

Legal Problems Regarding the Definition of “Factory” under the Amended Factory Act B.E. 2535 and Air Pollution: A Case Study of a Rice Mill in Chanthaburi

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Abstract

This research investigates air pollution from small business organizations, particularly rice mills, in Chanthaburi Province, focusing on legal gaps in Thailand’s Factory Act B.E. 2535 (1992). It examines how businesses not qualifying as “factory” still contribute to pollution, specifically PM2.5 and PM10 dust, impacting public health and the environment amid challenges like forest fires and traffic congestion. By analyzing Thai laws and comparing them with frameworks in Singapore and Sweden, the study aims to propose amendments to Thailand’s Factory Act to tackle air pollution from smaller enterprises better, ultimately raising awareness and suggesting legal reforms for more effective environmental management.

This research highlights the significant contribution of small rice mills in Chanthaburi Province to air pollution, particularly PM10 emissions, posing health risks to the community. In 2022, air quality

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monitoring revealed PM levels exceeding safe standards, emphasizing the environmental impact of these operations. The amended Factory Act B.E. 2535 (1992) exempts small businesses from strict regulations by redefining “factory,” potentially increasing environmental risks as responsibility shifts to local authorities under the Public Health Act. In contrast, Singapore requires factory registration for operations with over ten workers, ensuring stricter environmental oversight. Sweden’s “Polluter Pays Principle” (PPP) mandates industries to manage pollution and bear associated costs, promoting accountability and sustainability. While Thailand’s amendments prioritize investment, they do so at the expense of environmental protection, raising public health concerns. To mitigate these risks, Thailand should strengthen PPP enforcement through clearer definitions, increased fees for high-risk businesses, improved resource allocation, and enhanced environmental education, fostering long-term sustainability.

Keywords: Air Pollution, Factory, Rice mill

1. Introduction

1.1. Background and Significance of The Problem

At the beginning of this year, relevant institutions will jointly develop guidelines and measures to address the issue of small dust when dust levels exceed PM2.5 standards in Bangkok and surrounding areas. At the February 12, 2019, cabinet meeting, many northern provinces frequently experienced dust exceeding standards. The central and northeastern regions directly affect the environment, economy, and people's health and may expand into major issues in neighboring areas. Therefore, it is necessary to urgently and systematically address this issue through cooperation between the public and private sectors.³

In addition, since the beginning of 2019, the problem of fine dust or PM2.5 has continuously raised the danger warning value and shows no sign of decreasing. As a result, Thai people have to face this problem continuously, causing air pollution that has a wide impact on public health. According to a study by the Institute for Health and Evaluation, University of Washington, air pollution is a contributing factor that causes many diseases, such as chronic obstructive pulmonary disease, cerebrovascular disease, ischemic heart disease, lung cancer, and lower respiratory tract infections. Many chemicals in air pollution, including ozone, can also stimulate the lungs, making them more susceptible to

³ Pollution Control Department, *Action plan for driving the national agenda solving the problem of dust pollution*, accessed June 15, 2023, <https://www.pcd.go.th/strategy/แผนปฏิบัติการขับเคลื่อนวาระแห่งชาติ-การแก้ไขปัญหามลพิษด้านฝุ่นละออง/>.

infection, and is a contributing factor that leads to chronic obstructive pulmonary disease.⁴

Air pollution is the contamination of gases and particles that affect health, such as fine dust PM_{2.5}, caused by burning fossil fuels, agriculture, and volcanic eruptions.⁵ The World Health Organization (WHO) classified PM_{2.5} as a Group 1 carcinogen in 2013. Air pollution is measured and monitored by governments worldwide to protect the public. However, Thailand's air quality standards are still lower than those set by WHO, posing a threat to public health.⁶ The air pollution situation in Thailand in 2019 shows that ozone and PM_{2.5} problems remain important, especially in areas with heavy traffic and industrial areas. Measurements show that during 2017-2019, the average 24-hour PM_{2.5} dust value exceeded the standard many times, especially at the beginning and end of the year. Although PM_{2.5} has decreased since 2015, in 2019, the number of days exceeding the standard increased compared to 2018. PM₁₀ dust and ozone still exceed the standard in many areas, especially in the North, which needs to be urgently addressed.⁷

⁴ Greenpeace Thailand, *Preliminary Analysis Report of Transboundary Air Pollution*, accessed June 15, 2023, https://www.greenpeace.org/thailand/publication/68_53/satellite-derived-pm25-mapping-report/.

