

Development of Wastewater Treatment (Ipal) Communal Plant in Village Pardomuan Nauli in the District Laguboti District Toba Samosir with the Power of Community Participation

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Abstract

The development of environmental sanitation that is based on a community can be implemented through a community-based approach. A community-based approach aims to ensure sustainability through the emphasis of behavioral change and community life to be cleaner and healthier. This community-based approach was conducted since the planning phase, implementation of development up to the management of the means for the creation of a healthy sustainable settlement environment. In the community of Toba Samosir Regency, Implementation of community-based sanitation infrastructure management is a new thing, especially for the city in the village Lumban Dolok Pardomuan Nauli District Laguboti. With most of the activities of its inhabitants as farmers, merchants, and crude workers, researchers tend to doubt the community participation of Pardomuan Nauli village in the development of communal IPAL. Qualitative methodology research that will reduce the outcome of research findings will answer. With the method of approach to the perpetrators of the partsipasai in the construction of wastewater treatment plant (IPAL) communal is implemented with a). Community-based environmental sanitation Program (SLBM), b). Participation with a local cultural approach "Satahi Saoloan" to the togetherness gained more effectively that raises local content idea., C). Socialization is less than optimal so that community understanding of the program needs improvement.

Keywords: development participation, community empowerment, and environmental development

I. Introduction

The collection of Sitematis and wastewater analysis has become a useful tool in predicting the health status of the community (O'brien et al., 2019). Sanitation is a fundamental requirement of human beings, but the current sanitation conditions are less gaining attention and become a priority of development in some areas. This resulted in a decline in the Community's environmental quality. Sanitation development should be a development priority. Sanitation development has touched the settlements in rural areas, but sanitation conditions require serious attention among the facilities and sanitation infrastructures that are not equipped.

Infrastructure such as sanitation is the most important because it directly affects health and well-being. Sanitation infrastructure that has not been adequate because it does not fit the needs of the community so that sanitation can not fulfill its needs. Sanitary facilities are built for household demand and comfort (Dalahmeh et al., 2009). The level of comfort can be seen from the fulfillment of community needs, needs, including environmental infrastructure.

Environmental pollution is a severe symptom throughout the archipelago, including water pollution. Pollution is not only derived from industrial waste from factories that dispose of its wastewater without processing, but also a society that does not manage the water of the wastewater either intentionally or not. Often with the development of a region, the amount of household waste produced is greater. Also, pollution that has been offered by the low action of public awareness that directly disposes of dirt/stool and garbage to the body of water. Water is a vital resource because water is a very vital component in the survival of the human and Kesejahteraan environment (Shafqat, 2011).

The infrastructure and wastewater management facilities are closely related to health, environment, education, socio-cultural, and poverty. The greater access that the community has for sanitation facilities (settlement wastewater, waste, and environmental drainage) is then the smaller the occurrence of the spread of diseases transmitted by water and soil. Water use is important for every human activity (Shafqat, 2011). Community-based approaches need to be undertaken in the development of a Community-scale sanitation environment. Here it takes effort to convince the public about the importance of its participation in development (Fistarisma Isaac & Nusantara, 2016). Ensuring the management of wastewater requires a change of behavior and lifestyle of people. Community participation is conducted since the planning phase, implementation of development to the management level of facilities. With the participation of the community can easily understand and know how efficiently in improving the management of water from the village communities to the people of the city (Malisa et al., 2019). Sanitary conditions requiring serious attention in the majority of wastewater are discarded without any treatment, a wastewater management plan is indispensable (Lasut et al., 2008).

In households for the management of wastewater is usually used septic tanks that function anaerobic processes and the absorption. Management of waste using septic tanks has a low price and is suitable for dense urban areas, but the use of septic tanks can result in the pollution of underground water. Septic tanks are only for processing wastewater from WC only. For other wastewater (laundry wastewater, kitchen, and bathroom) discharged directly without processing, this causes environmental pollution. This will be the management of wastewater in need of the participation of the Community and its stakeholders (Wells et al., 2016). A communal wastewater treatment process is the right choice in the management of domestic wastewater. Communal Wastewater treatment plant (IPAL communal) can be used in the use of communal wastewater that can be used collectively (used by households). With the use of IPAL, wastewater safer when disposed to the environment or body of water. The management of wastewater using the IPAL has effective processes, institutional water arrangements, social tendencies, economics, culture, infrastructure development, public participation, and related stakeholders (Malisa et al., 2019).

