing population. Legal products such as laws, presidential regulations, ministerial regulations, local regulations through village regulations have been implemented in response to waste issues. However, waste issues until now remain a big challenge both to the government and the society.

Government's weak capacity in developing countries to provide waste management service is not supported by their people's awareness of environmental protection. [3] This government's weakness is not comparable to the complete regulations stipulated to solve waste issues. In Indonesia, Law No. 18/2008 concerning waste management has actually opened the opportunity for public participation in community management. Similarly, the implementing regulations such as Regulation of Minister of Environment No. 13/2021 has provided guidance for public participation as an important element in community based waste management. However, the implementation of the regulations is not able yet to control waste production.

Based on the issues on regulations regarding waste management, this research aims at reviewing waste management related regulations as the basis to build legal argumentation to respond to community-based waste management issues.

## 2 Method

This article employed a qualitative approach since it aims at gaining an in-depth understanding of regulations on community engaged waste management. The data were collected from secondary data and legal products such as laws, presidential regulations, ministerial regulations, local regulations, regent regulations and village regulations. A case study was employed in this research to study the village regulations of Kutasari Village, Baturraden District, Banyumas Regency. Kutasari Village was chosen under the consideration it had developed two models of waste management institution, namely community self-reliance group (*kelompok swadaya masyarakat*) and waste bank (*bank sampah*). The data were analyzed using content analysis method for legal argumentation formulation to solve community-based waste management issues.

## 3 Literature Review

### 3.1 Environmental Law

According to Otto Soemarwoto, in reality environment is a resource with self-regeneration capability, especially for non-renewable environmental resources. Therefore, managing and arranging the environment as a resource need to be carried out wisely [4].

Environment and natural resources management has only been national arranged in the last few decades. In natural resource utilization, natural components are not the only concerned ones, but there are other components such as production factors, such as capital, power, management methods, including processing, market and transportation. Right now, environmental pollution and or destruction occur everywhere at a quite rapid rate. Environmental issues are currently highlighted by many parties, since environment is human's source of needs for survival. In case this occurs continuously, the environment quality will decline [5].

In the international society, environmental decline prevention has been implemented in the Rio Declaration 1992 to implement sustainable development, with principle of which economic development is allowed but cannot cause any environmental damage or pollution [4]. Article 1 point (32) Law 32 or 2009 concerning Environmental Protection and management state:

“Every person means natural person or business entity, whether incorporated or not. In mineral (mining) exploitation, the government can carry it out itself and/or appoint contractor if necessary to perform works that are not or not yet performed by any government agency.”

Environment is a unity of space along with all items, powers, conditions and living beings, including humans and their behaviors which may influence the nature itself, continuing existence, and the welfare of humans and other living beings [6].

Based on the provisions of Article 1 point (2) Law No. 32 of 2009, environmental protection and management are a systematic and integrated effort to preserve the environmental functions and prevent environmental pollution and/or damage covering planning, utilization, control, maintenance, supervision and law enforcement.

The Indonesian Government issued laws and regulations, including Law Number 32 of 2009 concerning Environmental Protection and Management (UUPPLH) and had implemented sustainable development, one consideration of which states that environmental management is organized under the state's responsibility principle, sustainability principle and benefit principle aiming at realizing environmental sustainable development in developing the Indonesian populations who believe and fear God Almighty [7].

Justice must be of a concern in environmental law enforcement, but law is not identical to justice since it is general and binds every person and generalizes them. Anyone polluting the environment is subject to punishment regardless of his/her position and office.

In environmental law enforcement, the three elements must be compromised, namely legal certainty, benefit, and justice. This means that the three must receive proportionally balanced attention even if it is practically not always easy.

Environmental law enforcement may be performed preventively and repressively pursuant to its nature and effectiveness. In preventive environmental law enforcement, there is active supervision over compliance with regulation without any direct occurrence involving concrete event which causes suspicion that the regulation has been violated. The instruments for preventive law enforcement are outreach, monitoring and using supervisory authority. This way, the main law enforcer is official or government authorized to prevent environmental pollution. Repressive law enforcement is conducted when regulation has been violated. Repressive environmental law enforcement may be conducted with administrative instrument, criminal instrument, and civil instrument simultaneously in consideration of the sequence of those acts. However, from the perspective of consequence arising, such as from justice perspective which may need rehabilitation as soon as possible, law enforce is expected to have alternative choice. Andi Hamzah argues that:

“Determining what sanction is to be imposed to an environmental violation case should be discussed by MUSPIDA (Local Agency Discussion) institution. Discussion between Local Government, Police and Prosecutor, will determine which cases need to be prosecuted administratively, criminally or civilly” [8].

