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Thailand State of Pollution 2020 (B.E. 2563)

Thailand State of Pollution 2020 showed that good water quality was increased (Upper Tapi River was in excellent quality), overall image of coastal water quality was better, overall image of air quality in general areas was better than the previous year, and solid wastes were decreased from 2019.

Pollution Control Department, Ministry of Natural Recourses and Environment summarized Thailand State of Pollution 2020 in water quality, air quality and wastes. **State of water quality:** Water quality moved higher from fair to good quality, Upper Tapi River was in excellent quality in the past 10-year period (2011-2020), and water quality of water sources trended to be better which most of them were at fair to good quality and none was in very poor quality. **State of coastal water quality:** Overall image of coastal water quality was better which changing trend of them in the past 10-year period mostly were in good quality except in the area of Gulp of Thailand which was continuing poor quality. **State of air quality in general areas:** Overall image of air quality was better than the previous year, top 5 of provinces with best air quality were Narathiwat, Satun, Phuket, Songkhla and Yala, respectively with no number of days which air quality exceeded the standard. **Critical areas:** The $PM_{2.5}$ situation in Bangkok and its vicinity was decreased from 2019. **Haze in Northern provinces:** There were 112 days which particulate matter exceeded the standard which could be referred that in 2019 the accumulated number of hotspots was decreased. **Solid wastes:** The amount of solid wastes was 27.35 million tons (4% decreased from 2019). **Municipal hazardous wastes:** The amount of municipal hazardous wastes was 658,651 tons (1.6% increased from 2019). **Infectious wastes:** The amount of infectious wastes was 47,962 tons (10% decreased from 2019).

State of water quality

The water quality of 59 water sources and 6 still water resources: 2% was in excellent quality (equal to 2019), 37% was in good quality (9% increased from 2019), 43% was in fair quality (7% decreased from 2019), and 18% was in poor quality (equal to 2019). The top 5 of water sources found in good quality in 2020 were 1. Upper Tapi River (excellent quality), 2. Kok River, 3. Khwae Noi River, 4. Nong Harn River, and 5. Oon River. The top 5 of water sources found in poor quality in 2020 were 1. Lower Lam Takong River, 2. Lower Chao Phraya River, 3. Sakae Krang River, 4. Lower Rayong River, and 5. Kuang River. There were 8 from 59 water sources found in the same quality as their types of use. In the past 10-year period (2011-2020), the quality of water sources trended to be better, which most of them were at fair to good quality and none was in very poor quality.

State of coastal water quality

The coastal water quality: 4% was in excellent quality (100% increased from 2019), 60% was in good quality (2% increased from 2019), 27% was in fair quality (21% decreased from 2019), 7% was in poor quality (133% increased from 2019), and 2% was in very poor quality (equal to 2019). Overall image of coastal water quality was better which the top 5 of areas with good coastal water quality were 1. Klai Kang Won Palace Beach, 2. Ban Pak Bara Beach, 3. Maharaj Beach, 4. Nai Harn Beach, and 5. Ban Na-tub Beach. The top 5 of areas with poor coastal water quality were 1. Estuary of Chao Phraya River, 2. In front of Beaching Factory (35th kilometer), 3. the 12 December Mouth of Canal, 4. Sriracha (Koh Loy), and 5. Suchada Beach. The changing trend of coastal water quality in the past 10-year period mostly were in good quality except in the area of Gulp of Thailand with continuing poor quality.

The major courses of deteriorated surface water and coastal water quality were the discharge of effluents from municipal sector, households, tourist places, industrial and agricultural sectors. The municipal wastewater treatment systems were insufficient and some of them were still ineffective. Wastewater management in industrial and agricultural sectors were still ineffective. There were still the obstacle of implementation such as the trouble and complexity of wastewater treatment technology, the lack of proficient personnel in wastewater management, and the use of large areas in applying uncomplicated wastewater treatment technology, etc (because most productions still depended on community ways and seasons).