The effectiveness of waste management affects the development of an area (Xiao et al., 2017). Participatory development should start with the community as having the aspirations and most about the needs, the community as the main actors of development, and the Government as a facilitator (Fistarisma Isaac & Nusantara, 2016). For the people of Toba regency, the development of community-based sanitation infrastructure management is new, especially in the location of the community that will be built in Hamlet Lumban Dolok Pardomuan Nauli District Laguboti. People of the village Lumban Dolok Pardomuan Nauli District Laguboti activities as farmers, merchants, and crude workers, researchers tend to doubt the participation of the village community Pardomuan Nauli in the development of communal IPAL.

This study examines the factors that influence community participation, especially in the program SLBM in the village Pardomuan Nauli Laguboti District of Toba Samosir Regency. The people of Pardomuan Nauli village have very supportive characteristics of participating in economic, social, and cultural aspects. Some facts in the field that can be an obstacle, and the obstacles of society to participate are:

- a) The community has a low-income level, which causes the public to be unable to contribute to both energy and material;
- b) The low level of education that the community has made the community skeptical and apathy of the importance of sanitation infrastructure and living and healthy patterns;
- c) The community mostly has a profession as a farmer, trader as well as crude labor that resulted in the free time that the community-owned to be present in the meeting, donate power, and manage the sanitation infrastructure that has been built.

- d) The lack of public knowledge about the community-based environmental sanitation program, especially on the development of communal IPAL. This is a matter of community to be doubtful of the benefits gained from the sanitation infrastructure built.

Based on the constraints and problems that have been outlined on the basis that through this simple research is sought to trace the participation of rural communities in the implementation of development, so to direct the research and direct the data and facts into the form of writing that is scientific, it is necessary to be formulated problems in this research is how the community, description of community participation, implementation and barriers to the development of communal IPAL in realizing the community participation in the village Lumban Dolok Pardomuan Nauli District Laguboti. The purpose of this research is to know and analyze how the community, description of community participation, and implementation and barriers of development of communal IPAL in the realization of community participation in Hamlet Lumban Dolok Pardomuan Nauli District Laguboti.

II. Methodology

This research uses qualitative descriptive methods with inductive approaches. The inductive approach provides describing and explaining the state of the research object based on the facts that occur now specifically to be drawn in a general sense of the variables examined, without comparing to other variables. The descriptive method is characterized by focusing on current actual problems (Lexy J. Moleong, 2017). Research data sources are gathered through interviews and observations. The Data obtained is subsequently collected and compiled and analyzed and explained and then concluded (Sugiyono, 2006). Data sources in this study through written notes or audio/video recording, photo documentation, or other audiovisual forms. In addition to such data sources, researchers also use different data sources, namely written symbols (sources of archives and documents) and statistical data sources.

To know the overview of community participation in building communal IPAL in the village Pardomuan Nauli Laguboti District of Toba Samosir District, then it will be conducted interviews with a relevant informant (informant) and competent according to the research material. In this case, the chosen informant is the office of Commitment from the spatial Office and the District settlements Toba Samosir as the owner of the program, head of village Pardomuan Nauli, head of Hamlet Lumban Dolok, member of the Community Self-government (KSM) as a provider of development services and Field facilitator Power (TFL) as a companion of the KSM in the implementation of the development while the respondent is a community beneficiary of IPAL communal, namely the community that the water is flowing directly to IPAL

Purposive sampling which is the subject of research directly involved in the development of communal IPAL in Pardomuan Nauli village. The informant and respondents in this study include: informant; Commitment Office, head of village Pardomuan Nauli District Laguboti, head of village Lumban Dolok Pardomuan Nauli, Government Group members (KSM) GORAT as a provider of development services, field facilitator (TFL) as a companion/consultant development Implementation, people in the hamlet Lumban Dolok Pardomuan Nauli Village and the respondent; The household head of the beneficiaries, the water house is directly channeled to the IPAL, as many as 25 people.

III. Discussion

1. Implementation of local culture in development.

The problem concerns the need for consideration of how economies scale affects resource recovery with historical objectives based on the social protection of Health and Environment (Wells et al., 2016). For this matter, community participation is needed. Engagement is participation, involvement, and togetherness of citizens both individually and in groups (Fistarisma Ishak & Nusantara, 2016). Community participation is the act of several communities with commitment, and mutual understanding, analyzing, planning an activity together.

