



Environment

ISSN:2615 - 9600
English Edition I - 2020

VIETNAM ENVIRONMENT ADMINISTRATION MAGAZINE (VEM)

Website: tapchimoitruong.vn

ASSESSMENT OF URBAN AIR POLLUTION IN VIỆT NAM AND SUGGESTIONS FOR IMPROVEMENTS

Environmental impact assessment, environmental
licenses- significant steps in administrative reform
in the Draft Law on Environmental Protection (revised)





EDITORIAL COUNCIL

Nguyễn Văn Tài
(Chairman)

Prof. Dr. Nguyễn Việt Anh
Prof. Dr. Đặng Kim Chi
Assoc. Prof. Dr. Nguyễn Thế Chinh
Prof. Dr. Phạm Ngọc Đăng
Dr. Nguyễn Thế Đồng
Assoc. Prof. Dr. Lê Thu Hoa
Prof. Dr. Đặng Huy Huỳnh
Assoc. Prof. Dr. Phạm Văn Lợi
Assoc. Prof. Dr. Phạm Trung Lương
Prof. Dr. Nguyễn Văn Phước
Dr. Nguyễn Ngọc Sinh
Assoc. Prof. Dr. Lê Kế Sơn
Assoc. Prof. Dr. Nguyễn Danh Sơn
Assoc. Prof. Dr. Trương Mạnh Tiến
Dr. Hoàng Dương Tùng
Assoc. Prof. Dr. Trịnh Văn Tuyên

PERSON IN CHARGE OF ENVIRONMENT MAGAZINE

Nguyễn Văn Thùy
Tel: (024) 61281438

OFFICE

• Hanoi:

Floor 7, lot E2, Duong Dinh Nghe Str.,
Cau Giay Dist. Hanoi

Managing: (024) 66569135

Editorial: (024) 61281446

Fax: (024) 39412053

Email: tapchimoitruongtcm@vea.gov.vn

<http://www.tapchimoitruong.vn>

• Ho Chi Minh City:

A 907, 9th floor - MONRE's office complex,
No. 200 - Ly Chinh Thang Street,
9 ward, 3 district, Ho Chi Minh city

Tel: (028) 66814471; Fax: (028) 62676875

PUBLICATION PERMIT

Nº 1347/GP-BTTTT - Date 23/8/2011

Photo on the cover page:

Đà Nẵng City

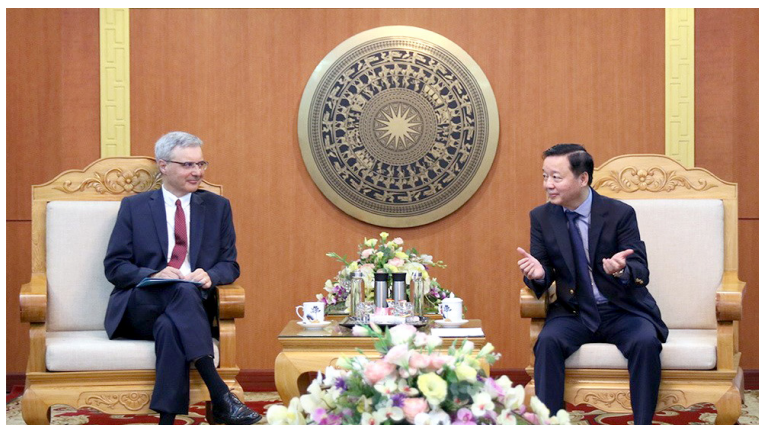
Photo by: VNA

Design: Hoàng Đan

English edition I/2020

Price: 30.000VND

CONTENTS



EVENTS & ACTIVITIES

- [04] MAI HƯƠNG: Việt Nam - France tighten environmental protection efforts
- [05] BÙI HẰNG: The Memorandum of Understanding signed on plastic waste management, circular economy development
- [06] THU HẰNG: Second meeting between Việt Nam, Japan on waste management and 3R principles
- [07] TRÀ MY: MONRE project to develop an unified and modern air monitoring network meeting international integration requirement and trend



LAW & POLICY

- [08] NGUYỄN VĂN TÀI: Breakthrough on policies and laws and activeness in the task of the management and environmental protection
- [11] LÊ THỊ MINH ÁNH: Overview of Circular No. 25/2019/TT-BTNMT guiding in details a number of articles of Decree No. 40/2019/ND-CP

Comment on revised Law on Environmental Protection

- [13] MAI THẾ TOÀN: Environmental impact assessment, environmental licenses – Significant steps in administrative reform in the Draft Law on Environmental protection (revised)
- [17] TRẦN VĂN MIẾU: Recommendations for the Draft Law on Environmental Protection (revised) to enhance the roles and responsibilities of mass organizations and residential communities
- [19] NGUYỄN THỊ HUỆ: Recommendations on improvement of provisions on economic instruments in the Draft Law revising and supplementing some articles of the Law on environmental protection
- [22] VŨ THỊ DUYÊN THỦY: Some measures to finalize the regulations on waste management in the Law on Environmental Protection





VIEW EXCHANGE

- [25] PHẠM NGỌC ĐĂNG: Assessment of urban air pollution in Việt Nam and suggestion for improvements
- [29] ĐỖ HOÀNG: Air pollution causes “huge” reduction in intelligence
- [30] NGUYỄN THỊ PHƯƠNG NGÂN: Covid-19: A warning for illegal wildlife poaching and trade
- [31] PHẠM TUYỀN - ĐẶNG SƠN HẢI: Bà Rịa - Vũng Tàu Province gradually converts its plan of domestic waste treatment from landfill to incineration and recycling
- 31] HƯƠNG ĐỖ: Proper waste control in Hạ Lôi Village to curb the COVID-19 spread
- [33] ĐỨC ANH: What are businesses doing to turn off the plastic tap?