⁵ World Health Organization, *What is air pollution*, accessed June 15, 2023, https://www.who.int/docs/default-source/thailand/air-pollution/briefing-on-air-pollution-for-thailand-2019.pdf?sfvrsn=b584ce7f_2.

⁶ Arubon Chotiphong, *PM 2.5 Dust in Thailand*, *Environmental Journal* 22,4 (2018), 50-56.

⁷ Anamai, *Handbook for the implementation of medicine and public health in the case of particulate matter less than 2.5 microns in size (PM_{2.5}) in 2021*, accessed June 15, 2023,

In addition, the Office of Environmental and Pollution Control 13 (Chonburi)⁸ reported on the smog situation in the Eastern region in 2019, finding that PM2.5 and PM10 dust particles were still the main problems, especially from November 2018 to February 2019, when PM2.5 exceeded the standard in every region. Ozone levels were high due to forest fires. In 2022, the situation worsened due to drought conditions and forest fires, affecting public health, causing irritation, and affecting visibility and image in the area.⁹

The critical issue of this study is to consider the sources of PM2.5 and PM10. It comprises natural sources such as dust from land and agricultural areas, forest fires, and sea salt that usually large total dust. Also, sources from human activities include fuel consumption, traffic, exhaust emissions, cars, car components. and dust blowing from the road, especially the gravel road industrial factories, power plants, construction, biomass incineration, solid waste incineration, and open burning and agriculture which is usually a speck of tiny dust.¹⁰ Therefore, it can be seen that the industrial plant, considered a type of business organization, is the cause or source of small dust PM2.5 and PM10. Such

https://hia.anamai.moph.go.th/web-upload/12xb1c83353535e43f224a05e184d8fd75a/m_magazine/35644/2920/file_download/96e5c50a7a65855da35267ce3937ae26.pdf.

⁸ The Office of Environmental and Pollution Control 13, *Environmental Quality Situation Report: Chanthaburi Province*, (Chonburi: Ministry of Natural Resources and Environment, 2020), 30-33.

⁹ Phyathai, *Dust, A silent threat that should not be ignored*, accessed June 16, 2023, https://www.phyathai.com/th/article/2855-ฝุ่นละอองร้าย_ภัยเงียบ.

¹⁰ Pollution Control Department, *Action plan for driving the national agenda solving the problem of dust pollution*, 5.

business operations may affect the health of people in Chanthaburi province.

According to the announcement of Chanthaburi Province requesting cooperation to refrain from all types of open burning, which is a measure to prevent and solve the problem of pollution from smog and fine dust (PM2.5) dated February 7, 2020, with both civil and criminal penalties, it reflects that the problem of air pollution has become a significant threat to the health of the people and the quality of the environment of Chanthaburi Province. In addition, Chanthaburi Province is geographically located next to Battambang Province, Kingdom of Cambodia, to the east, with a border distance of approximately 86 kilometers, making this area at risk of being affected by the problem of cross-border smog, similar to the situation in the northern region of Thailand. In addition, the report on the weather situation during the dry season in the eastern region also indicates that this area may face forest fires, with the highest temperature at 35 degrees Celsius, relative humidity between 65-75 percent, and a very high Fire Weather Index (FWI). In addition, traffic congestion during rush hours and festivals in the Chanthaburi urban area, coupled with the number of registered cars in the province, which has been increasing continuously from 2015 to 2019, further increases the area's air pollution risk.¹¹

Suppose a business organization's operations meet the definition of the “factory” of the Factory Act B.E. 2535 (1992). In that case, there

¹¹ Chakraphan Phothiphath and Suthinee Mekprayoon, *Air Quality Index Application for Risk Assessment from Air Pollution in Urban Boundary of Chanthaburi Municipality*, (Chanthaburi: Rambhai Barni Rajabhat University), accessed June 19, 2023, <https://eresearch.rbru.ac.th/showthesis.php?theid=2019&depid=2>.

will be a law to regulate and control air pollution, controlling the release of waste, pollution, or anything that impacts the environment, precisely, the Enhancement and Conservation of National Environmental Quality Act, B.E. 2535 (1992), and the Factory Act, B.E. 2535 (1992). However, if the business operations of any commercial organization do not comply with the definition of “factory” in the Factory Act B.E. 2535 (1992), And it is a commercial organization that sources small dust PM2.5 and PM10 and is not subject to the supervision of the Factory Law B.E. 2535 (1992).