Guideline for overall images of wastewater management were minimizing and controlling the discharge of effluent at sources, inspecting and enforcing pollution sources strictly, improving and developing water quality standard and standard for controlling water pollution at sources, building and strengthening wastewater facilities of Local Administration Organizations, bringing permitting system for pollution release to control pollution release not to exceed the capacity of water sources, using wastewater management standard as a criteria for business permits, and monitoring water quality in areas of provinces/Local Administration Organizations for guarding and warning water quality problems.

State of air quality

General areas: Overall image of air quality was better than the previous year from April 2020. The yearly average amount of $PM_{2.5}$ countrywide was 23 microgram per cubic meter ($\mu g/m^3$) (8% decreased from 2019). The yearly average amount of PM_{10} countrywide was 43 $\mu g/m^3$ (9% decreased from 2019). The highest 8-hour average amount of ozone was 81 $\mu g/m^3$ (11% decreased from 2019). These were due to the implementation of the Action Plan for Driving National Agenda "Addressing Pollution Problem (Particulate Matter)" of related organization together with the coronavirus 2019 pandemic situation, which made people minimize their travel activities, industries reduce their production capacities, and the electricity consumption countrywide reduced. The major pollutants still causing problems were $PM_{2.5}$, PM_{10}, and ozone. The top 5 of provinces with best air quality were Narathiwat, Satun, Phuket, Songkhla and Yala, respectively with no number of days which air quality exceeded the standard.

Critical areas

Bangkok and its vicinity: The $PM_{2.5}$ problem situation in 2020 was found during 20-25 $\mu g/m^3$ (decreased from 2019). The average amount of $PM_{2.5}$ in 6 provinces (Bangkok, Nonthaburi, Samut Prakan, Nakhon Pathom, Pathum Thani and Samut Sakhon) was 23 $\mu g/m^3$ (12% decreased from 2019). However, the air quality situation in Bangkok and its vicinity trended to be better due to the determination of more measures in preventing and addressing $PM_{2.5}$ such as the urged implementation of the Action Plan for Driving National Agenda "Addressing Pollution Problem (Particulate Matter)", monitoring and reporting daily air quality data (3 times per days namely 7.00 a.m., 12.00 a.m., and 17.00 p.m.) to warn, communicate, and build people's awareness, and promoting public participation in addressing the use of technical information to prevent and resolve air pollution problems.

Haze in Northern provinces: The situation was more slightly violent than 2019. There were 112 days which particulate matter exceeded the standard which could be referred that in 2019, the accumulated number of hotspots were 88,855 hotspots (2% decreased from 2019). The highest 24-hour average amount of $PM_{2.5}$ was 366 $\mu g/m^3$ (4% increased from 2019). The major cause was a large number of agricultural burning in combination with dry weather which made the rapid spread of forest fire. The addressing of Northern haze problem was implemented under the mechanism of the Disaster Prevention and Mitigation Act B.E. 2550 by determining 4 areas (forest, agricultural, roadside, and community areas) and 5 measures (command system, fuel reduction, awareness/network/volunteer building, and law enforcement). These included the upgrade of 12 measures in accordance with the Ad-hoc Action Plan in Addressing Pollution Problem (Particulate Matter), the use of aircrafts for supporting forest fire mitigation mission, the determination of strict burning ban period, and the setting up of the Forest Fire Mitigation Center.

Na Phra Lan Subdistrict, Saraburi Province: There were 92 days which PM_{10} exceeded the standard (39% decreased from 2019). The yearly average amount of PM_{10} was 107 $\mu g/m^3$ (9% decreased from 2019). In collaboration with the Committee on Prevention and Mitigation of Particulate Matter Problem in the Pollution Control Area, Rayong Province, there was the implementation under various action plans and public participation building such as the monitoring of particulate matter both in ambient air and from pollution release from sources, sending of Mr. PM_{10} to patrol in spot check areas to detect vehicles which did not follow the law, and the maintenance and cleaning of traffic roads to reduce the amount of dispersed particulate matter.