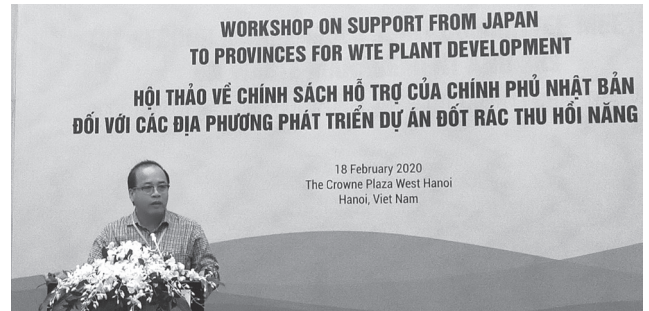
GREEN SOLUTION & TECHNOLOGY

- [35] VÂN HÙNG VỸ: Software for management and disclosure of automatic and continuous environment monitoring data
- [40] NGUYỄN TRUNG THÀNH: Surveying the public perception of the current situation of alum-iron waste in Tri Tôn District, An Giang Province
- [44] PHƯƠNG TÂM: Đà Nẵng Quảng Ngãi to spend 120,5 million USD on wastewater treatment system
- [45] ĐỨC SINH: Quảng Ngãi to spend 120,5 million USD on wastewater treatment system
- [45] CHÂU LONG: Hà Nội to build 70 more air monitoring stations



GREEN COOPERATION

- [46] TRẦN TÂN: Đà Nẵng to host ASEAN environmental meetings
- [46] CHÍ VIỄN: WWF - Việt Nam, GreenViet work to protect endangered primates
- [47] PHƯƠNG LINH: Japan finances Hồ Chí Minh City's upgrade of sewer system
- [48] NGUYỄN HẰNG: World Bank's new strategy helps Việt Nam better utilise solar power



GREEN GROWTH & DEVELOPMENT

- [49] ĐỖ HOÀNG: Fostering eco-industrial parks in Việt Nam
- [51] HỒNG NHUNG: Towards a pollution free world: 7 steps to circularity
- [54] HOÀNG ĐÀN: UNEP, IUCN to launch new € 20 million program on ecosystem-based adaptation
- [55] HỒNG GẮM: SCG: Resource optimisation, young people training keys to circular economy



NATURE & ENVIRONMENT OF VIETNAM

- [57] GIA LINH: Thừa Thiên - Huế takes measures to protect wild birds
- [57] TRẦN TÂN: Rare primate returned to nature in Tuyên Quang
- [58] XUÂN THẮNG: The element of Ecologde make the attraction for tourism
- 59] HIỀN NHÂM: Green tourism in Yên Đức village





Việt Nam - France tighten environmental protection efforts



▲ Minister of Natural Resources and Environment Trần Hồng Hà (right) met the French Ambassador Nicolas Warnery

On March 2nd, 2020 Minister of Natural Resources and Environment Trần Hồng Hà met the French working group led by Ambassador Nicolas Warnery. Attending the meeting were representatives of the Vietnam Environment Administration (VEA), the Vietnam Meteorological and Hydrological Administration, the Department of Climate Change, the Institute of Meteorology, Hydrology and Climate Change, the Department of International Co-operation and the Ministry Office.

Welcoming the Ambassador Nicolas Warnery to Ministry of Natural Resources and Environment (MONRE), Minister Trần Hồng Hà said the Ambassador, the French Embassy and the French Development Agency (AFD) had made great efforts to support the Ministry with its work. Positive outcomes had been made in dealing with climate change and implementing the Paris Agreement, thanks to the assistance of the French Government and the Ministry.

The Ambassador Nicolas Warnery said France would always partner with Việt Nam in environmental protection. Co-operation would give priority to projects and tasks on policy making, anti-plastic campaign, air pollution control and adaptation to climate change, he said.

The Ambassador added France was willing to share its legal framework with Việt Nam and the Ministry of Finance so that Vietnamese agencies would be able to improve their law enforcement and meet the international standards, especially when Việt Nam is integrating and has agreements with other nations in the world and the European Union.

Speaking highly of Việt Nam's commitment and status in ASEAN, Mr. Nicolas Warnery expected the country to keep supporting environmental protection and climate change projects.

In response, Minister Trần Hồng Hà said the Vietnamese Government had issued national action plans on marine plastic waste and climate change adaptation. Việt Nam pledged to join regional and global activities to achieve environmental goals, he said.

The Minister also highly appreciated France's comments for Việt Nam's Draft Law on Environmental Protection (revised). Based on the feedback of the global community, the MONRE would submit a new draft that contains activities on environmental protection and management and climate change adaptation. The Ministry also hoped to foster relations with French agencies and organizations in the fields of land management, science and technology, policy making and work management.

There was still room to bolster a bilateral relation between Việt Nam and France in environmental protection, the Minister said, adding the Ambassador, during his term, would help tighten the two-side bond and assist French businesses and organizations to operate in Việt Nam.

MAI HƯƠNG (Monre source)



The Memorandum of Understanding signed on plastic waste management, circular economy development



▲ Deputy Minister of Natural Resources and Environment Võ Tuấn Nhân (second, left) signs the Memorandum of Understanding with three companies

The Ministry of Natural Resources and Environment (MONRE) on February 19th, 2020 signed a Memorandum of Understanding (MoU) with Dow Chemical Vietnam Co. Ltd (Dow Vietnam), SCG Group and Unilever Vietnam International Co. Ltd to promote a Public-Private Partnership (PPP) initiative on plastic waste management and circular economy development.

Plastic pollution has become a global crisis and plastic waste is among the biggest challenges mankind has faced. An average of one million plastic bottles are sold every minute and five trillion plastic bags are consumed every year. However, only 12 percent of all plastic waste is disposed, 9 percent is recycled and 79 percent is piled up in landfills, dumps and in the nature. According to the Marine Conservation Organization, Việt Nam is one of the five countries that dump the largest amount of waste plastic into the sea, causing big negative impact on en-

vironment, socio-economic development and mankind. Thus, the PPP initiative signed between the MONRE, Dow Vietnam, SCG Group and Unilever Vietnam International Co. Ltd is expected to help share knowledge and technology, raise public awareness and promote innovation to confront the issue. The signing is also a statement that stresses dealing with plastic waste requires efforts of every stakeholder in the society from the Government agencies to the people and business community.