Concrete law enforcement means the enforcement of positive law in practice as it should be complied with to render justice in a case would mean deciding the lawsuit by deciding a law and find law *in concreto* in maintaining and ensuring compliance with material law using procedural methods determined by formal law [9].

The implementation of the environmental law enforcements are as follows:

1) Environmental Law Enforcement through Administrative Legal Instruments

Administrative instruments in environmental law enforcement may be preventive or repressive to enforce laws and regulations with imposition of administrative sanction. Law enforcement effort may be applied to activities regarding licensing requirements, environmental standards, Environmental Management Plan (RKL), and so on besides guidance in the form of instruction, guide and administrative supervision over industrial sector.

Administrative sanction primarily has instrumental function of coping with and control of forbidden acts. In addition, administrative sanction is mainly intended to protect interest protected by the violated provision. Below are some administrations as the instrument of administrative law enforcement:

- 1) Regulatory harmonization (*harmonisering*)
- 2) coercion (*bestuursdwang*)
- 3) Recognizance (*publiekrechtelijke dwangsom*)
- 4) Closure of business premise (*sluiting van een inrichting*)
- 5) Cessation of corporate machine activities (*bultengerbruksteling van een toestel*)
- 6) Revocation of permit through warning, coercion, lockout and recognizance [10].

According to Philipus M Hadjon, specific administrative sanctions include:

- 1) Coercion (*bestuursdwang*)
- 2) Revocation of beneficial decision (permit, payment, subsidy).
- 3) Imposition of administrative fine
- 4) Imposition of recognizance by the government [10].

Government coercion (*bestuursdwang*) may be described as ruler's real acts to end a condition that is prohibited by an administrative legal principle or in case an act is still performed but should be left by the people since it is contradictory to law. This differentiates government coercion (*bestuursdwang*) from other administrative sanctions. Administrative sanctions are imposed similar to criminal sanction, considerations of policies in state administration may shift to fine. Implementation of government coercion (*bestuursdwang*) is an authority, not an obligation, although before implementing it state administrative officials must consider related interests.

State administrative officials have broad movement space in imposing government coercion (*bestuursdwang*), but its implementation must be under consideration of:

1. *Pro bestuursdwang* :
  - a) Public interest harmed by legal condition, for example, environmental pollution.

- b) The interest of prevention of a precedent influence, that an individual's behaviors must not harm public interest. For example, both industrial sector and the society along a river have equal right to healthy environment.
  - c) Third party's interest, for example, the interest of people of downstream river depends on the river as their source of living.
2. *Kontara bestuurdwang* :
- a) Attention needs to be paid to violator's interest because of administrative coercion.
  - b) Non-practical *bestuurdwang*.
  - c) Cost rising for *bestuurdwang* imposed to violators makes them unable to pay for it, then the cost will be imposed to company (government) [10].

Revocation of a decision as an administrative sanction, according to Philipus M. Hadjon is caused by the following [10]:

- a) The concerned person does not comply with restrictions, terms or conditions of a law or regulation associated to permit, subsidy or payment.
- b) The concerned person, when applying for permit, subsidy or payment has given incorrect or incomplete data, so that if the data are given correctly or completely, the decision will be different, such as rejection of permit application.

Revocation of a decision in reality is also a decision. Revocation of a decision is not a new decision which revokes and declares previous decision null and void. As a conclusion, revocation of decision will pose new law for a person or civil legal entity to which the decision is enforced.

Administrative fine is usually related to taxing law. With regard to land and building tax, this sanction is imposed to taxpayer with tax due, and to him/her issued a notice of tax assessment. Administrative fine is usually imposed to motor vehicle tax arrears and others in the form of fine administrative sanction.

Recognizance imposition by state administrative officials as an administrative sanction is a new development, in which law makers give alternative to agency that is authorized to impose recognizance to the concerned person in replacement of *bestuurdwang*, recognizance will be imposed to violator if each time a violation is repeated or every day after it has been stipulated the violator does not fulfill his/her obligations. Recognizance is mainly intended for a condition in which *bestuurdwang* is practically difficult to implement or *bestuurdwang* will apply as a relatively heavy sanction for the violator.