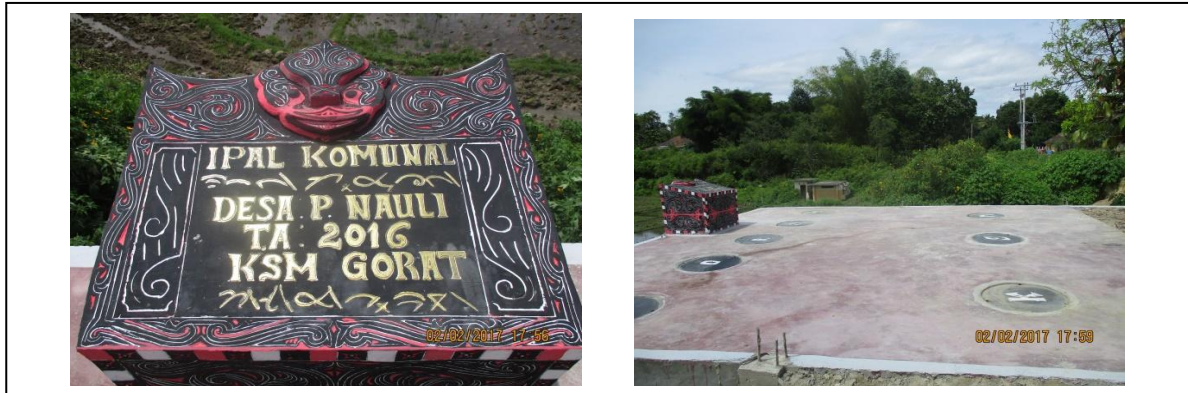
Implementation of IPAL communal to manage waste originating from households such as from the bathroom, kitchen, and laundry clothes before dumped into the body of water. IPAL can also serve as an anticipation of soil pollution by septic tanks. Many alternatives can be applied in waste management, 1) in-place management or beyond 2) high or low-tech facilities, 3) reuse or dismissal, 4) concentrations for reuse of waste discarded during maintenance or storage of trash in a safe way (Lasut et al., 2008). The sanitation sector becomes mandatory affairs of the Regency/city government (law number 32 years, 2004). The Regency/city government is asked to be able to design a strategy or policy to improve the development of sanitation. One aspect that became the basis of the implementation of the acceleration of the Settlement development program is the community participation in every stage of development (Afandi et al., 2014). Sanitation planning the district/city government is ideally at the scene of implementation has prepared comprehensive and strategic planning. The preparation can refer to the medium-term development plan (RPJM) of the Regency/city, the document of medium Term Investment development plan (RPIJM) of public works, provincial and national areas.

In achieving the target Millennium Development Goals (MDGs) and Universal Achievement in 2019, better known as "Program 100-0-100", which is one hundred percent of people's access to water, zero percent of slum and one hundred percent of sanitation-access society in 2019, the Government of Indonesia carried out SLBM (community-based environmental sanitation) activities that are sourced from the Special Allocation Fund (DAK) which is also commonly referred to by DAK SANITATION.

Along with the government program, Toba Samosir Regency, as one of the recipients of the recipient district, the year 2016, carried out the sanitation program in eleven locations, one of which is Lumban Dolok village Pardomuan Nauli District Laguboti. The community-based environmental Sanitation Program (SLBM), which is from now on referred to sanitation, is one of the government programs that aim to increase the number of households ' hygiene in the achievement of the universal target of access where implementation is implemented by community empowerment.

Empowerment of the community in question where the population is expected in the implementation of both the planning, location determination, application of physical construction until its operation and maintenance are carried out by the community itself. Regency Government of Toba Samosir Year 2016 implements Program DAK sanitation in 11 locations spread in 8 Kecamatan namely 2 locations in Balige subdistrict, 2 locations in the District Laguboti, 2 locations in the district of Nassau and each 1 location in Sub District Sigumpar, Silaen, Portsea, Lumban Julu and Habinsaran subdistrict. From the research findings, the implementation of Pardomuan Nauli Village Laguboti District is one of the recipient villages of the Program DAK Sanitation District Toba Samosir fiscal year 2016. The area of the town that became the location DAK sanitation 2006 was about 50 ha, with the population at that time 34 KK or 158 inhabitants. The system of waste management is not only about the management of waste itself but on environmental factors, and the economic and unemployment as well as productivity (Sushil, 1990).