The initiative will focus on four modules: Raising public awareness of curbing plastic consumption and at-source waste categorization; providing assistance for at-source classification and plastic waste recycling; installation of new technologies and initiatives for waste recycling and development of supporting policies for circular economy in Việt Nam.

Deputy Minister of Natural Resources and Environment Võ Tuấn Nhân highly appreciated the three businesses' proactivity in supporting the Ministry to deal with plastic waste issue, especially handling the difficultly-collectable outputs like single-use plastics. The Deputy Minister hoped the three firms, as the spearheads of the activity, will inspire and connect other businesses to take responsible actions to protect the environment and finish the waste-plastic problem as well as developing a circular, sustainable economy in Việt Nam ■

BÙI HẰNG

MONRE project to develop an unified and modern air monitoring network meeting international integration requirement and trend



▲ MONRE Minister Trần Hồng Hà and Deputy Minister Võ Tuấn Nhân chairing the online meeting

On 23rd March, 2020, Ministry of Natural Resources and Environment (MONRE) held an online meeting discussing the project on development of air monitoring network system in Việt Nam. The meeting was chaired by Minister Trần Hồng Hà and Deputy Minister Võ Tuấn Nhân. According to the report, significant attention has been paid on automatic monitoring activity recently, contributing to identification of environmental quality changes. The monitoring system helps identify early environmental problems in order to timely propose proper measures to protect the environment and support policy making process.

In fact, limited number and uneven distribution of monitoring stations and slow application of advanced air monitoring technology has led to inadequate reflection of state of the air environment. Therefore, it is an important and urgent need to develop an automatic monitoring network in order to timely provide sufficient and accurate data for enhancing early warning and forecasting capacity on air environment quality. At the same time, investment of the auto-

matic monitoring system would help speeding up the process of international integration in this area.

The meeting participants discussed and agreed to design and develop an automatic integrated air monitoring network that could produce accurate information and data on air quality and environmental changes, serving state management activity and people's information demand.

MONRE Leaders acknowledged participants' opinions and recommendations on issues of stations' locations and indicators to be monitored and measured. The Minister emphasized significant importance of the development of an advanced and unified automatic air monitoring network at both central and local levels for accurately tracing environmental pollution sources. Sufficient and accurate monitoring information and data would help decide appropriate solutions and measures to control and prevent potential environmental pollution, contributing to environmental protection and air environmental incidents response.

Minister Trần Hồng Hà proposed Provincial People's Committees and Cities to install automatic monitoring stations using advanced and unified technologies which could be compatible with the national network system. In addition to that, a "legal framework for information and monitoring data provision and sharing between Central and local authorities needs to be developed for serving socio-economic planning development", said the MONRE Minister■

TRÀ MY (Monre source)



Second meeting between Việt Nam, Japan on waste management and 3R principles



▲ Participants at the second meeting of the joint Committee on waste management and 3Rs

The second meeting of the joint Committee for waste management and 3Rs (reduce-reuse-recycle) between Việt Nam's Ministry of Natural Resources and Environment (MONRE) and the Ministry of Environment Japan (MOEJ) took place on February 18th in Hà Nội City.

MONRE and MOEJ signed a Memorandum of Understanding (MoU) on environmental co-operation on December 13th, 2013. Since then, the two sides have had many dialogues on policy making. The two agencies at the fourth dialogue on March 26th, 2018 in Tokyo, (Japan) agreed to set up a joint Committee for waste management and 3Rs, which will help improve Việt Nam's public sanitation system and environmental protection. Vietnam Environment Administration (VEA) was assigned to host annual meetings in which policies are made and technical assistance is delivered. On January 11th, 2019, the Committee had its first meeting to reach an accord which regulated role and operation of the Committee. Under the agreement, the Committee is accountable for exchanging bilateral

information and experience in waste management and 3R principles; connecting two sides' Government agencies, companies, experts and other stakeholders to develop a streamlined waste management system based on 3R principles and proper technologies.

The Deputy Director of the VEA Nguyễn Thượng Hiền said at the meeting that Việt Nam had made significant improvements in waste management and environmental protection. The Government had issued many decisions and resolutions to regulate waste management and treatment, including the Resolution No. 09/NQ-CP dated February 3rd, 2019 that appoints MONRE as the major Government agency to carry out solid waste management activities. The Ministry had then reviewed the waste management activities in all 63 provinces and cities across the country. The Ministry had also completed drafting an amended version for the Law on Environmental Protection, which is being reviewed by the Ministry of Justice and can be submitted to the Government in May 2020. The Draft Law contains a chapter on waste management, stating that waste is a kind of resource and it must be reused and recycled efficiently.

Participants at the meeting discussed topics such as incineration-based solid waste management, planning for at-source waste treatment facilities, Japan's incineration technologies and ash treatment and the future operation of the joint committee. They also made some suggestions on policy making, technological use and resource management to improve the work in Việt Nam.

THU HẰNG

Breakthrough on policies and laws and activeness in the task of the management and environmental protection

Dr. NGUYỄN VĂN TÀI - *General Director*
Vietnam Environment Administration

With determination to change from passive to active action and thoroughly grasping the Government's motto of action "Discipline, integrity, action, creativity, breakthrough and efficiency" and in line with the Working Program of the Government and the Ministry of Natural Resources and Environment (MONRE), the task of management and environmental protection in 2019 has made a drastic change from awareness to action. Along with outstanding achievements in socio-economic development in 2019, there are many positive results in the field of environment.