Revising this definition will result in industrial factories that use less machinery, a small number of workers, and several other businesses that cause severe impacts on the environment and public health, currently numbering more than 60,000 will not be regulated by the Factory Act B.E. 2535 (1992). In addition, the number of industrial factories will rapidly increase, and overall pollution will have a direct impact, such as PM2.5 dust air pollution control will occur.¹²

Therefore, researchers have seen many problems with rice mills in Chanthaburi. Rice mills are considered an example of a small business organization and a source of PM2.5 and PM10 small dust. In addition, some rice mills in business operations do not qualify as a “factory” as defined in the amended Factory Act B.E. 2535 (1992). Therefore, laws, measures, or other ideas should be developed to control or determine the responsibilities of such commercial organizations to correct ongoing or future impacts. These are the sources of the research study on Legal Problems Regarding the Definition of the Word “Factory” According to

¹² Chanthaburi Provincial Labor Office, *Chanthaburi Labor Situation*, accessed June 19, 2023, <https://chanthaburi.mol.go.th/wp-content/uploads/sites/34/2019/11/MINISTRY-OF-LABOUR-ประจำปี-2561.pdf>.

the Amended Factory Act B.E. 2535 (1992) with Air Pollution Problems: A Case Study of a White Factory in Chanthaburi Province.

1.2 Objectives of The Research

The objectives of this research are to examine the air pollution problems caused by small business organizations, particularly rice mills, in Chanthaburi Province; to analyze the characteristics of business enterprises that meet the legal conditions and those that do not, focusing on the definition of “Factory” as per the Amended Factory Act B.E. 2535 (1992); and to explore foreign legal frameworks governing the establishment of factories, specifically the principles of liability for environmental management and rehabilitation costs, in order to propose amendments or additions to Thailand’s existing laws.

1.3 Scope of The Research

This study aims to study and analyze the legal principles related to small enterprises of the rice mill type, which are part or part of the reason. One of the dust sources is the 1992 Factory Act and the 1992 Public Health Act, Enhancement and Conservation of National Environmental Quality Act, B.E. 2535 (1992), and other laws, including related foreign laws, such as those in Singapore and Sweden. It conducted a study in the area of Chanthaburi Province. Analyze the problem using the obtained information, and consider and recommend improvements to the law to align it with current social facts.

1.4 Research Methods

This research applies documentary research, which considers the principle, concept, and relevant law to government agencies in the region, and information from the Internet, including articles and

documents from Thailand and abroad. It analyzes the content, presents descriptive information, and makes conclusions and suggestions.

1.5 Benefits of the Research

The benefits of this research include raising awareness of air pollution problems caused by small business organizations, particularly rice mills, in Chanthaburi Province. It will also enhance understanding of both Thai and foreign laws related to factory establishment, including the principles of responsibility for environmental management and rehabilitation expenses in foreign countries. Additionally, the research will provide insights into the challenges of amending the definition of “factory” in the Factory Act B.E. 2535 (1992), particularly about air pollution issues, to recommend legal updates that reflect current realities. This information will be shared to foster knowledge and understanding of the problems that arise.

2. Research Result

The research results can be summarized according to the study objectives as follows.

2.1 Air pollution problems caused by small businesses rice mills in Chanthaburi Province

In 2019, Thailand’s total rice exports were 151.026 billion Thai baht, ranking third among agricultural and significant export products. In 2019, in Chanthaburi Province, there was a production of 4,714 tons of rice from the rice field. Rice cultivation is spread across all regions of the country, like rice mills. This vital industry has been in the way of life of Thai people for a long time because it processes paddy into rice by developing and introducing new technologies to assist small rice mills in

the community in producing rice. Rice has gradually developed into a larger-scale rice mill. Most rice mills are small rice mills with a capacity of no more than 20 horsepower, accounting for 92.12%. All factories are small and can operate immediately, followed by a significant 5.60% and medium-sized factories at 2.28%.¹³ The characteristics and types of rice mills are divided into three types: 1) Steam rice mills, and 2) An electric motor drives the rice milling machine. 3) A diesel engine drives the rice milling machine.¹⁴