Administrative Sanction and Supervision are set forth in Article 71 Law No. 32 of 2009 concerning Environmental Protection and Management, namely:

- (1) Minister, governor, or regent/mayor pursuant to their authority must supervise the compliance of one in charge of business and/or activities with the provisions stipulated in laws and regulations concerning environmental protection and management.
- (2) Minister, governor, or regent/mayor may delegate their authority in supervising technical officials/institutions in charge of environmental protection and management.
- (3) In conducting supervision, Minister, Governor, or Regent/Mayor appoints environmental supervisory official that is a functional official.

## 2) Environmental Law Enforcement through Civil Legal Instruments

The use of civil legal instruments to settle disputes related to environmental issues basically broadens legal enforcement effort of various laws and regulations, as stated by Andi Hamzah:

“Through civil law, compliance with environmental legal norms can be forced, either private or public law, for example, judge's authority to render decision on a command or prohibition for a person who has acted contradictory to the conditions of a permit related to environmental issue”. [8].

Regarding civil aspect, the application of civil law by authorized institution to enforce environmental policies is different from the application of civil law to force compliance with environmental laws and regulations. Sanctions applied to environmental law enforcement through civil means are usually in the form of indemnity to victim and recovery cost to the state. Civil aspect is stated in some articles of Law No. 23 of 1997 concerning Environmental Management, namely Article 34 on indemnity and Article 35 on strict liability for those who pollute and damage the

environment. Article 87 Law No. 32 of 2009 explains indemnity and Article 88 explains strict liability for those whose acts, businesses and/or activities use B3, produce and/or manage B3 waste, and/or cause serious threat to the environment are strictly responsible for the loss without any proof of guilt element.

The environmental law enforcement through civil instrument does not rule out filing claim under Article 1365 BW, since this article set unlawful acts in civil law in general. The main requirement for filing claim under this article is an unlawful act (*onrechtmatige daad*) has occurred.

### 3) Environmental Law Enforcement through Civil Legal Instruments

Criminal sanction may be in the form of criminal imprisonment and fine. Siti Sundari Rangkuti in Andi Hamzah states:

“Crime is not the main settlement of environmental pollution, but only an *“ultimum remedium”*. The legal sanction for control in its function as environmental manager is administrative sanction, while criminal sanction may be imposed to the authority serving personally released from his/her duties and authorities”. [8].

This opinion is in line with that of Rasyid Ariman in R.M. Gatot P. Soemartono, that:

“Criminal liability for environmental damage or pollution is charged to anyone who does that act, and when industrial companies cause the environment damaged or polluted, the ones responsible are the directors and other management”. [11].

Criminal sanction imposition is divided into intentionality and negligence. This means that when an act that causes environmental damage or pollution is committed intentionally, the penalization imposed to the one who commits it will be different if he/she damage or pollute the environment negligently.

Criminal law is basically legal sanction intending to regulate and determine social order in the society, ensure security and safety of the state. Criminal law is the forcing instrument to protect citizens from any acts which are harmful or may cause other to suffer. Thus, the function of criminal law in UUPLH is as a “social control” to force the people to comply with prevailing principles, in this case the principles are environment related.

## 3.2 Public Legal Awareness on Environment

Environmental awareness is a condition in which someone’s spirit is awakened by something happening in nature, especially related to the environment where he belongs to [12]. Environmental awareness also means a person's ability to understand what and how the problem should exist in the related environment. According to Jamanti (2014) environmental awareness can be measured by four indicators related each other in one stage covering knowledge, attitudes, behavioral patterns (actions) [13].

Awareness is a process where someone understands a situation which makes him/ her aware and well understand to what is happening and what will happen. Consciousness is what someone realizes; understand; feels or experiences. In other words, awareness can be understood as the process of recognizing the chosen ones.

In addition, awareness is a process where someone understands a situation which makes him/her aware and well understands what is happening, and what will happen. Self-awareness is the process of recognizing motivations, preferences and personalities and then realizing the influences of these factors on judgments, decisions and interactions with others.

When viewed in a legal context, awareness means a combination between attitudes, understanding, and obedience to the regulations applied in communities as well as participating in maintaining the public orders. Awareness is the sustainable attitude and understanding a rule by following the applicable rules.

Law is a social phenomenon which means a symptom existing in the society. As a social phenomenon, law aims at seeking balance rather than interests contained in the society to avoid chaos.

Besides, law is a set of rules coercively living with the society, and contains orders and prohibitions to orderly regulate the people's lives.