The Government's direction that does not trade off environmental values for economic growth has thoroughly implemented. Many localities such as Bà Rịa - Vũng Tàu, Bình Dương, Đồng Nai, Thái Bình, Thừa Thiên - Huế... refused the projects with out-of-date technologies or the projects with the location within environmentally sensitive areas. Instead, they attracted investment projects using advanced and environmentally friendly technologies. There have been many environmentally friendly and eco-friendly models for the urban and rural areas, industrial zones, trade villages and manufacturing establishments and household waste recycling models implemented in Hà Nội, Bắc Ninh, Hậu Giang, Đà Nẵng, Quảng Bình, Cần Thơ, Bình Dương... As a result, economic development has become more sustainable and environmentally friendly.

There has been more active prevention instead of passive response in the tasks of environmental management. The prevention and control with a focus on specific priorities have kept down the increase in environ-

mental pollution level and prevent incidents which cause serious environmental pollution. Accordingly, it has strictly monitored the environmental protection activities of big enterprises and projects such as Hưng Nghiệp Formosa Hà Tĩnh Iron and Steel Company Limited, Lee and Man Paper Manufacturing Ltd, Nghi Sơn Refinery and Petrochemical Complex project, Nhân Cơ Alumina Plant, Bình Sơn Refining and Petrochemical Joint Stock Company, Dung Quất Refinery, Hòa Phát Dung Quất Steel Joint Stock Company, thermal power plants...

The environmental indicators have achieved the targets defined in the Vietnam Socio-Economic Development Plan. The proportion of industrial complexes and export processing zones that have qualified concentrated sewage treatment systems is 89% (an increase of 1%, equivalent to 16 industrial zones, compared to 2018) that reaches the targets set out in Vietnam Socio-Economic Development Plan. About 13% of domestic wastewater is collected (an increase of 1% compared to 2018). The percentage of solid waste collected is 86,5% (an increase of 0,5% compared to 2018). In 2019, four more protected areas in Việt Nam have been recognized as ASEAN Heritage Parks by the Secretariat of the Association of South-east Asian Nations (ASEAN), including Vũ Quang National Park (Hà Tĩnh Province), Bidoup - Núi Bà National Park (Lâm Đồng Province), Lò Gò - Xa Mát National Park (Tây Ninh Province) and Ngọc Linh Nature Reserve (Kon Tum Province). As a result, Việt Nam has become the country having the largest number of heritage parks in the region (10 Heritage Parks). It makes an important contribution to the conservation of natural ecosystems and biodiversity as well as the development of tourism, culture and history of Việt Nam.

The campaigns against plastic waste and single-use plastic have been widely implemented. These campaigns have also involved the whole political and social system, business owners and citizens and thereby make dramatic changes in awareness and actions of the whole society in reducing plastic waste.

On the other hand, there have been many environmental issues and challenges in 2019.

Some environmental-related incidents took place that directly affected people's daily lives. Typically, the Rạng Đông Light Bulb warehouse fire in Thanh Xuân Ward caused air pollution. The discharges causing contamination in tap water sources supplied by Sông Đà Clean Water Investment Joint Stock Company (Viwasupco) became the water crisis in many districts in Hà Nội.

Air pollution in big cities has become complicated. The increasing trend of air pollution has recorded in some time of the day and some days of the year, especially when there is a combination of meteorological and climatic factors or fog due



to the increase in air pollution sources. Air quality index (AQI) sometimes exceeded the safety threshold, especially the index of fine dust (PM_{2.5}) that posed negative impacts on people's health.

The amount of urban wastewater has gone up while the collection and treatment infrastructure has not met the requirements. Most urban wastewater has not been treated and discharged into the environment that pollutes surface water sources in cities and residential areas.

The volume of solid waste is increasingly growing. Most of the waste has not been classified at the source. The capacity for waste collection is limited. The rate of domestic waste reused and recycled is low. Furthermore, there are many shortcomings in terms of infrastructure and technology in the collection and treatment of hazardous waste.

The quality and biodiversity of forest ecosystems have declined. The establishment and expansion of nature reserves are slow while the number of wildlife species has decreased. Besides, there have been risks from invasive alien species and genetically modified organisms.

In 2020, all social, economic and environmental targets identified in the five-year socio-economic development plan of the period of 2016 – 2020 will be complet-

ed. This will create the basis for longer-term goals towards 2030 and 2045. As the global and regional context is complicated and the competition is getting fiercer, the nations have increasingly focused on environmental technical barriers. Besides, the openness of the economy in Việt Nam is high so that there is the risk of transferring backward and less environmentally friendly technologies into the country. On the other hand, in Việt Nam, the scale of the economy and the population is growing together with rapid industrialization and urbanization. The raising exploitation of natural resources and an increase in sources of pollution and waste generation have put pressure on the environment and adversely affecting the quality of the environment and biodiversity. It is said to prioritize economic growth, attract investment at all costs and neglect the requirements of environmental protection. Also, the Government's direction in which there is no trade-off between economic development and environmental protection has not been fully implemented while the responsibility for environmental protection and the performance of environmental protection activities have been limited and ineffective. This has posed significant challenges for environmental protection management in Việt Nam.

To successfully achieve the targets in 2020 and the goals of the 5-year socio-economic development plan in the period 2016 - 2020 and provide a basis for the management and environmental protection in the following 5- year period, the key tasks should be carried out as follows:

Firstly, it should focus on the development and improvement of the legal system on environmental protection to satisfy the practical requirements in the period 2021 - 2030. The three main missions include:

- To revise the Law on Environmental Protection (LEP) to fully and timely institutionalize the Party's views on environ-



▲ Lò Gò - Xa Mát National Park (Tây Ninh Province) recognized as ASEAN Heritage Park in 2019



mental protection, meeting the requirements for growth model transformation, making the environment become one of three major pillars of development and pushing the work of environmental protection to a new stage. The key policies identified in the Draft LEP (revised) include the classification of investment projects and manufacturing establishments according to their environmental impacts to take appropriate environmental management measures. Additionally, the Draft LEP (revised) also defines environmental zoning, classification of investment projects based on environmental criteria, environmental management mechanism according to the project life cycle, integration of environmental permits and certificates in which every manufacturing establishment has only one environmental license. It also clearly prescribes the Government's responsibility for state management of the environment and environmental management of investors and entrepreneurs. Furthermore, the management of solid waste is regulated in accordance with the current socio-economic context. Under the Draft LEP, the use of economic tools and financial mechanisms are enhanced in environmental management.