Residents of this region are indigenous peoples, they have their land with a livelihood of almost most of the profession as a farmer, while the rest as building labor and self-employed. Character participation with local cultural ideas found in the implementation of the physical building characteristic with the assistance of ideas by pouring in the form of "Gorga" according to local Batak culture, as shown in the following figure:



Source: Documented, 2018

Figure 1. Village communal IPAL Pardomuan Nauli

With the idea of participation given by the community to add character characteristics from the IPAL and fulfill the needs of clean water of the people of Lumban Dolok Hamlet by using a source of water derived from the wells and a portion of the water wells. The source of clean water and drinking water for household needs comes from the well dug and some water springs from the springs. Condition of sanitary facilities and infrastructure in Lumban Dolok Hamlet is not adequate; this happens because the community economy is classified as medium downward. The sanitation infrastructure in Lumban Dolok Hamlet is still as simple as the ownership of the private Jamban/MCK using tanks that are not standard and polluting the soil and groundwater. Implementation of communal IPAL development in Hamlet Lumban Dolok Pardomuan Nauli Sub-district Laguboti implemented after the government of Toba Samosir Regency through the Office of Spatial and settlements, as the SKPD in the public health Program of DAK Sanitation, implementing the socialization in the village, the community that will be built. This is evidenced by the percentage of 52% of the 25 respondents who participated in the socialization event as well as the formation of KSM. Community participation directly in meeting meetings at the socialization and structure of the KSM by optimizing the local culture "Satahi Saoloan" can be seen in table 1.

Table 1. The response of respondents based on participation in meeting/meeting of socialization of IPAL communal development and formation of KSM

| Response | Value | Frequency | Score | % |
|---------------|-------|-----------|-------|--------|
| Very Active | 4 | 4 | 16 | 16,00 |
| Active | 3 | 8 | 24 | 32,00 |
| Less Active | 2 | 1 | 2 | 4,00 |
| Inactive | 1 | 12 | 12 | 48,00 |
| Amount | | 25 | 54 | 100,00 |

Source: Primer Data 2019

The process of mentoring is done so that people understand the benefits of communal IPAL. This mentoring was conducted with community organizing in the form of a community group (KSM). This formation of KSM aims to facilitate the process of mentoring as well as a container to unite the potential of human resources owned in the village of Lumban Dolok village Pardomuan Nauli Laguboti District so that planned planning can run according to the program.

2. Implementation and barriers of communal IPAL

In the application of IPAL shared research, it was found that the community participated:

a) district in the implementation of physical/human resources will be voluntarily involved in the participation of physical/energy when the Society assesses, sees and senses that the program implemented is implemented responsibly. Following the provisions and directly beneficial to the needs of the community, then the city will be directly involved and participate in supporting the development activities. Participation in this context is active participation that is implemented by the community to speak and carry out the development activities.

b) Community participation in the form of money/material will be straightforward or can facilitate the development program that has been planned and agreed before; this is because, in every implementation, an activity always requires money/material. The support of money/material provided can be the necessary materials in the process of implementing the development, facilities, and infrastructure that support the development of or in the form of cash.

c) Community participation in the operation and maintenance of communal IPAL, service, and maintenance of facilities and infrastructure that have been awakened amid society to be a specter in development lately, this is due to the lack of a second taste and ownership of public facilities that woke up. Deficient public awareness is still a significant constraint. Maintenance will build IPAL communal, which has been awakened in Lumban Dolok village Pardomuan Nauli This until the end of research has not been found restrictions because the facilities and infrastructure that woke up still functioning well.

Implementation is not forever experienced optimal success, for that in this research gained the findings of the constraints of community participation in IPAL communal development. Implementation of IPAL joint development has been governed by the Minister of Public Works, and people's Housing of the Republic of Indonesia 47/PRT/M/2015 about Technical indicators of DAK infrastructure were in principle the development of IPAL with holistic empowerment and participation of society. Community involvement in the form of the participation in the planning process, implementation of construction and operation, and maintenance. The application of IPAL development is a proper implementation that asks for the support and involvement of all stakeholders in each region.

It is not known by the people of Pardomuan Nauli village in general and the people of Lumban Dolok Hamlet in particular, so the implementation of the development of IPAL has not fully received input and commitment from all stakeholders of the development of IPAL. The implementation of development will not be effective if all the stakeholders involved in the development do not support each other in every stage of implementation. After the researchers conduct a direct observation of the development of the IPAL dive process and conduct interviews with all stakeholders both from the government elements, facilitator, KSM, village and community devices can be known constraints of community participation in the development of communal IPAL in the village of Pardomuan Nauli, District Laguboti Toba Samosir, among others: a). Factors of knowledge about the communal IPAL development Program, people of Pardomuan Nauli village generally do not know about the development program of IPAL. This is known for the results of a questionnaire conducted by researchers against those who have received immediate benefits. The results of the questionnaire showed that respondents were very aware of only one respondent with a percentage of 4%, already know as many as eight respondents with a percentage of 32%, enough to know four respondents with percentage 16%, less knowing ten respondents with a percentage of 40% and not knowing two respondents with a percentage of 8%. This suggests that people, in general, do not know the whole program as intended. The ignorance of the community about this program is a constraint on community participation in the development of IPAL because people tend not to participate directly; b). Factors of consciousness are participating in the development activities in participating that arise. The factor that causes it is the awareness of the community itself.

