Population density, human development index, priority watersheds and voluntary disclosure of pollutant release data by textile companies in Indonesia

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Abstract. There are currently twenty textile companies in Indonesia that have voluntarily disclosed information about their release of hazardous chemicals from their production facilities on an internet page. The information disclosure is carried out using the PRTR system approach, and individually by the twenty companies. In the period of 2013 to 2019, together, 43 information disclosures were recorded. All companies that disclose their pollutant release data are located in locations with very high population densities. Meanwhile 75% of them operate in locations with high HDI levels. In addition, only one company that voluntarily disclosed their pollutant release data is not located in priority watersheds. This study might provide the first step for further research on the driving or pulling factors of the voluntary information disclosure. Information that should be the rights of the public.

1. Introduction

The policy of environmental information disclosure for pollution control, especially for industrial pollution, is increasingly being used by countries in the world including developing countries. There are two types of information disclosure programs, namely emissions inventory and environmental performance ratings [1]. The first type, commonly called pollutant release and transfer register (PRTR), only reports emissions or disposal data without using it to assess or describe company’s environmental performance [2]. An example of this first type is the United States Toxic Release Inventory (TRI) which is managed by the United States Environmental Protection Agency (EPA) which focuses on toxic pollutants which may not be regulated in conventional regulations.

Community access to information is a key element of PRTR. UNITAR states that the PRTR system consists of three important elements: a structured database; information exchange network to submit and publish data; and dissemination mechanisms to convert the data into information and make it available to the public. PRTR that is available to the public provides access to environmental information in accordance with the principle of the right to know of the community, and can encourage interested or affected parties to ask questions and request improvements to the protection of human health and the environment [3].

Disclosure of environmental information works on two sides, namely the company's supply side and demand side for environmental services [1]. It was further explained that the supply side illustrates the extent to which stakeholders allow companies to pollute or use environmental services. While the demand side illustrates the marginal costs of pollution reduction carried out by companies.
Disclosure of environmental information, will change the supply side by changing what information available to governments, local communities, consumer organizations and market agents [1]. Information related to pollution by companies that become available can then create costs for companies that are encouraged by these stakeholders. For example, taxes, litigation fees or even costs related to conflicts with affected local communities. From this description, we can see how stakeholders, including the community, could play an important role in responding to information revealed, or in other word, to take corrective steps [4].

However, external pressure from stakeholders can also encourage companies to increase their pollution reduction efforts [5], including those which could come indirectly through disclosure of environmental information. This external pressure may be seen from the context of the location where the company operates. For the scope of local communities, population density factors [6], income levels [7], and population education [1] where reporting facilities are located determine the level of industrial pollution reduction responses. While for some disclosure programs determine the details of data disclosed to the public, as for the case of PROPER in Indonesia [1].

Although it may not be widely known, there are 20 textile companies in Indonesia that have voluntarily disclosed information about the release of hazardous chemicals from their production facilities on an internet page. The disclosure of information is carried out using the PRTR system approach and individually by the twenty companies. In the period of 2013 to 2019, together, 43 information disclosures were recorded. The internet site where the twenty companies uploaded their information on the release of pollutants was managed by an institution in China, which called the Institute of Public and Environmental Affairs (IPE).

This study will try to examine the external context in relation to location where the twenty textile companies operate. Several factors that might explain the external context of the company, which can affect the stakeholder supply side for the use of environmental services by the company, will be used to conduct the study.

2. Methods
To examine the external context of the twenty companies, the author will use descriptive statistics methods. The collected data is arranged in a table 1 that juxtaposes companies and external factors of each company. These data are then further processed descriptively. Data related to the company's external factors are obtained from the Indonesian Central Bureau of Statistics and from relevant government policies.

External factors used are the level of population density and human development index (HDI). In addition, government policies related to the river, in this case the policy of establishing priority watersheds for actions will also be used in the study. The population density level will refer to the classification of population density according to Government Regulation In lieu of Law Number 56 of 1960 concerning Determination of Agricultural Land Area. While the HDI classification will refer to the Central Statistic Agency’s guidance. The National Priority Watershed will refer to the ministry policies that deal with environmental management and quality of water resources.