The objective of law has a universal nature such as order, serenity, peace, prosperity and happiness in the social life orders. With the existence of Law, each case can be resolved through a court process mediated by judge based on the applicable legal provisions. In addition, law aims at maintaining and preventing everyone to judge him/herself.

The development of a nation can be seen from its citizens' legal awareness level. The higher the legal awareness of a nation's citizens, the life in society and state will be more in orders. On the other hand, the lower the legal awareness of a nation's citizens the law of jungle will be then applicable. The Relative parameters to the existence of certain legal awareness level are briefly explained as follows:

1. First indicator is someone's legal knowledge on certain behaviors regulated by law. The legal regulations meant here are both written and unwritten laws. These behaviors involve those prohibited by law and behaviors permitted by law.
2. Second indicator is legal understanding, which is related to a number of information belonging to someone on the content of regulations of a particular law. In other words, "legal understanding is an understanding on the contents, objectives, and benefits for the parties that lives are regulated by these regulations.
3. Third indicator is legal attitude, in which someone has a tendency to make certain judgments on law. A legal attitude will involve the people's legal choices in accordance with the existing values and eventually the communities accept them to appreciate those laws.
4. Fourth indicator is legal behavior, in which someone complies with the applicable regulations. This is the core of legal awareness as seen whether or not a rule applied in the society.

## **4 Result and Discussion**

In Indonesia, the government's purpose of stipulating Law No. 18/2008 concerning waste management is to improve the people's health and environmental quality and make waste a resource. With regard to public access to waste management, article 28 paragraph 1 states "the people may play a role in the waste management organized by the Government and/or local government". Public participation in this context of law shows that they are deemed as an important actor in waste control. Moreover, in line with rapid population growth, the people produce more waste.

Public participation in waste management shows a change in the waste management paradigm from bureaucratic to participatory approach. In the context of law, public participation has become a strategic issue as one important actor responsible for environmental issues. The government with all of limitations is faced with increasingly complex issues. Increased production of waste, especially domestic waste, is one of the complex environmental issues. Therefore, the government needs public participation to solve waste issues.

In 2017, the government through Presidential Regulation No. 97/2007 concerning the National Policies and Strategies on Domestic Waste and Similar Wastes Management strengthened public engagement through communication, information and education. Increased volume of domestic waste could not be managed by the government itself. The government was aware of the importance of building good communication with the public. With good communication, the people are expected to receive information of how to manage waste management by themselves. Besides, the public can also participate in educating their members. With public participation in waste management, communication, information and education related to community based waste management can be socialized well.

About 2012, the ministry of environment issued Regulation of State Minister of Environment of Republic of Indonesia Number 13 of 2012 concerning the Guidelines on the Implementation of Reduce, Reuse, and Recycle through Waste Bank. In the ministerial regulation, the institutionalization of community based waste management is set forth more clearly in the form of waste bank.

The definition and function of Waste Bank according to Regulation of Minister of Environment of Republic of Indonesia No. 13 of 2012 is the place to sort and collect recyclable and or reusable waste with economic value. Waste Bank is a place to store waste sorted by type, and waste stored in waste bank is one with economic value.

The concept of waste bank is defined as the place to sort and collect recyclable and/or reusable waste with economic value. In this context, public perception of waste tried to be changed. Waste is not merely waste or residue without any value. Through waste bank, the society is encouraged to perform 3-R activities, namely reduce, reuse, and recycle. The 3R activities are any activities to reduce anything which may cause waste, to reuse usable waste for the same or other function, and to process waste into new product.

The government of Banyumas Regency has responded to the importance of public participation in waste management. Through Local Regulation No. 6/2012 concerning waste management, the local government encourages formation of Community Self-Reliance Group (KSM) institution operating in waste management. The local government also gives incentive in the form of exemption from licensing for KSM. Article 11 states that (1) "everyone who does waste management business activities must have

permit from Regent except it is performed by community self-reliance group". This incentive is intended for KSM of waste management to develop in the society, especially at village level.

To give guidance on domestic waste management to villages, the local government issued Regent Regulation No. 54/2018. KSM's task is to reduce and handle domestic waste and similar wastes. In support of this KSM's task, village government gives KSM with access to use local assets under a lend-use mechanism. Such an incentive is intended to facilitate and stimulate KSM to do waste management.

In 2018 the government of Banyumas Regency also issued Regent Regulation No. 45/2018 concerning Banyumas Regency's Policies and Strategies in Domestic Waste and Similar Wastes Management. The Regent Regulation is the implementation of the provisions of Article 7 paragraph (5) Presidential Regulation Number 97 of 2017 concerning the National Policies and Strategies on Domestic Waste and Similar Wastes Management. Through this Regent Regulation, the local government opens public participation in waste management, both through community self-reliance group and waste bank.