The area of Map Ta Phut, Rayong Province: Benzene and 1,3-butadiene were found increased, while 1,2-dichloroethane decreased from the previous year. The problems solving of volatile organic compounds (VOCs) included the data analysis of VOCs measurement result and non-common production activities to find cause to control the release of said substances, the preparedness of industrial plants and related organizations to implement new regulation on the standard for controlling exhaust ventilation from petroleum refinery to control benzene ventilation in terms of surveillance around the fence, and the situation monitoring by driving implementation via various committees in Rayong Province as resolving mechanism.

Solid wastes, household hazardous wastes, and **infectious wastes**

Solid wastes: The amount of solid wastes was 27.35 million tons (4% decreased from 2019). These solid wastes were separated at sources for recycling as 11.93 million tons (5% decreased from 2019), were correctly disposed as 11.19 million tons (14% increased from 2019) and were incorrectly disposed as 4.23 million tons (34% decreased from 2019). The top 5 of clean provinces in 2020 were Bangkok, Phuket, Lamphun, Rayong, and Nonthaburi, respectively. One cause that made the amount of solid wastes reduced was the coronavirus 2019 pandemic situation. During 26 March 2020 – 31 May 2020, the amount of municipal solid wastes in Bangkok and its vicinity and some Local Administration Organizations was found reduced due to the control of travelling to Thailand of foreign tourists. While, the determination of Work From Home measure made the amount of Single use plastic increased especially in urban areas with the increase in product and food purchase services via online system. For the comparison of solid waste collection in 76 provinces, it was found that the amount of solid wastes prior to pandemic period (since October 2019 – March 2020) was approximately 68,000 tons per day, during Work From Home period (April 2020) was approximately 63,000 tons per day, after first pandemic period (May – November 2020) was approximately 63,000 tons per day, and after new pandemic period (December 2020 – January 2021) was approximately 58,000 tons per day. For Bangkok, it was found that the amount of solid wastes trended to be reduced prior

to pandemic period (since October 2019 – March 2020) with approximately 326 tons per day, during Work From Home period (April 2020) was approximately 312 tons per day, after first pandemic period (May – November 2020) was approximately 293 tons per day, and after new pandemic period (December 2020 – January 2021) was approximately 271 tons per day. Thus, it was found that trend of the amount of solid wastes in 77 areas was reduced.

However, it was found that the amount of plastic wastes generated during pandemic situation period was approximately 6,300 tons per day which was 15% increased from normal period with approximately 5,500 tons per day. Since 1 January 2020, there has been the implementation of "Everyday Say No To Plastic Bags" Project with the announcement of measure of banning plastic bag provided in department stores, supermarkets, and convenience stores which more than 90 network parties of department stores, supermarkets, and convenience stores have joined the Project. Moreover, on 30 September 2020, there has been the signing of MOU between the Ministry of Natural Recourses and Environment and food delivery platforms such as Grab Food, Line Man, Wongnai, Gojek, Food Panda, Lalamove, and related organization for joint driving of banning Single use plastic from food delivery to promote the waste reduction at sources (households).

Household hazardous wastes: In 2020, the amount of household hazardous wastes was approximately 658,651 tons (1.6% increased from 2019). Most of them were wastes from electrical and electronic equipment with 428,113 tons (65%), and other types of hazardous wastes such as batteries, dry cell batteries, chemical containers, and aerosol spray cans with 230,538 tons (35%). From the government policies on supporting the providing of household hazardous waste management system, Local Administration Organizations and related organizations had to provide the collection points of household hazardous wastes at community and their collection centre at provincial levels. These made the household hazardous wastes managed properly with 121,695 tons (18.5% of generated household hazardous wastes) which found increased from the previous year but still in very little proportion. The top 5 of provinces with continued and effective implementation of household hazardous wastes management were Chiang Rai, Ang Thong, Ubon Ratchathani, Rayong, and Nakhon Si Thammarat, respectively. The main reason of little proportion of proper household hazardous waste management were non separation of hazardous wastes from general wastes by most people, lacking of people awareness, and no regulation of Local Administration Organizations to enforce household hazardous wastes management as well as no law to oversee the management of wastes from electric and electronic equipment. However, the guideline for household hazardous waste management were the increase in Drop Points of household hazardous wastes at community and provincial levels, the building of cooperation network among public, private, and people sectors on household hazardous waste management, and the encourage in launching of Wastes from Electric and Electronic Equipment Management Act B.E. ....