- To implement three missions on the development of national master plans on environmental protection, biodiversity conservation and environmental monitoring. This identifies four main contents, including environmental zoning, biodiversity conservation, a master plan of centralized solid waste treatment facilities and the environmental monitoring system to guide investment and develop economic sectors in line with the environmental load threshold, monitoring and warning of environmental quality.

- To finalize the system of environmental technical regulations and standards to meet the regional and international standards and building roadmap to apply technical barriers in order to prevent the risks of environmental pollution and transferring backward technologies into Việt Nam.

Secondly, it should give priority to coordinate with Ministries, branches and localities to solve the serious environmental problems that directly affect people's daily lives and receive huge attention from the whole society such as air pollution in cit-

ies, ordinary waste, plastic waste, contamination of surface water sources in urban areas, residential areas and key economic areas. It also speeds up the relocation of manufacturing establishments which cause environmental pollution or not being in compliance with relevant master plans.

Thirdly, it should proactively prevent and monitor the projects and sources of waste which are likely to cause serious environmental pollution. It also continues to promote the operation of the Committee in charge of monitoring environmental performances of large-scale projects or manufacturing establishments. The participation of all provinces and cities directly under the Central management should be mobilized to review and strictly control projects and establishments which are likely to cause serious environmental pollution so that environmental protection activities in such establishments are guaranteed and serious environmental incidents are prevented.

Fourthly, it should continue to promote environmental administrative procedures reform so that the implementation of such procedures is simplified. At the same time, it should eliminate unnecessary administrative procedures for environmental management; integrating the evaluation of relevant administrative procedures in the field of environmental protection; organizing the implementation of administrative procedures in compliance with laws and creating favorable conditions for citizens and entrepreneurs.

The fifth task is effective coordination with Ministries, line Ministries and localities to promptly respond and handle environmental incidents. The consolidation and operation of the hotlines for the public to provide information on environmental pollution from Central to district levels should be promoted across the country. Accordingly, it helps to resolve environmental pollution issues from local levels and to build the belief in environmental protection state management.

The sixth task is to complete three year - inspection of establishments under the List of 17 types of industrial establishments which are likely to cause environmental pollution to synthesize and evaluate the current status of their violations and their compliance with laws. As a result, it helps to set up the direction of inspection and examination work and increase the effectiveness of enforcement of regulations on environmental protection in the coming period.

The seventh task is to strengthen propaganda and education activities, raise awareness about environmental protection; promote the role of socio-political organizations and the community in environmental protection. It should carry out communication programs to involve the society in environmental protection, especially in sorting waste at source and reducing the use of plastics and plastic bags. Besides, it also should give a compliment to individuals/organizations for their achievements in environmental protection as well as creating mass movements or replicating good environmental models and best practices; thus, promoting environmental protection activities in the whole society■



Overview of Circular No. 25/2019/TT-BTNMT guiding on details a number of articles of Decree No. 40/2019/ND-CP

LÊ THỊ MINH ÁNH

Vietnam Environment Administration

The Government on May 13th, 2019 issued Decree No. 40/2019/ND-CP amending and supplementing a number of articles of the Government's Decrees which stipulate in detail the implementation of the Law on Environmental Protection (LEP). Accordingly, the Ministry of Natural Resources and Environment (MONRE) issued Circular No. 25/2019/TT-BTNMT guiding on details the implementation of a number of articles of the Decree No. 40/2019/ND-CP and prescribing the management of monitoring services. The Circular shall come into force since February 15th, 2020.

The Circular consists of 7 chapters, 40 articles and 6 annexes that specify the content of the strategic environmental assessment (SEA), environmental impact assessment (EIA), environmental protection plan and environmental rehabilitation and restoration in the course of mineral mining; environmental protection in importing scrap as production materials; provision on the list of environmentally friendly products and services; criteria for selection and appraisal of municipal solid waste treatment technology (MSW); closure of municipal solid waste landfills, environmental quality management; management of monitoring service activities and report on environmental protection performance.

The Circular has new provisions on the EIA report. Accordingly, at least ten experts shall be consulted on EIA reports of projects with large discharges prescribed in Appendix IIa while the consultation requires no less than three experts in the case of other types of projects. Furthermore, it also requires to gather professional organizations' opinions on the accuracy of the models to be applied to specific types of projects, including projects of which investment policies are decided by the National Assembly or the Prime Minister causing a potential risk of sedimentation, erosion or saline intrusion; projects of submerging dredging material into the sea with a total volume of 5 million cubic meters of material or more; projects with industrial wastewater volume of 10.000 cubic meters per day and night or above (except for the cases in which wastewater generated being connected to the concentrated wastewater treatment systems and wastewater in aquaculture projects) and projects with emission volume of 200.000 cubic meters per hour or above.

There are a number of changes after the EIA report is approved. The previous regulations pointed out that any changes in the EIA report might be accepted by the competent agency in charge of approving the EIA report. Under the new Circular, in case of an increase in size or capacity or technology changes, the owners of facilities, industrial parks or projects shall notify the competent agency for approving such changes or re-compile EIA reports. In other cases, the owners of facilities, industrial zones or projects shall decide themselves. They are not required to notify the competent agency and shall take legal responsibility for their decision.

Regarding the monitoring of waste during trial operation of waste treatment works of projects or facilities, the Circular prescribes composite samples as well as monitoring and evaluation during the period when the performance of each stage is adjusted and during the period when the operation of wastewater and emission treatment work is stable. Accordingly, during the former period, the sampling shall be carried out at least once every 15 days for at least 75 days. The minimum number of sampling days is five. Monitoring parameters of each treatment stage are the main ones used to serve the design at each stage. During the period of stable operation of wastewater treatment works and dust and emissions treatment works, the sampling shall be undertaken at least once a day within 7 sequential days. It also requires at least one sample of input wastewater and at least 7 samples of output wastewater, dust and emissions. If the sequential measurement, collection and analysis of samples might not be carried out due to force majeure, they shall be measured, collected and analyzed on the next day. The monitoring parameters shall comply with technical regulations on wastewater. For the project or facility that made a plan for trial operation of waste treatment work before February 15th, 2020, the project owners and facility owners are only responsible for monitoring waste during the period of stable operation, not the period when the performance of each stage is adjusted.