According to research, in 2018, 283 new legal entities were registered in the province of Chanthaburi, with a registered capital of 603,572,000 Thai baht divided into 197 limited companies and 13 new factory registrations. Eight registered businesses in Chanthaburi province operate rice mills in total. In addition, the Industrial Office of Chanthaburi Province summarized the overview of Chanthaburi Province; Chanthaburi has 200 factories.¹⁵ Factory types classified them: There are nine factories of type 2 and 191 factories of type 3. In addition to the number of factories classified by major industries, the first is plant products. There are three medium-sized white mills in Chanthaburi Province. The air pollution caused by rice mills is as follows: Smoke, exhaust gas, and combustion dust. In the cases of oil-based mills and rice husk-based

¹³ Suksan S. and Thanwadee S, *Academic Report of the Academic Symposium (Proceedings)*, accessed June 19, 2023, <http://www.chefile.cmru.ac.th/faculty/2559/graduate/SAR2/KPI2.1/2.1-4-2.pdf>.

¹⁴ Rungkiat Nipitthakul, *Knowledge Management: Technique and Experience Rice Mill Supervision Bureau of Industrial Works Sector 1*, accessed June 19, 2023, <http://reg3.diw.go.th/cluster1/wp-content/uploads/2016/2.pdf>.

¹⁵ Chanthaburi Provincial Industrial Office, *Report on the industrial situation in Chanthaburi Province in 2023*, accessed June 19, 2023, <https://www.diw.go.th/webdiw/static-fac/>.

radiator mills, this type of fuel produces pollutants in the air or exhaust gas during combustion, including smoke generated by incomplete combustion of carbon-containing substances, and solid particle dust floats in the air. In addition, combustion will also produce steam, including gases and compounds. Once in contact, it will cause dizziness, fainting, tears, nasal congestion, and may cause lung diseases.¹⁶

The air pollution emissions in each region of Chanthaburi can be seen as PM10 emissions. Chanthaburi District has a capacity of 59 ppb because it has many fuel-burning factories and large rice mills.¹⁷ Therefore, the operation of a small business organization such as a rice mill is considered an example of a business organization that is the cause or source of tiny dust particles.

Due to the weather conditions in Chanthaburi, such business operations may affect the health of the people of Chanthaburi. In Wat Mai Sub-district, there was an air quality monitoring station. The measurement results showed that in 2022, the average value exceeded the standard value (the standard value is 25 micrograms per cubic meter), and the 24-hour average exceeded the standard value (50 micrograms per cubic meter).¹⁸ It displays the severity of air pollution in Chanthaburi, and part of the problem comes from small businesses of the rice mill type.

¹⁶ Pollution Control Department, *Annual Report on Industrial Plant Control*, (Bangkok: Ministry of Industry, 2019), 42 - 45.

¹⁷ The Office of Environmental and Pollution Control 13, *Environmental Quality Situation Report: Chanthaburi Province*, (2020), 15 - 18.

¹⁸ Pollution Control Department. *Annual Report on Industrial Plant Control*, (2019), 42 - 45.

2.2 Amendment to the definition of the word “Factory” according to the Amended Factory Act B.E. 2535

The Cabinet resolved to propose the Factory Bill (No. ...) B.E. to the National Legislative Assembly. Furthermore, the Office of the Council of State has prepared a memorandum of reasons and necessity for proposing the abovementioned bill. Because the Factory Act B.E. 2535 (1992) has been in force for a long time, some provisions are inappropriate and inconsistent with current circumstances, especially the strict and delayed criteria for controlling factory operations, which creates problems and obstacles to the factory operation. New factory operation control rules should be changed to control factory operations only when necessary. Fast and economical, reducing the burden on factory operators and small businesses.¹⁹ The solution is modifying the definition of ‘factory,’ initially defined as using machines with a total power of 5 horsepower or equivalent to 5 horsepower or more or using seven or more workers. That means that the total power of the machine used is 50 horsepower or equivalent, or using 50 or more workers.²⁰ The amendment is to determine the criteria for controlling the operation of a new factory by changing to control a giant factory to reduce the burden of small factory operators, making it easier to operate a factory. However, the definition in the new law will increase the number of small industrial factories that do not fall under the definition of “factory.” In the revised law, businesses can operate in any building or location nationwide

¹⁹ The National Environmental Commission. *Summary Analysis of the Draft Factory Law*, accessed June 15, 2023, https://www.senate.go.th/document/mSubject/Ext84/84281_0001.PDF.