Infectious Waste: In 2020, the amount of infectious waste was 47,962 tons (10% decreasing from 2019) caused by hospitals under the Ministry of Public Health, hospital under the Department of Academic Affairs under the Ministry of Public Health, Sub-district Health promotion hospital, hospitals affiliated with other ministries, private hospital, private clinic, animal hospital, and a dangerous infection laboratory were properly managed for 47,440 tons (98.91%). Although the epidemic situation resulted in a large number of infectious waste from medical care activities, medical diagnosis in hospital, disease surveillance and analysis of a danger infection laboratory, including temporary medical facilities, and a place provided for quarantine or an isolated person to observed symptoms, the overall quantity of infectious waste decreased when compared to the same period of the previous year (Department of Health 2020). Pollution Control Department has published the preliminary guideline how to manage used masks to prevent epidemic crisis for local authorities and public. In addition, a survey of the number of used masks was conducted by coordinating with the local authorities to report the number of used masks via QR Code monthly. It was found that during 1st April-31st December 2020, there were 17.89 tons of used masks which were managed by disposing in landfill (25.01%), burning in the incinerator of local authorities (9.40%) and local authorities nearby (5.60%), eliminating by private company who has duty to get rid of infectious waste (8.52%), and others such as collected and sent them to the sub-district health promotion hospital and the hospital in the areas, collected to the Sub district Administrative Organization to dispose, pour disinfectant and burn then sent them to the public health in the area to dispose properly (51.47%).

Moreover, pollution management must have law enforcement at sources by using integrated measurement with concerned agencies, informing list of pollution sources that loading wastewater to environment not meet the standards in order to push concerned agencies to control according to the regulations, and raising capacity building on waste water management by enhancing knowledge and understanding on maintenance and develop wastewater treatment system to get along with the standards. In 2020, the results from law enforcement at sources were as follows:

Monitoring and Law enforcement at pollution source: There were totally 581 sources that had been monitored in Bangkok and its vicinity. The number of 295 buildings of private sector had 40.81% of wastewater met the standard and 59.19% of wastewater didn't meet the standard. While 286 buildings of government sector had 38.73% of wastewater met the standard and 61.27% of wastewater didn't meet the standard.

Pollution complaint: There were 718 complaints which increased from 2019 (469 complaints). 524 complaints were done completely (73%). The most of pollution complaints were smell (42%), dust/smoke (30%) and noise/nuisance (14%). The source of the most compliant was factories (47%), and the second was entrepreneurs (26%). For the evaluation of the satisfaction of the complaints, appellants were satisfied with giving advice, recommendation and notification of the problems (98%) and problem solving (75%).

Environmental Protection Unit (EPU): Both the central and the 16 environmental protection units will integrate the operations with relevant agencies such as the 4th Coordination Center (OC.4, ISOC), the National Police Department, Department of Special Investigation, Office of the Anti-Corruption Commission in the government sector, and local authorities, etc., to perform a mission of monitoring and implementing relevant laws to monitor, investigate, and resolve complaints, implement the relevant laws on pollution according to the orders and recommendations from the steering committee of the Environmental Protection Unit. Environmental Protection Unit has investigated and solved the problem of pollution complaints that made high impact on the environment and the public, such as

• The problem of bad smell from the leakage of chemicals within the factory of Maida One Co., Ltd., Chachoengsao Province.

• The case of water supply and agricultural areas contaminated with wastewater from the factory operation at Win Process Co., Ltd., Rayong Province.

• The case of water quality in the 16th Joan Basin Reservoir was in acidic condition that contaminated from the operation of the industrial plants in Chachoengsao Province.

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