▲ *Monitoring of municipal solid waste landfills after closure following the regulations*

The Circular promulgates techniques for works on prevention and response to incidents caused by wastewater if the project owner adopts the technical solutions (building tanks to contain wastewater) as prescribed in Clause 6, Article 37 of Decree No. 38/2015/ND-CP which is supplemented in Clause 19, Article 3 of the Decree No. 40/2019/ND-CP. In addition, the owner of the project, facility or industrial park shall, according to the characteristics and loading rate of the wastewater flow, propose other technical solutions to the competent authority to operate works on prevention and response of incidents, ensuring the compliance with relevant technical requirements and the plan on prevention and response to incidents.

The provisions on the selection of criteria, appraisal and announcement of municipal solid waste treatment technologies are also stipulated. The evaluation of technologies for municipal solid waste treatment shall be based on their compliance with requirements for environmental protection and regulations on technology transfer. According to the results of confirmation of completion of environmental protection works, the MONRE shall promulgate, update the list of municipal solid waste treatment technologies and publish it on the MONRE's website. At the same time, the Circular prescribes procedures for a shutdown of a sanitary municipal solid waste landfill, including identification of the subject, monitoring of the environmental state after the shutdown, conditions for reuse of the landfill and the responsibilities of the owner of the landfill.

When it comes to environmental quality management, the Circular regulates the monitoring, assessment and announcement of the surface water and air quality status; investigation, assessment and warning of environmental quality; determination of the degree, scope and causes of contamination and soil improvement and remediation. Accordingly, water and air quality indicators must be posted on the web portal of competent State management agencies. The preliminary investigation or assessment is carried out to investigate or assess the site to determine and announce whether or not the site is polluted. Contaminated sites shall be classified into 3 following levels: low-level environmental contamination; medium-level environmental contamination and high-level extremely severe environmental contamination. Any organization or individual that is confirmed as the one that causes environmental contamination shall carry out detailed site investigation and conduct environmental de-

contamination, improvement and remediation plan and report the results to the MONRE or Provincial People's Committee.

Previously, the owner of project and facility had to prepare many periodic reports on environmental protection, namely report on periodic environmental monitoring, report on automatic environmental monitoring, report on municipal solid waste management, report on normal industrial solid waste management, report on hazardous waste management, report on imported scrap management and report on results of environmental monitoring and restoration in the course of mineral mining. As a result, there is a significant number of overlap information between these reports. Under the new Circular, owners of the project and manufacturing, trading and services facilities only have to elaborate a periodic report on environmental protection activities according to the prescribed regulations, and then submit it to competent authorities before January 31st of the following year. The first report shall be submitted before January 31st, 2021. The new environmental protection report shall contain the following contents: environmental monitoring and supervision; management of wastewater, solid waste, hazardous waste and imported scrap; environmental rehabilitation and restoration for a mineral mining project. Furthermore, the owners of projects and facilities are not required to submit documents related to environmental protection reports. Such relevant documents are archived to serve the inspection work by competent authorities when needed. These new provisions aim to implement the policy of reforming and simplifying administrative procedures. On the other hand, project owners who invest in technical infrastructures of industrial parks shall carry out the reporting regime in accordance with regulations on environmental protection in industrial zones.

The new Circular also stipulates the registration of environmental testing activities; responsibilities of the providers of environmental monitoring services after the certificate is obtained and the management of environmental monitoring services provided by secondary monitoring units. Specifically, applicants for registration of testing services in conformity with environment sector and certification of eligibility for provision of environmental monitoring services may choose to follow administrative procedures for issuance of the certificate of registration of testing services in conformity with environment sector and certificate of eligibility for provision of environmental monitoring services under regulations on single-window system promulgated by the MONRE.

Every provider of environmental monitoring service shall archive physical or electronic documents about environmental monitoring services it provides to serve the inspection work. As for providing environmental monitoring services, if the provider signs service contracts with customers, such contracts shall have the provider's unique signs and the date of the contract shall be clearly stated. The signs shall contain ordinal numbers indicating the date on which the contract is signed in chronological order in a calendar year. Results shall be returned to customers via test reports bearing the signature and seal of the competent authority. The test reports shall be prepared in accordance with relevant regulations. In case of environmental monitoring services provided by secondary monitoring units, sample transfer records shall be included in the documentation of environmental monitoring service providers and secondary monitoring units■



Environmental impact assessment, environmental licenses- significant steps in administrative reform in the Draft Law on Environmental Protection (revised)

Dr. MAI THẾ TOÀN

Vietnam Environment Administration

The Law on Environmental Protection (LEP) 2014 was passed by the 13th National Assembly at its 7th Session, replacing the LEP 2005. After 5 years of implementation, the LEP has contributed to creating positive changes in environmental protection. However, besides the achieved results, the implementation process showed that the LEP has revealed limitations, shortcomings and has not been adjusted in time with new challenges posed to environmental protection. In order to meet the new requirements, continue to institutionalize policies and views of the Communist Party and the State on environmental protection, the Draft LEP has been developed, supplemented and amended with many new points, in which the contents of environmental impact assessment (EIA) and environmental licenses (ELs) are among the progressive changes in administrative reform. The following are assessments of remaining issues related to the use of EIA tools and post-EIA procedures according to the investment project life cycle, analyzing the major changes in administrative reform in the Draft LEP (revised), which is being submitted to the competent authorities for consideration and decision.