²⁰ *Ibid.*, 3-4

without applying for a factory construction permit because the application process for building permits in one's area under the Building Control Law has been canceled from the definition of this factory.²¹

When any commercial organization conducts business under the definition of "factory" in the revised Factory Act B.E. 2535 (1992), there will be regulatory agencies, roles, and tasks directly related to pollution control, namely the pollution control department. The role and general tasks of the Pollution Control Department, complying with the relevant provisions of the Enhancement and Conservation of National Environmental Quality Act B.E. 2535 (1992), mainly involve publishing announcements of pollution control zones, determining source pollution control standards, and determining the types of pollution sources that must control exhaust emissions.²²

In addition, the Pollution Control Department Announcement of the National Environment Board, No. 36, has been issued regarding the standardization of particulate matter less than 2.5 microns in the general atmosphere according to the Factory Act B.E. 2535 (1992), the primary purpose is to control the location and operation of factories for economic development and environmental protection, including health and public health. Regarding air pollution control, the Minister of Industry has been empowered to issue ministerial regulations setting standards and control methods, emissions of polluted air arising from factory

²¹ Somnuk Jongmeewasin. *Analysis of the Impact of the 2019 Factory Law on the Environment and Communities*, accessed June 19, 2023, <https://ilaw.or.th/node/5359>.

²² Pongsak Pattha. *Laws Related to the Control of Particulate Matter Less Than 2.5 Micron (PM2.5)*, accessed June 19, 2023, https://cdc.parliament.go.th/ewtadmin/ewt/elaw_parcy/ewt_dl_link.php?nid=2365.

operations, such as the Ministerial Regulation No. 2 (B.E. 2535 (1992)) in conjunction with the Notification of the Ministry of Industry No. 2 (B.E. 2536 (1993)). If anyone violates the ministerial regulations or notices issued by the minister, a fine not exceeding 200,000 Thai baht will be imposed under Article 45 of the Factory Law B.E. 2535. Therefore, it can show that any organization engaged in business meets the definition of “factory” in the Factory Act B.E. 2535 (1992). There will be relevant laws and government agencies to supervise factory emissions and strictly comply with the law.

Suppose the business operations of any commercial organization do not comply with the definition of “factory” under the Factory Act B.E. 2535 (1992); it will not be subject to supervision by the government as mentioned above agencies. Based on the observations of the Extraordinary Committee that had considered the Factory Bill (No. ...) B.E., it was appropriate to observe and propose to the National Legislative Assembly that the Factory Act (No. ...) B.E. has regulated the factory using machinery from 50 horsepower or more than 50 workers. In this case, the existing factories with lower machinery utilization sizes are no longer subject to factory law. However, some types of factories may need more qualified machines and workers, but they may still require control and supervision. Supervise business operations to avoid causing disturbance to surrounding personnel.²³ A commercial organization that does not meet the definition of “factory” in the Factory Act B.E. 2535 (1992) will be controlled by Public Health Law, B.E. 2535 (1992). The

²³ Piyaporn Kittiwet. *Problems of Supervision of Factory Operations*, (Bangkok: Office of the Ombudsman, 2018), accessed June 19, 2023, https://ombstudies.ombudsman.go.th/article_attach/1-6%20piyaporn%20full%20text.PDF.

adjusted amendment requires that the governing body local authorities have the power to control some or all types of activities that are harmful to health as prescribed by the Minister of Public Health. Local governments have the right to issue local regulations on businesses that endanger health in a manner that controls all operations carried out within the jurisdiction of the Minister of Public Health. The type of business that must be controlled within the jurisdiction. The mechanical rice milling business is one of the businesses that must comply with local government regulations.

Moreover, Section 5 of the Revised Factory Act B.E. 2535 (1992) “Factory” refers to: The total power of buildings, places, or vehicles using machines is 50 horsepower or equivalent to 50 horsepower or more, or the following personnel are used: 50 or more people using machines or factories. According to the type or type of factory specified in the ministerial regulations, ministerial regulations have been issued to determine the factory’s type and scale in ministerial regulations B.E. 2563 (2020): Determine the scale of factories operating seed or tuber businesses. The following are the rice milling, peeling, or polishing items listed in Article 9 (1) of the list at the end of ministerial regulations. The dimensions of Class 2 factories shall not exceed the machine dimensions. 75 horsepower, without boilers, the size of the third type factory must exceed 75 horsepower, or all sizes of factories must have boilers. There is no specified number of workers. The research shows that when the definition of “factory” is revised and considered in conjunction with ministerial regulations, the type and size of the factory are determined. In 2020, rice mills used electric motors to drive rice mills. The rice mill

uses a diesel engine to drive a rice mill with a machine size not exceeding 75 horsepower. One of the reasons for air pollution is not subject to the Factory Law but rather to the Public Health Law, the Local administrative organizations' responsibility.

