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Air

Air Pollution Control Act Revised for Source to End-of-Pipe Controls

Revisions of the *Air Pollution Control Act* (空氣污染管制法) include five points to implement "Clean Air" policies. In the future, 120 bylaws will be revised or added for thorough control under environmental protection and sustainable development principles. These bylaws cover planning of air quality improvement, as well as control, treatment, and response from end-of-pipe pollutant emitters. With public health in mind, the EPA works to promulgate various measures to establish a prevention and warning mechanism.

"Clean Air" is a major environmental policy objective. Revisions of the *Air Pollution Control Act* were passed in the Legislative Yuan after three readings on 25 June 2018, announced for implementation by President Tsai Ing-wen on 1 August, and took effect on 3 August 2018. Five major points include additions and amendments of the good neighbor clause, the factory source control mechanism, mobile pollution control measures, harsher penalties, and more importantly, pursuit of illegal gains and addition of the whistleblower clause. The revisions aim to strengthen planning for air quality improvement, pollution source control and middle management, and end-of-pipe treatment and response.

Total Makeover as New Stage in Air Pollution Controls Begins

1.Post-revision planning and implementation

(1) Some 118 bylaws will be amended or added after a preliminary inventory. As it takes time to formulate bylaws based on legal procedures, implementation principles have been set first as the legal basis for various operations during the transitional period.

(2) A mechanism is set up to evaluate air quality standards every four years. Air quality standards are the first target in each evaluation which act as the goals of the central government's control projects and regional governments' control plans. For stationary pollution sources, planning is to take place for the second phase of the *Kaohsiung-Pingtung Area Air Pollutant Total Quantity Control (TQC) Plan* (高屏地區空氣污染總量管制計畫). Addition and revisions of regulations relating to harmful pollutants, the food and beverage industry, boiler standards, and continuous automated monitoring

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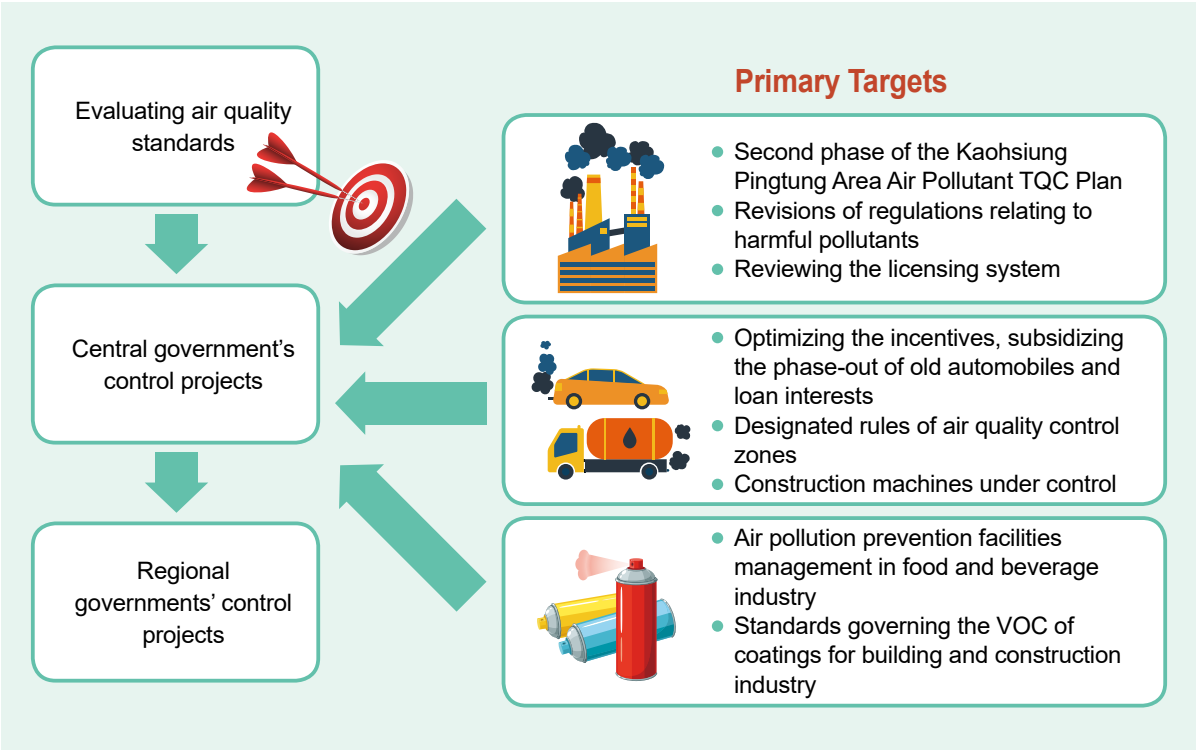
will take priority.