Some inadequacies of EIA and ELs under the current regulations

For EIA: According to current regulations, there are too many types of projects that EIA must be implemented together with the same required levels of mandatory procedures to be carried out among objects with different characteristics of impacts on the environment. This is costly for businesses, especially in cases where projects have negligible environmental impacts but still have to carry out many environmental procedures because of belonging to the investment policy decision group of the National Assembly, Prime Minister (such as investment projects on education, culture, sports...); belonging to the group of projects

with land use of nature reserves, national parks, historical - cultural relics, world heritage sites, biosphere reserves and scenic places already ranked (projects of renovating historical areas; road, shed and camp construction works at administrative service areas or small-scale construction projects in buffer zones of conservation areas...).

In addition, some of investment projects that are likely to cause environmental pollution are still being implemented in densely populated areas with low load capacity of the environment, which has caused urgent environmental problems. Many major environmental pollution and environmental degradation incidents on a large scale and outbreaks of environmental hotspots due to waste discharge and landfill causing environmental pollution have occurred in many places, causing major economic, social and environmental consequences both in the short term and long term, affecting the production, life and health of the people, causing disturbance, security disorder and annoyance among the people. Current regulations also make businesses and management agencies not active in the process of investment review, allowing project implementation.

One of the causes of the above situation is the lack of national environmental protection planning and space planning into the following areas: areas where conservation and protection are needed, areas where environmental and ecological restoration is needed, areas where socio-economic development is prioritized. In addition, the consideration of approval decisions and EIA reports as “universal tools” is a basis for state management agencies to supervise, investigate, inspect enterprises during the operation period as it actually took place in the past time as unreasonable during the operation period, the environmental issues of the facilities may completely change from what was forecasted and proposed in EIA reports.

Regarding post-EIA administrative procedures: According to the current system of legal documents, procedures on investment policies, investment decisions, design assessment, construction licensing for construction investment projects are not closely associated with EIA activities, environmental confirmation and licensing leading to the fact that many production, business and service establishments have been put into operation but without environmental procedures carried out.

Currently, according to the current provisions of the LEP 2014 and some related laws such as the Law on Water Resources 2012, Law on Irrigation 2017, after EIA stage, project approval, before the project officially comes into operation, the project owners must carry out many administrative procedures in the



field of environmental protection and other related fields, including: Confirmation of completion of environmental protection works; license for discharge of wastewater into water sources; license for gas emissions; certificate of eligibility for environmental protection in importing scrap as raw production materials; license for hazardous waste treatment; register book of hazardous waste generator; environmental protection plan; environmental management plan...

The simultaneous existence of many legal documents on post-EIA with the inconsistent contents of regulations, different regulations in different times and licensing agencies make it difficult for management agencies in the investigation and supervision of compliance with the regulations on environmental protection of organizations and individuals and also embarrass enterprises in the implementation process. In fact, there are cases that have the same content (monitoring program, required quality of wastewater after treatment), but between the decision on EIA approval, the confirmation of completion of environmental protection works and the license for discharge of wastewater into water sources there are different provisions. There are even cases where the decision on approval of the EIA report for the project allows the quality of the treated wastewater of grade B, when the project is constructed and put into operation, when applying for a license for discharge of wastewater into water sources it is required by state management agencies to have wastewater treated as of grade A; in EIA appraisal and approval process, it is not required to build an emergency response lake, however, when issuing a license for discharge of wastewater into the water sources, it is required to build an emergency response lake... causing a lot of difficulties, costs and obstacles for enterprises. Consequently, there have been works with approved EIA reports, confirmation of completion of environmental protection works that have been constructed, put into trial operation and operation, but not yet been granted license for discharge of wastewater into water sources. In many cases, the delay in the completion of licenses due to conflicts and obstacles arising from the documents of the state management agencies mentioned above causes large costs from contractor delay, making risks for investors because of being sanctioned for administra-

tive violations in the field of environmental protection and water resources.

Meanwhile, in advanced countries around the world, management agencies do not use EIA reports as a management tool for operating facilities, but most use types of ELs associated with the environmental management plan of project owners to manage (such as the US, Japan, EU countries, Australia, China...). Integrated Pollution Prevention and Control Directive (IPPC Directive) of EU, Japan..., all stipulates ELs to control the operation of the facilities during operation period.

For ELs: Currently, there are 2 methods of issuing ELs in the world: integrated ELs (currently applied in EU countries, OECD countries...); many single ELs, each with its own environmental issues (being applied in the US, Australia, China...). The application of an integrated or single license method depends on the legal system and the actual situation of each country, however, they ensure the principle of not overlapping, a specific object is not subject to both licensing methods. Following the current trend, some countries such as South Korea, are transitioning from a single license to an integrated license, especially for large-scale projects that have significant impacts on the environment. In some EU countries (Germany), ELs not only stipulate and permit for environmental issues, but also extend the regulations on construction requirements and conditions...

In Việt Nam, there are still some types of ELs under both the above mentioned licensing methods. The Law on Water Resources stipulates for license for discharge of wastewater into the water sources (as a single license form), while the LEP 2014 stipulates for confirmation of completion of environmental protection works (as an integrated license). The existence of both licensing methods leads to overlapping, contradictions in licensing content, arising procedures, causing annoyance for businesses.

Solutions in the Draft LEP (revised)

With the viewpoint, the policy of reducing the burden of administrative procedures, creating an open and favourable en-



▲ Investment projects are considered according to their size, nature and level of impacts on the environment to require environmental procedures



vironment for projects while ensuring strict and effective management of environmental protection when the projects come into operation, the Draft LEP (revised) supplemented and amended provisions on EIA and environmental licensing in the direction specifically as follows:

Clearly define who must implement EIA and ELs on the basis of criteria on the environmental impact of investment projects considering the scale, nature and extent of impact on the environment that require environmental procedures in 4 groups of different investment projects (including: group 1 - must implement EIA, there is no need for ELs; group 2 - must implement EIA and must have ELs; group 3 - must not implement EIA but must have ELs; group 4 - no environmental procedures are required). The regulation of projects with little impact on the environment (groups 3 and 4) that do not have to implement EIA will reduce the cost of appraising EIA reports, creating favourable conditions for the projects soon to be implemented.