It is also questionable to the researcher to the respondent, the results of the questionnaire from the respondents showed as many as eight respondents with a percentage of 32% participated in the participation of the water Rumanhya to be connected to IPAL, not because of his desire but because it is invited by others. If the citizens are already aware of the importance of the development for himself and

his environment, then it is certain that they will also be more intense in their involvement in the implementation of the development. It is intended so that the dicta-taken in development can be achieved that increases the degree of better life; C.). Education level factors, generally the community with a high level of education have a higher awareness or attention to development activities undertaken, both development conducted by the Government and the non-governmental community. They understand the benefits of the development done, and they are pleased to participate in the development. In communities that have a low level of education, they do not understand the benefits of development and the implementation of the development, this makes the community with a low education become apartis of development.

The results of the questionnaire to visit that the respondent who did not graduate school 1 respondent with a percentage of 4%, graduated SD 2 respondents with a percentage of 8%, graduated Junior 5 respondents with a percentage of 20%, graduated high school 15 respondents with a percentage of 60% and graduated two respondents with a percentage of 8%; d). Low-income generation, the level of community income Lumban Dolok Village Pardomuan Nauli is different, the level of participation in the development may be different as well. In addition to the different levels of income every day, it is also different. This can reduce its participation in development. The higher the Community's income, the higher the level of participation in the development.

The low income of people of Lumban Dolok village Pardomuan Nauli, evidenced by the results of a questionnaire that showed that 13 respondents with a percentage of 52% worked as a farmer, three respondents with a percentage of 12% working as a building worker, seven respondents with a percentage of 28% worked as a rambutan entrepreneur. Only two respondents with a percentage of 8% working as a Civil. The public also prioritizes the need for a living for his family than participating in development. Behavior is a process of consequence about a person's beliefs about the outcome of his behavior and influences their attitude toward behavior (Aung & Arias, 2006).

The information above is a major obstacle in the implementation of development programs because in the essence of community participation in both the form of energy material/money appears on the will and circumstances of the community who want to be involved in the implementation of development. For planned planning according to the needs of the community. The situation can not be imposed by the Government to the community, so this constraint should be considered for the advancement and welfare of the people of Lumban Dolok village in particular and Pardomuan Nauli villages in general. Most of the Community recognizes environmental and health threats, but it does not align with the behavior of society (Devitt et al., 2016). Increased community participation needs to be completed with various activities that can stimulate the interest of the community in participating. And society is given an understanding of the importance of wastewater management so as not to pollute the environment.

IV. Conclusion

Based on the results of the discussion conducted in the research on community participation in the development of wastewater Treatment installation (IPAL) communal in Desa village Pardomuan Nauli Laguboti District Toba Samosir, then it can be formulated community participation in meeting or meeting in the socialization of communal IPAL development program and establishment of KSM and strengthening local culture in the form of idea participation and culture deliberation with "Satahi Saoloan" found to optimize implementation of the program.

The Regency/city government is asked to be able to design a strategy or policy to improve the development of sanitation. One aspect that is the basis of the implementation of the acceleration of the Settlement development program is community participation in every stage of development. The main obstacle in the implementation of development programs, because the lack of community participation in either the form of personnel/money appears on the will and circumstances of the community who want to

be involved in the implementation of development. For planned planning according to the needs of the city. The situation cannot be imposed by the Government to the public, so this constraint needs to be considered for the advancement and welfare of the community.

Community empowerment, in principle, carried out in the program DAK sanitation in the village Pandomuan Nauli, can be adopted, replicated, and developed in other locations and the development of other rural infrastructures. Empowerment of the community in question where the population is expected in the implementation of both the planning, location determination, application of physical construction until its operation and maintenance are carried out by the community itself. The process of mentoring is done so that people understand the benefits of communal IPAL. This mentoring was conducted with community organizing in the form of a community group (KSM). This formation of KSM aims to facilitate the process of mentoring as well as a container to unite the potential of human resources owned in the village of Lumban Dolok village Pandomuan Nauli Laguboti District so that planned planning can run according to the program.