(3) The EPA is going to intensify promotion of controls on mobile pollution sources and enhance economic incentives in order to encourage replacement of old vehicles and other pollution amelioration measures. After the revisions, control measures for diesel vehicles will help lower pollutant emissions as the primary goal. Vehicles can be used normally as long as they comply with emission standards. Assistance will be given to reduce pollution produced by large diesel vehicles, and various subsidy measures are currently under evaluation. Moreover, more diverse improvement projects will be implemented to adjust pollution emission systems, install pollution prevention equipment, provide subsidies for vehicle purchases, and give credit guarantees or low-interest loans.

2. Current status of promotion of the *Air Pollution Control Action Plan*

Passed by the Executive Yuan on 21 December 2017, the *Air Pollution Control Action Plan* (空氣污染防制行動方案) details specific control and prevention measures for every air pollution source. It covers air pollution reduction for state-run and large-scale enterprises, boiler controls, controls of oily smokes produced by the food and beverage industry, amelioration of problems caused by burning of joss paper, controls on airborne dust from construction and dumping sites, and reuse and treatment of agricultural straw and orchard branches. Other areas include controls on airborne dust from riverbanks, subsidization for replacing large diesel vehicles of phases 1 to 3, improvement of two-stroke motorcycles, promotion of electric produce shipping vehicles, port transportation controls, new traffic control measures, transport vehicle electrification, subsidization or promotion for installation of air-purifying walls, and so on.

The EPA has set various indicative policy goals, such as cutting in half the number of days in 2019 on which air quality readings reach red alert levels (unhealthy for all groups) and by 2030, total electrification of newly purchased vehicles for government use and buses for public transportation. They also include total sales bans on gasoline-powered motorcycles by 2035 and gasoline-powered vehicles by 2040. Via the aforementioned control and prevention measures, it is expected that, by the end of 2019, the annual average $PM_{2.5}$ concentration will be reduced from 22μg/m^3 (in 2015) to 18μg/m^3, and the yearly number of red alert days reported by air quality monitoring stations be reduced from 997 station/days (in



Evaluating standards, formulating plans and adding new control items

2015) to 499 station-days.

In 2018, the average $PM_{2.5}$ concentration in Taiwan was 17.5μg/m^3, lower than the 18.34μg/m^3 in 2017, the 20.0μg/m^3 in 2016, and the 22.0μg/m^3 in 2015. Also, as of 2018, there had been 310 station-days of air quality red alerts, also lower than the 483 stations-days in 2017 and the 874 station-days in 2016.

Results of the overall *Air Pollution Control Action Plan* as of the end of January 2019 include assisting 834 industrial boilers, and assisting 653 commercial boilers. Also, 6,365 food and beverage enterprises were installed with oily smoke filtration equipment, 30,302 metric tons of joss paper burning was controlled, and 240,983 kilometers of riverways were cleaned up after the flooding period to control dust. Moreover, 21,758 diesel vehicles of Phases 1 and 2 were phased out, and 1,062 diesel vehicles of Phase 3 as well as 723,070 two-stroke motorcycles underwent pollution control. The EPA will keep implementing the plan with regional environmental bureaus in order to improve air quality in autumn and winter.

2019 Goals

1. The EPA will continue to analyze air quality, update the air pollutant emission inventory, develop model simulation tools, analyze pollution sources and causes, and enhance planning of air quality management strategies.
2. Total quantity control of air pollutants will continue, as well as management of targeted stationary sources, with emission standards evaluated and tightened to ensure proper implementation of various measures.
3. The boiler improvement strategy will continue, including establishing a promotion platform, organizing seminars, providing boiler subsidies, removing obstacles for phase-out, and speeding up phase-out of high-polluting boilers.
4. The EPA's 2019 goals for improving large diesel vehicles under Phases 1 to 3 are to phase out 6,000 vehicles and lower the pollution of 7,000 vehicles, and reduce pollution from or phase out one million two-stroke motorcycles. Other measures to cut down emissions of mobile pollution sources include designating air quality maintenance zones that prohibit or limit entrance of high-polluting vehicles, as well as promoting low-polluting transit systems and clean fuels.
5. Controls for airborne dust from riverbanks will be properly carried out. The EPA aims to reduce 1,110 metric tons of total suspended particulate (TSP) and 320 metric tons of particulate matter. Ten acres of exposed surfaces will be turned into green land, which is expected to absorb a total of 75 metric tons of sulfur dioxide and 3.8 metric tons of nitrogen dioxide and also reduce five metric tons of particulate matter.

Air

Air Quality Red Alert Days Halved Ahead of Schedule

With the joint effort between central and local governments, air quality in Taiwan improved significantly in 2018. Statistics show a 35.8% decrease in red alert days from 2015 to 2018, meaning that the EPA has accomplished its phased target of halving the number of red alerts ahead of schedule.

According to the air quality monitoring results of 2018 based on the Air Quality Index (AQI), the number of red alerts set off over the years has gradually fallen from 997 in 2015, 898 in 2016, 483 in 2017 and 310 in 2018. Comparing 2018 red alerts to 2015 and 2017, the numbers have decreased by 68.8% and 35.8%, respectively.