3. Results and Discussion
At Table 1 presents data on location-related external factors, where the twenty companies that have voluntarily disclosed information on the release of pollutants to the public through an internet site operate. From the table 1 it can be seen that all companies that disclose pollutant release data to the public are located in areas with very high population densities. It can be also seen that they operate in areas that have a moderate to a very high HDI. Last one is that all companies, except one, operate in watersheds that are National Priority Watersheds. This is according to ministry policies that deal with environmental management and quality of water resources, which is related with the national medium-term development plan for the period of 2010 - 2014 and 2015 - 2019.
Table 1. Location-related External Factors of Twenty Textile Companies’ Facility in Indonesia.

| No. | Company | City/District | Watershed | Population density | Human Development Index | Priority watershed, Yes or No |
|-----|---------|---------------|-----------|--------------------|-------------------------|-------------------------------|
| 1.  | Company 1 | Cimahi | Citarum | very dense | High | Yes |
| 2.  | Company 2 | Majalengka | Cimanuk | very dense | Medium | Yes |
| 3.  | Company 3 | Magelang | Progo | very dense | Medium | Yes |
| 4.  | Company 4 | Semarang | Garang | very dense | High | Yes |
| 5.  | Company 5 | Semarang | Garang | very dense | Very High | Yes |
| 6.  | Company 6 | Kab. Bandung | Citarum | very dense | High | Yes |
| 7.  | Company 7 | Bogor | Ciliwung-Cisadane | very dense | High | Yes |
| 8.  | Company 8 | Jakarta Barat | Ciliwung-Cisadane | very dense | Very High | Yes |
| 9.  | Company 9 | Semarang | Garang | very dense | Very High | Yes |
| 10. | Company 10 | Tangerang | Cisadane | very dense | High | Yes |
| 11. | Company 11 | Cianjur | Citarum | very dense | Medium | Yes |
| 12. | Company 12 | Cimahi | Citarum | very dense | High | Yes |
| 13. | Company 13 | Tangerang | Cisadane | very dense | High | Yes |
| 14. | Company 14 | Cimahi | Citarum | very dense | High | Yes |
| 15. | Company 15 | Purwakarta | Citarum | very dense | Medium | Yes |
| 16. | Company 16 | Semarang | Garang | very dense | Very High | Yes |
| 17. | Company 17 | Tangerang | Cisadane | very dense | High | Yes |
| 18. | Company 18 | Bekasi | Citarum | very dense | High | Yes |
| 19. | Company 19 | Tangerang | Cisadane | very dense | High | Yes |
| 20. | Company 20 | Serang | Ciujung | very dense | Medium | No |

Diverse data at Figure 1 is indicated by the HDI where the company operates. Although it can be said that as many as 75% of companies that disclose pollutant release information operate in areas with high HDI, and 25% operate in areas with moderate, not low HDI.

Figure 1. Human Development Index.
Meanwhile, by looking at the three factors at once, there are 55% of companies operating in locations with very high population density, high HDI levels, and operating in priority watersheds (Figure 2). While companies that operate in areas with very high population density, in priority watersheds, but with different levels of HDI: medium and very high, each amounting to 20%. What interesting is that there are 5% of companies or 1 company, out of 20 companies, that do not operate in priority watersheds, even though they operate in areas with very high population density and with medium HDI levels. The company is located in Serang Regency.

Figure 2. Human Development Index in pollutant area.

It could be said that these figures are in harmony with previous studies that say that population density, income levels, and population education where reporting facilities are located determine the level of pollution reduction responses by the company, and for some disclosure programs determine the details of data disclosed to the public. Meanwhile, the priority river basin policy from the government can be seen as a level of environmental services supply for the use of companies. Or in other words, how far the government allows the river to receive pollutions from industry and other sources.

4. Conclusion
This research describes the external factors of the company in relation to the location where companies, that voluntarily disclose information on their pollutants release to the public, operate. All companies that disclose their pollutant release data are located in locations with very high population densities. Meanwhile 75% of them operate in locations with high HDI levels. In addition, only one company that voluntarily disclosed their pollutant release data that is not located in priority watersheds.

It may be too soon to conclude that a combination of these three factors can explain the phenomena of voluntary disclosure of information; or that a combination of these three factors can encourage companies to disclose environmental information to the public. However, this might be the first step for further research on the driving or pulling factors for the company to disclose information on their pollutant release into the environment. Something that should be the rights of the public.

Acknowledgment
This research is funded by the Grant of Indexed International Publication for Master Student (Publikasi Internasional Terindeks Mahasiswa Magister-PITMA B) Universitas Indonesia 2019 with contract number NKB-1024/UN2.R3.1/HKP.05.00/2019.

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