The local government has also developed the incentive and disincentive systems in reducing Domestic Waste and Similar Wastes. The budget to deal with domestic waste is provided by the local government to areas that perform 3R practice. Meanwhile, areas that do not perform 3R practice, the government gives disincentive. However, the form of disincentive is not explained in detail.

Until 2021, there are 27 KSMs developing, distributed in 26 sub-districts and 1 village. Meanwhile, there are 101 waste banks in Banyumas Regency, distributed in 17 sub-districts and 84 villages [14]. Therefore, the waste bank institution model develops in rural areas more than in urban areas. Meanwhile, the KSM institution model is preferred by urban society. This also shows that the waste bank model is more popular than KSM. Waste bank's popularity in rural areas shows the society's awareness of performing 3 R and has given waste with economic value.

Table 1. Number of KSMs and Waste Banks in Banyumas by Location

	Village	Sub-district
1. KSM	1	26
2. Waste Bank	86	15
Total	87	41

Source: Banyumas Environment Agency, 2020

The data also show that village society's level of acceptance of community based waste management institution is higher than sub-district society. Interestingly, the choice of waste bank institution in rural areas is also more than in urban areas, which shows that villager society's response to waste management is relatively enthusiastic.

However, compared to the existing number of villages in Banyumas, the number of community based waste management institutions is still low. There are 301 villages in Banyumas, while there are only 87 villages adopting community based waste management institution or only about 29 percent. On the contrary, the level of community based waste management institution in 30 sub-districts is up to 136 percent. This also shows that sub-district society is quite enthusiastic about participatory waste management efforts. There are even more than one KSM and Waste Bank in a sub-district. Therefore, sub-district or urban society's level of participation in waste management is high.

The total waste managed by waste banks in Banyumas Regency is up to 73,340.41 kg per month or almost 7.3 ton per month [14]. This means that by size per day the waste deposited to waste banks is about 2,444.68 kg per day or 0.244 ton per day. This size is still quite low compared to waste wasted in the environment of up to 200 ton per day [15]. This means that environmental law enforcement is still ineffective to grow the reduce, reuse and recycle culture.

At village level, this study finds Kutasari Village as one of the villages formulating Village Regulation No. 4/2016 concerning environment hygiene. The village government is aware of population impact on the increase in village society's consumption pattern. Consequently, the volume and types of waste will increase. Therefore, in the village government's view, there is a need for good environmental waste management.

The importance of public participation is also noted in Village Regulation No. 4/2016. The complexity of waste management needs an integrated and participatory approach. Village government is aware that they cannot operate it by itself. Public participation is needed to solve the complexity of domestic waste management.

In waste management implementation, the village regulation regulates the society's obligations as follows:

- a. make trash bin available in their respective house;

- b. clean up and collect waste from households, residential environment, alley and surrounding roads;
- c. keep house/residential environment, roads waterways and or river clean;
- d. dispose of waste as referred to in item b collected from household, residential environment, alley and surrounding roads into available trash bin;
- e. collection and transportation of waste from households to TPS (waste disposal site) is performed by environmental hygiene community, LSM or KSM at Village, Sub-village or neighborhood council level.

This study also finds that in Kutasari Village there are two waste management institutions, namely KSM of Kutasari Village and Waste Bank “Inyong”. KSM was established as the implementation of village regulation No. 4/2016 concerning environmental hygiene. Meanwhile, Waste Bank “Inyong” was established by the initiative of female figures in Kutasari Village. Historically, Waste Bank “Inyong” was established ahead of KSM. By legality, village head decision has legitimated the existence of Waste Bank “Inyong”.

That there are two waste management institutions in Kutasari Village shows that waste management has attracted public attention. Waste is no longer deemed unworthy item. On the contrary, waste is currently a product with economic value and can be sold at a fair price.

Normatively, from the provisions of Laws to village regulation, waste management has been regulated in detail. Similarly, public response both in village and sub-district shows great support for public engagement in waste management. However, there is a wide gap between legal regulation and community based waste management institution’s role in growing public environmental awareness. The regulations hierarchically regulated from the central to local levels are evidently insignificant to grow a new culture of waste management.