The EPA points out that the cities/counties with the best reductions of red alerts are Taichung City, Nantou County, Kinmen County, Pingtung County and Yunlin County, with reduction rates ranging from 49% to 75%. Additionally, a total of 23 monitoring stations across Taiwan issued red alerts on 3 March 2018 because of poor diffusion of air pollutants due to the wind direction combined with fireworks launched on Lantern Festival. Taipei City and New Taipei City alone registered 12 red alert readings on that day.

Monitoring data also shows that air quality is often affected by wind factors, such as diminished wind speed for a long period and

weakened wind strength. For instance, multiple occurrences of changes in wind direction severely worsened the air pollution in 2018 due to air pollutants that can be carried along air currents from other cities, especially when the wind starts blowing in an easterly direction. The EPA states that Taiwan's air quality usually worsens during fall and winter months because of prevailing weather conditions. Therefore, to prevent further air quality deterioration, both central and local governments are required to participate in and take contingency measures based on the *Regulations Governing Emergency Measures to Prevent Severely Deteriorated Air Quality* (空氣品質嚴重惡化緊急防制辦法). When an air pollution episode is predicted, depending on the pollution level, an alert must be released and preventive actions are to be implemented, such as cutting down pollutant emissions from factories, upwind sources and local power plants. If air quality continues to degrade, different levels of emergency response and safety measures are required to be carried out depending on the pollution concentration levels. As the pollution concentrations worsen, the extent of controlled targets and measures also widen, to include both public and private premises.

Chemicals

Amendments Announced by President Tsai for the *Toxic Chemical Substances Control Act* with Seven Focuses

The revisions of the *Toxic Chemical Substances Control Act* (毒性化學物質管理法) was brought up as a response to the government's five food source safeguard control strategies and chemical substances safety policy. After the revisions passed the third reading in the Legislative Yuan, the Act was renamed "the *Toxic and Concerned Chemical Substances Control Act* (毒性及關注化學物質管理法)" and adopted after President Tsai Ing-wen's announcement on 16 January 2019. It will start a significant new era in chemical substance controls in Taiwan.

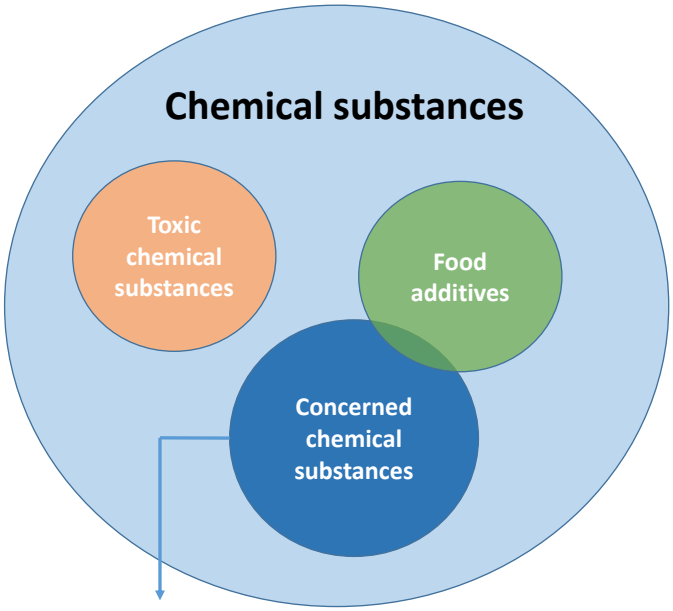
Inclusion of food safety to address major public concerns

The EPA stated that, the *Toxic Chemical Substances Control Act* has been through six amendments. The latest amendment in 2013 added a chemical substance registration system, which gradually improved the relevant chemical substance control regulations in Taiwan. However, problems with food safety and source control of chemical substances surfaced, and incidents involving toxic chemicals occurred in recent years. In response to public concern, the EPA began reviewing and revising the Act.

The EPA explained that the revisions took references from the concept of the UN's Strategic Approach to International Chemicals Management (SAICM). Any management loopholes have been closed by coordinating obligations and regulations of each of the responsible competent authorities. The seven highlights include adding "concerned chemical substances"; adding a separate chapter devoted to "accident prevention and emergency response"; holding the "National Chemical Substances Control Meeting"; setting up specific funds; shortening the time required for enterprises to notify authorities of accidents; banning online purchase of toxic and concerned chemical substances listed for control; and adding clauses regarding whistleblowers and pursuit of illegal gains. Expansion of controlled substances, strengthening of accident management, improvement of coordinating mechanisms, long-term financial considerations, and other issues of public concern have all been thoroughly improved upon. The details are as follows:

Adding "concerned chemical substances" with more thorough evaluations and controls

1. "Concerned chemical substances" added: Chemical substances, besides toxic chemicals, are evaluated to see if they should be listed for further controls, as part of an effort to expand the scope of chemical substance source controls. Based on their different characteristics, chemical substances are also placed under tiered management, such as labeling for the basic category, as well as mandatory application for approvals from competent authorities and mandatory



- Screening and evaluating chemical substances, placing them under tiered management
- Enhancing the management intensity to control the flows of chemical substances

The revisions of the Toxic Chemical Substances Control Act include adding "concerned chemical substances"

registration of records of use. Concerning accident response, enterprises are required to submit risk prevention and response plans, have response equipment ready, and are also obligated to notify authorities and act in response when accidents occur.