Therefore, the researcher believes that it is appropriate to propose considering the law on Singapore factory registration and the concept of responsibility for environmental restoration expenses in foreign countries as a basis for amending or adding laws in the future.

2.3 Singapore Factory Establishment Registration Law

Like many other major cities, Singapore values air quality and focuses on preventing air pollution from two main sources: industrial and automotive air pollution. Additionally, mist and smoke caused by regional forest fires drifting in during the August-October southwest monsoon have also affected Singapore's air quality.²⁴ Singapore has comprehensive urban planning and industrial facilities that can help the government more easily control air pollution areas. Environmental problems are something every country worldwide pays attention to and tries to deal with it. The country's past industrial development has seen Singapore suffer from noise, water, and soil pollution, the use of technology and machinery to generate air, and waste and waste from factories and enterprises. As a small island country, Singapore has no choice but to urgently and effectively address environmental issues as much as possible to maintain the operation of the country's economy and society.

²⁴ Tan, P. H., & Khoo, W. H. (2023), "Air Quality Management in Singapore: Policies and Challenges", *Environmental Science & Policy*, 134, 124-132. 126.

Therefore, the Singapore government has issued several laws to regulate and promote the preservation of environmental quality in the country. For example, the Environmental Protection and Management Act (Chapter 94A) was enacted in B.E.2542 (1999) to control various environmental pollution problems with the National Environment Agency (NEA) under the Ministry of the Environment and Water Resources as the law enforcement agency. The Pollution Control Department is responsible for issuing permits for emissions to operators or industries.²⁵ Singapore was one of the first countries in Southeast Asia to become industrialised.²⁶ Therefore, the Factory Law was enacted in 1971 and only applies to factories. Secondary laws have always amended the law above due to accidents in the workplace requiring constant review of existing laws. The essence of this factory law stipulates that the first responsible person is the owner of the registered factory.²⁷ Nevertheless, the Occupational Health and Safety Law later abolished the Factory Law.²⁸

²⁵ Thailand Development Research Institute, "ASEAN's ongoing legal information project: Singapore law and related legal information Singapore's Society, Culture, Politics, and Security." LAW for Asean, Accessed June 19, 2023, [https://lawforasean.krisdika.go.th/File/files/รายงานข้อมูลกฎหมายของประเทศสิงคโปร์\(ด้านเศรษฐกิจ\).pdf](https://lawforasean.krisdika.go.th/File/files/รายงานข้อมูลกฎหมายของประเทศสิงคโปร์(ด้านเศรษฐกิจ).pdf).

²⁶ Monica Limtanakool (2020), Factors attributing to Singapore's economic development: The Developmental State Model explanation, Master of Political Science Thesis, Bangkok: Chulalongkorn University, 2.

²⁷ Kalaya Kiattawornchai, "Environmental, Occupational Health and Safety Law," Office of the Council of State, accessed June 20, 2023, <https://www.krisdika.go.th/data/activity/act13447.pdf>.

²⁸ "Legislation for workplace safety and health," Ministry of Man power, Accessed June 20, 2023, www.mom.gov.sg/legislation/workplace-safety-and-health.

The workplace Safety and Health Act (CHAPTER 354A) is the main legislation that will enforce the principles of the new occupational safety and health framework that replaces the Factory Act, effective March 1, 2006. According to the said Act, Part 2, the definition of Section 5(2) gives the meaning of the factory, as in this Act, "factory" means any land and buildings within that place. There are persons employed to carry out the following processes: supervision, sorting, packaging, storage, modification, repair, construction, processing, or manufacturing of any goods or products; supervision, sorting, packaging, storage, and processing, or producing any hazardous substances, repairing, constructing, processing, or producing any vehicles or motor vehicles.

In addition, when considering the workplace safety and occupational health regulations, Factory Registration B.E. 2551 (2008) came into effect on November 1, 2551, a secondary law under Section 65 of the Occupational Safety and Health Act. As mentioned above, the regulations on factory registration are issued in Article 3, submitting a request for establishing a factory. These rules do not apply in the following cases: any land and building with fewer people working there than 10.