From the result of review on regent policies related to waste management at village level, this study finds that Regent Regulation No. 6/2012 concerning waste management only regulates specifically formation of community self-reliance group as waste management institution. This local regulation does not regulate formation of other institution model at all, such as Waste Bank. Similarly, Regent Regulation No. 45/2018 concerning Banyumas Regency’s Policies and Strategies in Domestic Waste and Similar Wastes Management does not specifically regulate waste bank’s role. However, in the policy program plan there is effort to strengthen waste bank and community self-reliance group.

At village level, in the case study on Kutasari Village Regulation No. 4/2016 concerning environmental hygiene there is not specific regulation on waste bank formation. The village regulation only sets formation of non-government organization (LSM) or community self-reliance group (LSM), while in Kutasari Village there is one waste bank that has been established ahead of KSM. Moreover, Waste Bank “Inyong” has developed not only as a waste storage institution, but it buys waste in cash and directly from the people who deposit their waste. In addition, the waste bank serves public demand wishing a barter pattern of waste for rice and snack. This approach evidently receives positive response from the society in the form of changed behavior from waste disposal to sorting waste since waste has become an asset with economic value. [16]

That there is no specific regulation on waste bank at regency and village levels is actually ironical. Waste bank in the context of green city is actually an important instrument at national level in determining Adipura City. In Banyumas Regency, the waste bank model as a community-based waste management institution tends to be more popular than KSM model. Unfortunately, the regency and village governments do not specifically regulate waste bank, while the initiative of formation of waste bank, which is supported by public figures who are concerned about the environment, still needs government’s guidance.

The bottom-up formation process of waste bank is the excellence of waste bank. A case study in Jogjakarta finds that waste bank agents actively perform socialization to the public for 3R practice. Waste bank has also encouraged development of public capacity to be self-reliant. [17] Moreover, the case in Jogokerten, Sleman Regency, waste bank has promoted 4 R movement (reduce, reuse, recycle and replanting). With the 4 R movement, waste management may be performed more efficiently from its very sources, especially at domestic level. [17]

However, the study conducted by Edy Santoso et al. finds that the implementation of Local Regulation No. 6/2012 concerning waste management and the enforcement of local regulation in Banyumas Regency are still weak [18]. In the public opinion, the local government’s commitment to waste management is still relatively weak. The regency government puts excessive focus on the facilities, infrastructure and budget aspects of waste issues. Meanwhile, the human and cultural aspects lack of serious attention, while waste management does not only need support from technical aspects, but also non-technical aspects, such as human and culture. [18]



The policy makers' minimum attention to the human and cultural aspects shows that waste management regulation at local level is oriented to technical-administrative approach instead of community empowerment. The study conducted by Widiyanto et al. finds that lack of public participation in waste management at domestic level is also related to the lack of community figures' support for the success of environmental hygiene program. [19]

## 4 Conclusion

Local and village regulations in Banyumas Regency have set waste bank management institution at community level. The awareness of the importance of public participation in waste management grows. With the increasing complexity of waste, the local and village governments have established waste management institution. The society positively responds to the regency and village government policies by establishing community self-reliance group and waste bank.

Unfortunately, regency and village policies do not specifically regulate waste bank, while Regulation of State Minister of Environment of Republic of Indonesia Number 13 of 2012 concerning the Guidelines on the Implementation of Reduce, Reuse, and Recycle through Waste Bank has mandated waste bank's important role as a model of community-based waste management institution. Empirical evidences have also strengthened waste bank model's higher effectiveness than other institution model in educating and transferring information to the society in culturing the 3R movement. Moreover, in the case in Jogjakarta it is found that waste bank has encouraged 4R movement for more efficient waste management from the very sources.

The lack of specific regulation on waste bank has caused the 3R movement in Banyumas Regency not well-developed. Consequently, the volume of waste generation keeps increasing in line with the continuously growing population. This situation will certainly increase the volume of waste disposed of to the environment.

This study recommends the regency and village governments to formulate public policies on waste bank. Moreover, the waste bank model is greatly accepted by the society. The formulation of public policies on waste bank shall not merely regulate waste bank formation process, but also pays attention to local cultures and wisdom as part of community based waste management movement. For the government, the commitment to encouraging waste bank agents' role in educating and giving information of waste management needs to be strengthened. Therefore, the waste management budget of Banyumas Regency should not only be allocated to procurement of waste management facilities and infrastructure. It is also necessary to allocate the public budget to strengthen the role of waste bank agents and the society in order to enhance their capacity in more efficient, effective, independent and sustainable waste management.

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