2. A separate chapter devoted to "accident prevention and emergency response" has been added: During the revision review, legislators specifically paid attention to accident prevention and emergency response. Therefore, a separate chapter was added to require enterprises to submit their risk prevention and response plans to regional governments for reference. These plans are to be put online for public inquiry. A certification system was put in place for professional responder training and responding units, which focuses on prevention and preparation during normal days and providing onsite disaster relief at times of accidents to prevent harm to people and the environment.

Holding the inter-ministerial "National Chemical Substances Control Meeting" convened by the Premier through evaluations and controls

3. Organizing the "National Chemical Substances Control Meeting": Since responsibilities for chemical substances control in Taiwan are distributed among different ministries, the EPA has worked to expand source management while coordinating with all relevant ministries. Aligning with the newly added meeting system, the premier is to convene meetings to conduct interdepartmental coordination for risk assessment and control measures for chemical substances so as to produce better results.

Setting up funds to collect "chemical substances operation fees" from enterprises

4. Setting up funds: The EPA is to collect operation fees from those handling toxic and concerned chemical substances and use the fees to set up the toxic substance and chemical substance funds. The EPA specified that the establishment of the funds helps with source management of chemical substances and helps enterprises cut the costs of accident response.
5. Shortening the time required for enterprises to give notice of occurrence of accidents: The accident notification time required for enterprises is shortened from one hour to 30 minutes. Circumstances requiring notification have also been adjusted, since in the past enterprises were only required to provide notification after pollution caused by an accident had been confirmed to affect the environment outside a factory. Now, notification is mandatory if pollutants are likely to affect the environment outside a factory, which largely increases the responsibility of enterprises as well as the response time for regional governments to act. Moreover, regarding stipulations on informing firefighting units about the layouts of factory equipment, the EPA elevated these regulations from the level of enforcement rules to that of enabling statute.
6. Banning online sales of toxic and concerned chemical substances listed for control: Sales and transfers of toxic and concerned chemical substances that are listed for control are forbidden if

conducted by mail order, online purchase, or in any forms where those involved in the transaction cannot be identified. The EPA noted that there are existing penalties and regulations for sellers and buyers violating the ban, but the revisions specifically target online platforms. If not exercising due care and hence referring both sellers and buyers without permits to conduct sales, operators of said platforms will be fined between NT$60,000 and NT$300,000, with every lapse subject to separate penalties.

7. Adding clauses concerning pursuit of illegal gains and whistleblowers: Those violating regulations under the Act will be pursued to return illegal gains on top of the original fines. Also, the EPA set up a system for reporting rewards and to encourage whistleblowers to report violations. Moreover, factories are to disclose data such as permits and registrations for public supervision.

Outlook

The EPA emphasized that the revisions include setting up funds to expand chemical substances control, helping enterprises lower operational risks, and ensuring environmental safety and sustainability. As for collecting chemical substances operation fees from enterprises, those characterized as potentially involving "high risks, large affected areas, and consistently in large quantity" will be the first group subject to fee collection.

Waste

Promotion of Reutilization of Livestock Waste Sediment and Fluid

To reach various livestock industry environmental goals, such as improving river quality, air quality, and circular economy objectives, the EPA has been actively promoting the use of sediment and fluid from livestock manure for farmland fertilization. Several annual goals have been achieved from 2016 to 2018. They include permission obtained from 350 farms to use manure as fertilizer, with an annual amount of 1.5 million metric tons, and a 5% reutilization rate for livestock industry sediment and fluid.

Containing a high level of organic matters, nitrogen, and phosphorus, livestock manure is well-suited as a fertilizer for crops. Sediment and fluid derived from anaerobic fermentation can be reutilized to fertilize farmland. Otherwise, manure discharged into rivers becomes misplaced resources. In 2015, the EPA began amending relevant regulations for the use of livestock waste sediment and fluid as farmland fertilizer.

Evaluation and revisions on a rolling basis to set up reutilization treatment goals

1. Post-revision planning and implementation

For relevant regulations, the EPA revised the *Water Pollution Control Measures and Test Reporting Management Regulations* (水污染防治措施及檢測申報管理辦法) on 24 November 2015. Ten articles were added specifically as the legal base for use of livestock waste sediment and fluid for farmland fertilization. Other amendments announced on 28 October 2016 include broadening the substances eligible for reutilization, simplifying processes by cutting test items from 19 down to 11, and making revisions to allow more flexibility of management. Meanwhile, evaluations were carried out consistently on a rolling basis.