Most of the Community recognizes environmental and health threats, but it does not align with the behavior of society (Devitt et al., 2016). Increased community participation needs to be completed with various activities that can stimulate the interest of the community in participating. And society is given an understanding of the importance of wastewater management so as not to pollute the environment.

References

1. Afandi, Y. V., Sunoko, H. R., & Kismartini, K. (2014). Status Keberlanjutan Sistem Pengelolaan Air Limbah Domestik Komunal Berbasis Masyarakat Di Kota Probolinggo. *Jurnal Ilmu Lingkungan*, 11(2), 100. <https://doi.org/10.14710/jil.11.2.100-109>
2. Aung, M., & Arias, M. L. (2006). Examining waste management in San Pablo del Lago, Ecuador: A behavioral framework. *Management of Environmental Quality: An International Journal*, 17(6), 740–752. <https://doi.org/10.1108/14777830610702557>
3. Dalahmeh, S. S., Assayed, M., & Suleiman, W. T. (2009). Themes of stakeholder participation in greywater management in rural communities in Jordan. *Desalination*, 243(1–3), 159–169. <https://doi.org/10.1016/j.desal.2008.04.022>
4. Devitt, C., O'Neill, E., & Waldron, R. (2016). Drivers and barriers among householders to managing domestic wastewater treatment systems in the Republic of Ireland implications for risk prevention behaviour. *Journal of Hydrology*, 535, 534–546. <https://doi.org/10.1016/j.jhydrol.2016.02.015>
5. Fistarisma Ishak, R. dan, & Nusantara, A. W. (2016). Analisis partisipasi masyarakat dalam menunjang pembangunan desa di kecamatan tongauna kabupaten konawe. *Jurnal Ekonomi (JE)*, 1(1), 67–79.
6. Lasut, M. T., Jensen, K. R., & Shivakoti, G. (2008). Analysis of constraints and potentials for wastewater management in the coastal city of Manado, North Sulawesi, Indonesia. *Journal of Environmental Management*, 88(4), 1141–1150. <https://doi.org/10.1016/j.jenvman.2007.06.011>
7. Lexy J. Moleong, D. M. . (2017). *Metodologi Penelitian Kualitatif (Edisi Revisi)* (Revisi). Rosda.
8. Malisa, R., Schwella, E., & Kidd, M. (2019). From “government” to “governance”: A quantitative transition analysis of urban wastewater management principles in Stellenbosch Municipality. *Science of the Total Environment*, 674, 494–511. <https://doi.org/10.1016/j.scitotenv.2019.04.194>
9. O'Brien, J. W., Grant, S., Banks, A. P. W., Bruno, R., Carter, S., Choi, P. M., Covaci, A., Crosbie, N. D., Gartner, C., Hall, W., Jiang, G., Kaserzon, S., Kirkbride, K. P., Lai, F. Y., Mackie, R., Marshall, J., Ort, C., Paxman, C., Prichard, J., ... Mueller, J. F. (2019). A National Wastewater Monitoring Program for a better understanding of public health: A case study using

- the Australian Census. *Environment International*, 122(October 2018), 400–411. <https://doi.org/10.1016/j.envint.2018.12.003>
10. Shafqat, A. (2011). The role of the municipality in waste water management in Bahawalpur city. *Management of Environmental Quality: An International Journal*, 39(3), 233–243. <https://doi.org/10.1108/EUM0000000005454>
 11. Sugiyono. (2006). *Statistik untuk Penelitian*. CV ALFABETA.
 12. Sushil, D. (1990). *Industrial Management & Data Systems Waste Management: A Systems Perspective*.
 13. Undang-Undang Nomor 32 Tahun. (2004). *Tentang Pemerintah Daerah*.
 14. Wells, E. C., Zarger, R. K., Whiteford, L. M., Mihelcic, J. R., Koenig, E. S., & Cairns, M. R. (2016). The impacts of tourism development on perceptions and practices of sustainable wastewater management on the Placencia Peninsula, Belize. *Journal of Cleaner Production*, 111, 430–441. <https://doi.org/10.1016/j.jclepro.2014.08.050>
 15. Xiao, L., Zhang, G., Zhu, Y., & Lin, T. (2017). Promoting public participation in household waste management: A survey based method and case study in Xiamen city, China. *Journal of Cleaner Production*, 144, 313–322. <https://doi.org/10.1016/j.jclepro.2017.01.022>