This law covers the operations of industrial establishments in various sectors, including rice mills, which are part of the manufacturing and processing of goods. Rice mills are defined as "factories" within section 5(2) of the Act, which provides that land and buildings where persons are employed to process, manufacture, store, or repair goods are considered factories subject to regulatory control. For rice mills, where paddy is processed into rice, such operations are considered

"processing goods" within the definition of factories. Therefore, rice mills must comply with occupational health and safety standards stipulated in this Act, just like other factories, regarding managing workplace risks, preventing accidents, and training employees on safety measures.

Therefore, rice mills must comply with occupational health and safety standards stipulated in this Act, just like other factories, regarding managing workplace risks, preventing accidents, and training employees on safety measures. In addition, if the rice mill has more than ten employees, the factory must comply with the Factory Registration Act 2008, which requires the entrepreneur to apply for the establishment of the factory with the relevant authorities and to comply with occupational health and safety risk prevention measures, such as dust and noise control, which are essential factors in the operation of the rice mill. This legislation reflects the commitment of the Singapore government to protect the health and safety of the country's workforce, especially in the working environment of industrial factories, which is a vital part of economic development.

2.4 Principles of Responsibility for Sweden Environmental Management and Restoration Costs

In 1972 in Stockholm, Sweden, at the United Nations Conference on the Human Environment, the issue of natural resource degradation and the environment was brought up for negotiations and called on all countries to be aware of the wasteful use of resources and beyond the limits of natural resources while the population of poor countries is still

living in poverty.²⁹ Along with data from the World Commission on Environment and Development (2021), the organisation's member countries have agreed to develop their environmental policies on major issues, with polluters paying for them (Polluter Pays Principle: PPP). Its purpose is to encourage the industry to adjust and reflect environmental costs in product prices.

The Polluter Pays Principle (PPP), proposed by the Organization for Economic Cooperation and Development since the 1970s, is outlined in Principle 16 of the 1992 Rio Declaration. It states that governments should internalize environmental costs in economic activities and use economic tools against polluters, with funds allocated to pollution reduction efforts to ensure responsibility for environmental costs without hindering international trade. This principle emphasizes that environmental costs should be incorporated into the production costs of goods and services; if these costs are not reflected in prices, it can lead to overconsumption and increased environmental degradation. Therefore, manufacturers must acknowledge their environmental impact and include these costs in their operations. Ignoring environmental values can result in resource wastage and crises in environmental sustainability that are essential for human survival.³⁰

According to this principle, rice mills are responsible for managing and reducing the environmental impact of their operations. This law can

²⁹“The first session of the United Nations Environment Assembly - UNEA 1,” Pollution Control Department, Accessed June 20, 2023, <https://www.pcd.go.th/hazards/เอกสารสรุปผลการประชุมส.>

³⁰ Wasinee Nanthakwang, “The Concept and Principle Environmental Tax Law,” (Master of Laws, Finance and Taxation Law Faculty of Laws Chulalongkorn University, 2011), 18.

be accomplished through the adoption of cleaner, more efficient technologies, as well as the implementation of preventive measures to control dust and noise within the factories. Additionally, if rice mills contribute significantly to pollution, they may be required to pay environmental fees or taxes, which would be used for environmental restoration and mitigation efforts. Failure to account for environmental costs, such as neglecting the management of dust and waste, could lead to long-term environmental problems, adversely affecting nearby communities and potentially exposing rice mills to legal actions or financial penalties. Thus, considering environmental costs and adhering to the "polluter pays principle" is essential for the long-term sustainability of rice mills and for ensuring sound environmental stewardship.

The Polluter Pays Principle applies to rice mill factories under the Amended Factory Act B.E. 2535 (1992), which defines a "factory" as an industrial establishment involved in production and processing. Under this principle, rice mills manage and mitigate air pollution caused by their operations, such as dust generation and emissions. Rice mills must implement measures to control air pollution, including dust control systems and waste management practices, and comply with air quality standards. If they fail to do so, they may face penalties and be required to cover costs for environmental remediation. In summary, the PPP mandates that rice mills proactively address their environmental impact, particularly regarding air pollution, ensuring legal compliance and promoting sustainable practices.