A target has been set for the ratio of livestock industry wastewater treated for reutilization, in order to expedite implementation as well as expand the promotion of livestock manure reutilization. On 27 December 2017, the EPA announced the amended *Water Pollution Control Measures and Test Reporting Management Regulations*. At least 10% of the livestock industry's total wastewater is to be treated for reutilization. This entails reusing livestock waste sediment and fluid as farmland fertilizer, based *on the Regulations Governing the Use of Recycled Agricultural Wastes* (農業事業廢棄物再利用管理辦法). It also allows use for crop irrigation when livestock waste sediment and fluid meet the *Effluent Standards* (放流水標準). For existing pig farms with 2,000 pigs or more, the ratio of wastewater treatment is to be 5% within five years and 10% within 10 years. For farms with 20 to 2,000 pigs, the ratio is to be 5% within 8 years and 10% in 12 years.

Livestock waste sediment and fluid reutilization goals attained

The EPA has been actively promoting the use of livestock waste sediment and fluid for farmland fertilization. From 2016 to 31 December 2018, permission has been obtained from a total of 490 livestock farms to use livestock waste sediment and fluid as farmland fertilizer. A total of 1.61 million metric tons of fertilizer was applied, for a reutilization ratio of 5.58%. These results have surpassed the yearly goals set for 2018, which were to obtain permission from 350 livestock farms, apply 1.5 million metric tons of fertilizer, and reach 5% reutilization.

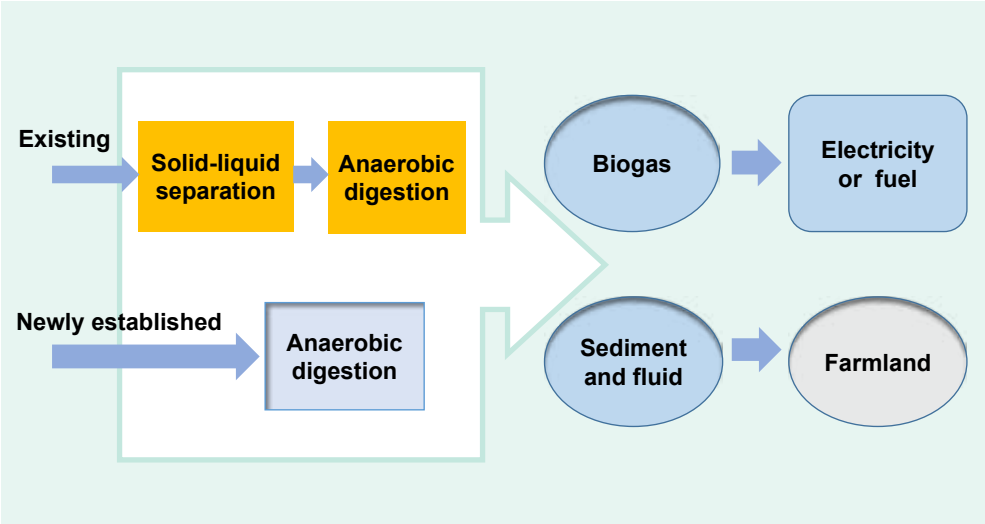
Besides the use of livestock waste sediment and fluid as farmland fertilizer, livestock manure reutilization efforts also resulted in waste reuse in 74 agricultural enterprise cases, while there were 49 cases of sediment and fluid compliant with the *Effluent Standards* used for crop irrigation. Combining the three reutilization methods above, 613 farms adopted manure reutilization practices, 1,933 hectares of farmland had reutilized resources applied on them, and 338 metric tons of treated wastewater were used for irrigation. Meanwhile, 20,803 metric tons of organic pollutants were reduced for the year, equivalent to the amount of pollution processed by 380 gravel contact oxidation treatment plants with a daily capacity of 10,000 metric tons, whose total construction costs would be approximately NT$38 billion. The livestock waste sediment and fluid used as fertilizers contained 632 metric tons of nitrogen, equivalent to 97,437 bags of Taifer's #5 Organic Compound Fertilizer.

Through manure reutilization, the livestock industry can save NT$150 million in utility costs for aeration treatment for phase three wastewater treatment and NT$18.95 million in water pollution prevention costs. Farmers can save NT$28.62 million in fertilizer costs. Additionally, rivers get cleaned up and odors are reduced. Stakeholders, participants, and the environment all benefit.

Promotion conducted via demonstrations in five townships in 2019

To promote reutilization of livestock manure, the EPA began a new project in 2018, choosing Wanluan in Pingtung and Mailiao in Yunlin--both with a high concentration of livestock industry, as demonstration townships. As many as 86 visits were paid to local livestock enterprises, production and marketing cooperatives, or relevant institutes, and eight discussions were held with local key figures. Via the above, the EPA has highlighted this matter to enterprises and asked that they comply with the policy in order to increase the reutilization ratio in the demonstration townships.

By the end of December 2018, the EPA had assisted 11 farms in Wanluan with reutilizing livestock waste for farmland fertilization or applying to use effluent for irrigation, aside from the existing nine farms granting permission for reutilization for farmland fertilization or crop irrigation with effluent. In Mailiao, 10 farms have newly become eligible for reutilization, raising the total to 12 eligible farms. With these initial results, the EPA will expand the demonstration scale by adding up to five townships, hoping to further raise the awareness of resource



Livestock waste sediment and fluid reutilization

Sediment and fluid derived from anaerobic fermentation can be reutilized to fertilize farmland.

reutilization.

Subsidization for collection, transporting, and irrigation vehicles and farmland storage tanks for more flexible irrigation

Small-scale farms lack wastewater treatment technology and manpower. In light of this, the EPA has been subsidizing local governments to set up reutilization facilities to treat the manure in these farms, as well as assist large farms to help smaller ones or to centralize manure treatment. So far local governments have carried out six projects with subsidies, collecting and transporting manure of 45,232 animals from 21 farms with a 75% reutilization rate. Implementation reached 40% in Hualien County and Taoyuan City and 20% for the two projects in Pingtung County. Yunlin County is in the process of contract negotiation for its two projects.

To help establish irrigation systems that have more flexible operation, the EPA has subsidized local governments to purchase manure-collecting and transporting vehicles, irrigation vehicles or machinery, and farmland storage tanks. To date Kaohsiung City, Taichung City, Yunlin County, Pingtung County, and Hualien County have been approved for subsidies, enabling the purchase of 23 vehicles for collecting and transporting manure and irrigation as well as 67 farmland storage tanks.

Moreover, an online platform was enhanced in 2018 to meet the needs of farms and ranches by providing local governments' current status on promoting reutilization in 2018. Both ranchers and farmers can also enter the online platform to register their own data on sediment and fluid production and farmland irrigation, enabling local governments to help coordinate and match potential suppliers and those in need of irrigation (http://epafarm.dsmynas.net/farm/index.php).

Continual supply of future incentives, subsidies and services

In the future, the EPA will continue its efforts in encouraging more livestock enterprises to participate in manure reutilization with more incentives, subsidies, and services. They include assisting local governments or commissioning pig farmers' associations to hold seminars and visiting tours. Farmers will be assisted to test contents in sediment and fluid as well as soil and groundwater quality, match farmlands potentially in need of irrigation, and apply for reutilization projects. Subsidies will be provided to large farms to help smaller ones, for centralized collecting and treatment, and for purchase of collecting and transporting vehicles, irrigating vehicles or machinery, and farmland storage tanks. Existing projects such as demonstration townships will also continue to be carried out.

For any questions concerning sediment and fluid reutilization projects, enterprises are welcome to inquire with local environmental protection bureaus or go to the EPA's Water Quality Protection Webpage (https://water.epa.gov.tw/Page1_3.aspx).

Inspection

Central and Local Governments Settle on Short-, Mid-, and Long-Term Food Waste Plans Against Swine Flu

In an attempt to prevent the spread of African swine flu, the EPA invited regional environmental bureaus to convene a meeting on 15 January 2019. The attendees examined food waste production amounts and management methods, and then formulated short-, mid-, and long-term plans for food waste disposal and treatment.

Regional environmental bureaus that participated in the meeting came from 11 cities and counties. The EPA stated that the bureaus will submit to the Council of Agriculture (COA) formal documents to ask for extensions for pig farms within their jurisdictions that have not yet been inspected to receive permission to use their high-temperature steam cookers to process food waste. During this period, county and city environmental bureaus are required by the EPA to make sure that enterprises already able to steam cook food waste reapply for qualification. Regional environmental units will also intensify inspections by working with agricultural and administrative

departments, which will assist pig farms without steam cooking facilities to use animal feed instead.

The EPA has set up plans to enhance short-, mid-, and long-term capacity to process food waste. In the short term, regional governments are to be subsidized to install emergency processing facilities, such as shredding, drying, and pulping equipment and fast fermentation treatment modules, the cost of which is NT$450 million. County and city governments are urged to submit applications for purchasing equipment.

Mid-term goals include strengthening processing capacity of public regional composting plants, assisting public sewage treatment plants to dispose food waste through anaerobic digestion, and assisting large civil enterprises to set up fast fermentation equipment themselves.

The long-term plan for food waste will focus on bioenergy. Taichung City completed the first phase of disposal facility construction in October 2018 (with a daily capacity of 80 metric tons), and construction of another one in Taoyuan City is expected to be complete by July 2021. Disposal facilities in Tainan City, Yilan County, Taipei City, and Kaohsiung City are currently underway, and when completed are expected to treat 800 metric tons of household food waste every day.

Lastly, the EPA emphasized that the fight against swine flu will need all citizens and government agencies to contribute together and thus requested cooperation from regional environmental protection units.