3. Discussions and conclusions

3.1 Discussions

According to the Factory Law B.E. 2535 (1992), the definition of "factory" has been revised from "factory" to using machines with the following total power: 5 horsepower or more, or the use of 7 or more workers, defined as the use of machines with a total power of 50 horsepower or more, or the use of 50 or more people. From the amendment, several business organizations run a business as an activity that poses a high risk to public health despite using small machines or a small number of workers. Moreover, it causes impacts in many dimensions, whether it is health, society, education, or occupation and lifestyles, that may change and cause serious environmental impacts arising from the amendment of the definition of the word "factory" because business organizations are not subject to factory law. Nevertheless, it must fall under the Public Health Act B.E. 2535 (1992), which is the duty of local administrative organizations to take care of that business.

From the study of the amendment of the definition of "factory" according to the Factory Act B.E. 2535 (1992) compared to the research on the definition of "factory" and the establishment process of factories in Singapore, the revisions in Thailand are as follows: Singapore is a more developed industrial country than Thailand, but Singapore has a legal principle for establishing a factory registration, that is, there must be more than ten people working. Unlike Thailand, which has set the number of workers to 50 people or more, it must be registered to establish a factory. The law regarding establishing factories in Singapore is

essential for registering the factory because only more than ten workers must be registered to establish a factory legally.

However, establishing factory standards in Thailand is equivalent to using some personnel and machine horsepower. Therefore, companies may be engaging in business that may cause damage to the environment. For instance, increasing rice mills that do not meet the registration requirements may lead to air pollution. Together with the study from the analysis memorandum summarizing the essence of the Factory Act B.E. ... (No. ...) prepared by the Office of the Council of State to focus on controlling the operation of large factories only. No statements, academic opinions, or supporting research were evident regarding the reasons for such amendments. However, there are reasons for revision in the comparison table between the Factory Law B.E. 2535 (1992) and the Draft Factory Law (No....). B.E. ... Determine new standards for controlling factory operations through review by the State Council by changing to control a giant factory to reduce the burden of small factory operators, making it easier to operate a factory. It can be seen that although this reduces the burden on small entrepreneurs, in this situation, legislators attach great importance to investment promotion, which the victim of such investment promotion is the reduction and ignoring standards to prevent potential harm to communities and the environment caused by factory operations. In addition, such revisions may lead to business organizations affecting the environment and people's well-being if a business organization is polluting, such as operating a business organization that poses a high risk to people's health or impacts the environment.

3.2 Conclusions

One should consider the responsibility principle in managing and restoring the environment abroad, such as whether the polluter is responsible or pays (PPP). Consider proposing amendments. Alternatively, the law has been amended by specifying that the fee for applying for a license to operate a business that poses a high risk to public health should be increased to an appropriate proportion. Suppose that the fee for applying for a license to operate a business that poses a risk to society and the environment is added to the regulations of the local enterprise protection organization responsible for health hazards in each region. Suppose the business does not comply with the definition of a “factory” in the Factory Act of 1992, which the local government organization supervises, in order to increase income in developing and enhancing various measures for local areas to care for and restore the environment in their areas and create changes or positive effects on the environment in the area and the country in the future.

Moreover, the Polluter Pays Principle (PPP) is a concept that encourages polluters to be responsible for the damage caused to the environment and is included in Article 96 of the National Environmental Protection and Promotion Act B.E.2535 (1992) in Thailand. However, the enforcement of this principle still faces several problems, such as a lack of clarity in the definition and scope of pollution, technical limitations and resources of responsible organizations, lack of cooperation from entrepreneurs, inadequate information systems, and lack of education and training on the importance of the Polluter pays principle. Therefore, improving the clarity of the law, increasing budget and resources,

promoting public-private partnerships, and organizing training to raise awareness are essential to make this principle effective and create a better environment in the future.

In addressing air pollution issues, it is essential to consider various laws beyond the Factory Act B.E. 2535 (1992), including the Environmental Protection Act (No. 2) B.E.2552 (2009), which enhances emission control measures; the National Health Act B.E. 2550 (2007), aimed at safeguarding public health; the Water and Air Pollution Control Act B.E. 2535 (1992), related to pollution management; the Building Act B.E. 2552 (2009), governing construction that affects air quality; and the Ministerial Regulation on factory emission standards. Analyzing these laws in conjunction with the Factory Act offers a comprehensive understanding of the definition of "factory" and effective air pollution management in Thailand, especially regarding these operations' environmental and public health impacts.

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