1. If pig farms in respective jurisdictions switch from food waste to animal feeds, producing counties or cities should be informed to respond early and track flows of food waste.
2. Regional governments are asked to work with private composting plants.
3. Food waste sources with production capacity of over one metric ton should be assisted to set up their own treatment equipment themselves.
4. As Chinese New Year drew near, regional governments were to put more effort on promoting to the public ideas of cherishing food, shaking off excess water from food waste, and making holiday meal plans that responsibly manage excess food.
5. Those that plan to send their own food waste to incinerators for disposal will receive subsidies for forklifts needed for operations.
6. Each county and city is to immediately propose subsidies needed to purchase drying and shredding facilities and highly-effective composting modules in the short term. For the mid- and long-term, county and city governments will help enable anaerobic digestion equipment in public sewage treatment plants to dispose of and treat food waste, as well as subsidize establishment of regional composting sites and bioenergy plants.

Water Penalties Intensified for *Water Pollution Control Act* Violations

On 16 January 2019, the EPA announced revisions to the *Regulations of Penalties and Amount of Fines for Violations of the Water Pollution Control Act* (違反水污染防治法罰鍰額度裁罰準則). The revisions deal with determination methods for penalty points, taking into account the number of *Water Pollution Control Act* regulations an action violates, as well as clarifying severe forms of violations, violation scales and effects, acts of illegal dilution, and penalty intensification and reduction.

The EPA noted that the revisions and reevaluations were done in response to the 13 June 2018 revision of the *Water Pollution Control Act*. The goal was to remove competent authorities' doubts when they determine violations and issue penalties based on the Act, and also to align with major bylaw amendments of recent years.

Amendments specify provisions of violations and the points of evaluation. Moreover, there have been many incidents of fuels leaked into water bodies, yet the scales of these incidents were not clearly determined, leading to severe violations that received light penalties. Currently fines

are too light for severe violations committed by public sewage system operators and there are also targets not covered by the *Water Pollution Control Act*. Illegal activities are difficult to deter, so there was a need to strengthen and add provisions on violations and the penalty calculating basis. The revisions to penalizing principles were an opportunity for reevaluation to strengthen execution powers and harshly punish violations of the Act to safeguard the quality of rivers and surface water bodies.

Major focuses of the revisions are as follows:

1. Severe violations under the *Water Pollution Control Act* are clearly specified and are punishable by the heaviest fines according to the regulations.
2. Provisions of violations and evaluation points have been added and revised in response to the amendments of the *Water Pollution Control Act* and relevant bylaws.
3. Article 28 Paragraph 1 of the *Water Pollution Control Act* is revised. Scales of violations are to be determined in the same way to determine violations involving leaked fuels, wastewater, raw ingredients, chemical agents, or other pollutants.
4. Revisions are made regarding scales of construction sites as well as to provisions and evaluation points for not complying with regulations concerning wastewater runoff controls.
5. Revisions are made regarding collection targets for water pollution control fees for enterprises and sewage systems, as well as determination of accumulated days of overdue fees. Also, determination of fines for household water pollution prevention fees have been deleted.
6. Amendments were made to the determination of accumulated days for those who are obligated to declare but fail to do so, as well as for those who have received notification of deadlines to make declarations but fail to do so on time.
7. Revisions were made to the penalty units for public sewage systems and enterprises not under the control of the *Water Pollution Control Act*.

Water

Implementation Results of Heavy Metal Controls for Irrigation Water Sources

To improve the quality of irrigation water sources, the EPA began assisting Taoyuan City, Changhua County and Taichung City in implementing total quantity effluent control for specific agricultural lands from 2015. By the end of 2018, a total of nine cities/counties had completed the establishment of seven total quantity control zones and tightened the effluent standards in five of them. The control zones and standards mainly focus on heavy metals that have serious effects on human health.

Food safety has become a major concern to the general public in Taiwan. Since farmlands lacked independent irrigation and drainage canals in the past, irrigation water sources were polluted by the excessive levels of heavy metals in wastewater discharged from nearby factories. Because of the heavy metals accumulated in the soil, some rice has been found to be contaminated by an excessive amount of heavy metals, such as cadmium and copper. Heavy metal pollution in farmlands has affected Taiwan's agricultural and economic development and environmental resources, and poses serious threats to human health.

The Council of Agriculture (COA) started implementing the Irrigation Water Quality Protection Plan on 31 October 2013, which restricts in stages different types of enterprises from discharging wastewater into irrigation systems. Meanwhile, the EPA commenced to formulate improvement measures for irrigation water quality, which mainly target contaminated rivers, drainage systems and irrigation canals. The measures aim to prevent pollution at its source and the key focuses include: assisting local governments in designating total quantity effluent control zones, tightening industrial effluent standards, and imposing heavier fines for violations of the *Water Pollution Control Act*.

After establishing total quantity controls, enterprises that discharge heavy metals will be prohibited

in areas that are classified as a Category 1 Total Quantity Effluent Control Zone. For existing enterprises, discharge standards will become stricter. Furthermore, local environmental protection bureaus enhanced effluent inspections and sampling frequency by establishing more water quality monitoring stations. In addition, to reduce effluent discharge from existing enterprises and prevent future pollution, local environmental protection bureaus also examined controlled enterprises to improve their wastewater treatment capacity and reduce wastewater effluent. Assistance was also provided for the changing of discharge canals and for relocation to industrial parks for integrated management.

In addition, the EPA also revised the *Effluent Standards* on 25 December 2017. The revisions tightened the maximum values of nine types of heavy metals (including copper and lead) in the effluent discharged by specific enterprises and sewage systems. Moreover, if enterprises commit serious violations or have been ordered to suspend operations, their discharge permits will be revoked and they will not be granted one in the next three years, which is in effect termination of their businesses.

After total quantity effluent control zones were established in 2016, three of the control zones achieved a passing rate of 99% on the copper concentration in irrigation water in 2018. The results showed that irrigation water quality has improved significantly after the establishment of the control zones.

To further improve irrigation water quality, the EPA will continue implementing total quantity control and conduct rolling reviews on control measures and reduction progress. The EPA will also work with the COA, local environmental bureaus and the Department of Irrigation and Engineering to safeguard Taiwan's farmlands and the safety of agricultural products.

Chemicals

Government Agencies Join Forces to Safeguard Food Safety

To ensure food safety during the Lunar New Year holiday, the EPA joined forces with the Ministry of Health and Welfare (MOHW) and the Council of Agriculture (COA) to monitor food safety. The EPA also reminds the public to only purchase domestic agricultural and fishery products that have clear origin labels and official certifications.

Food safety has always been a key focus of government policies. The EPA has therefore been working with different ministries to promote the "Five Rings of Food Safety" Policy. The five rings include: strengthening food source control, reestablishing a production-management food tracing system, increasing inspection capabilities, imposing harsher penalties, and encouraging public oversight. Through inter-ministerial cooperation, the five-ring policy is executed based on the responsibilities of each department. The EPA's responsibility is to carry out at-source safety control to prevent chemicals that pose potential health risks from contaminating the food supply chain. The MOHW will enhance the sampling and inspection of agricultural products before they arrive at markets, and the COA will be in charge of food inspection in markets.

The EPA has experienced several occasions where toxic chemicals were found in food products in the past, such as the Rhodamine B found in glutinous rice, metanil yellow and dimethyl yellow in dried tofu, maleic anhydride in starch and Sudan Red G in salted duck yolks for mooncakes. Therefore, to prevent toxic chemical substance contamination, the EPA has divided the control measures into two categories: policy making and source control.

To support the five ring policy, the EPA banned the use of 13 harmful chemical substances (e.g., Rhodamine B) in food on 26 September 2017. Companies that use these 13 substances in their products are stipulated to submit their operation reports regularly, clearly label all containers/packaging and handling premises, prepare material safety data sheets (MSDS), and obtain approval documents. Moreover, the EPA declared on 28 June 2018

another 14 chemicals, including Sudan Red, as toxic chemical substances that are illegal to use in food.

Companies that manufacture products containing these 14 substances shall start reporting operations from 1 January 2019. Additionally, all containers/packaging and handling premises have to be labeled and material safety sheets completed by 1 July 2019. Companies must also acquire approval documents by 1 January 2020, which will be reviewed by Lunar New Year. To ensure the management and tracking of the chemical substances, approval documents are not to be used by other parties. The EPA has completed reviewing the operation reports and assisted enterprises to meet the requirements by Lunar New Year.

The EPA inspected over 3,000 raw chemical material enterprises in both 2017 and 2018. It will continue to investigate more companies in 2019. Also, the EPA has been working with health and agricultural agencies to conduct joint inspections around special holidays and did not find any banned toxic chemicals in food products in 2018.

To ensure food safety, the MOHW conducted extensive food samplings and inspections in supermarkets to get ready for Lunar New Year, which resulted in a 98% pass rate. The inspections targeted food manufacturers, sellers and restaurant operators, and encompassed a wide range of safety factors, including: operation registration, hygiene conditions, product labeling, and random testing for illegal food colorings. The COA concentrated in monitoring drug residues in seafood and inspecting meat quality, as meat and poultry are common dishes on Lunar New Year tables. The COA will also continue to promote the tracking system for agricultural products.

Amendments to the *Toxic Chemical Substances Control Act* (毒性化學物質管理法) were passed by the Legislative Yuan on 21 December 2018 and were renamed as the *Toxic and Concerned Chemical Substances Control Act* (毒性及關注化學物質管理法) by the president on 16 January 2019. The *Toxic and Concerned Chemical Substances Control Act* added new regulations on concerned chemical substances and expand the list of controlled substances to gradually strengthen the management of chemicals that are harmful to human health and the environment.

The EPA joined forces with the Ministry of Health and Welfare (MOHW) and the Council of Agriculture (COA) to monitor food safety.

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