Regarding ELs, in order to ensure strict management and simplification of administrative procedures for enterprises, the Draft Law will consolidate, integrate existing ELs and the license for discharge of wastewater into water sources into ELs, including: Confirmation of completion of environmental protection works, license for discharge of wastewater into water sources; license for gas emissions; certificate of eligibility for environmental protection in importing scrap; license for hazardous waste treatment; register book of hazardous waste generator; environmental protection plan in accordance with the regulations in the field of environmental protection and some other related fields (Law on Irrigation, Law on Water Resources).

For projects that are subject to both EIA and ELs, the Draft Law stipulates that the administrative procedures for issuing ELs can be implemented before the projects go into trial operation of waste treatment facilities. For projects that are not subject to EIA, administrative procedures for issuing ELs are carried out before appraising the feasibility study report, basic design (or economic - technical report, construction drawing design for projects requiring only one step design) and before issuing construction license. This provision ensures clearly defined environmental requirements before an orga-

nization or individual carries out project emissions and is also compatible with the construction regulations to avoid organizations and individuals those must implement administrative procedures to adjust construction licenses many times when they have to renovate and upgrade works to meet the emission and environmental protection requirements of environmental state management agencies if later issuing ELs.

According to the provisions of the Draft Law, all projects, production, business and service establishments generating wastes must have ELs, except for some cases such as agencies and schools; small-scale projects, production, business and service plans with little effects on the environment during the project implementation period without generating wastes or just generating conventional wastes in small quantities treated by on-site treatment facilities and equipment meeting the requirements of environmental technical regulations or generating domestic wastes managed under local regulations.

In order to create favourable conditions for organizations and individuals to implement administrative procedures for application of ELs, the Draft Law has designed two types of ELs, including: EL and Registration of environmental protection plan, depending on the scale of emissions, type of production, level of environmental pollution of the production, business and service projects, establishments. Corresponding to that, the procedures for issuing ELs, registration of environmental protection plan will also be stipulated according to 2 levels with different composition of documents, sequences, procedures, methods, conditional requests... In the Draft Law, these contents are currently in principle, which will be specified in the Government's decrees. In addition, the Draft Law specifies the contents of the licensing authority, the contents of the licenses, the principles, the grounds for licensing, the rights and obligations of the license holders, the relationship between the ELs and other relevant environmental management tools (EIA), minimized administrative procedures with the EL policy, transitional provisions to ensure conformity, minimizing negative disturbance when issuing policies.

Overall assessment according to this orientation, ELs ensure 3 main roles: Being a tool to ensure necessary and sufficient conditions, allowing facilities before going into operation to comply with the requirements, conditions for preventing, reducing and eliminating pollution, including: Measures and facilities for waste collection, storage and treatment; Thresholds for generated wastes; Requirements for environmental monitoring and supervision; Being a tool that allows state management agencies to control and adjust the pollution load of wastes generated from production, business and service establishments in order to control pollutants, maintain and protect the objective of environmental quality; Being a basis for the state management agencies on environmental protection to supervise, investigate, inspect organizations and individuals in the course of project operation. With the 3 roles mentioned above, ELs are defined as documents issued by a competent state management agencies permitting project owners, production and business establishments to operate all or part of works, projects, production and business establishments with specific environmental protection requirements and conditions.



Thus, the classification of the 4 groups of investment projects mentioned above and the integration of different administrative procedures into ELs, the Draft LEP (revised) has strongly promoted administrative reform in dealing with administrative procedures for environment, contributing to cutting costs for businesses, promoting development but still ensuring control of environmental impact risks of investment projects, creating favourable conditions for development in accordance with functions and sensitivity levels, load capacity of the environment where investment projects are implemented■

REFERENCE DOCUMENTS:

1. MONRE (2020), "Documents of LEP (revised)".

2. Lê Trinh (2015), "How to improve the EIA quality in Việt Nam"? Website of Vietnam Association for Conservation of Nature and Environment.

3. Mai Thế Toàn (2016), "Current situation and recommendations to improve the EIA system in the process of reviewing investment projects". Hà Nội, Environment Magazine No. 8/2016.

4. Mai Thế Toàn (2018), "Developing a legal framework at the level of laws, decrees and circulars on EIA" under the topic "Researching the status and proposing to complete the legal basis for EIA for investment projects, environmental control and supervision of operating production and business establishments. Developing technical guidelines for EIA for mineral extraction and steel production projects" under the science and technology program on climate change responses. Natural Resources and Environment Management, 2016-2020", topic of MONRE, Code: Climate change/16 - 20.

5. European Union, Directive 2010/75/EU of the European Parliament and of the Council of 24 November 2010 on industrial emissions (integrated pollution prevention and control). EUR-Lex website.

6. OECD, (2007), "Guiding Principles of Effective Environmental Permitting System". T OECD Website.

7. South Korea, Act on the integrated control of pollutant-discharging facilities [Enforcement Date 28th. November 2017.] [Act No.15107, 28th. November 2017., Partial Amendment].

According to the Vietnam Party and Government's Statement, environmental protection is the career of all people, by the people and for the people. Moreover, environmental protection is an urgent and long - term task. In order to achieve success, it is crucial to mobilize the participation of Government Ministries and agencies at all levels, mass organizations, religious organizations and communities from socialization for environmental protection.

Mass organizations are established on a voluntary basis that is of the people, by the people and for the people. The mass organizations are organized and operate in accordance with the Constitution and laws and in conformity with the Charter of the organization. The mass organizations represent and protect legal and legitimate rights and interests of all strata of the people; participates in state administration and socio-economic management. Article 9, Chapter 1 under the Constitution 2013 regulates mass organizations in Việt Nam, namely Vietnam Fatherland Front (VFF), socio-political organizations and social organizations.

Residential communities are the groups of Vietnamese people living in the same villages, hamlets, quarters, or residential zones. The key characteristic that determines communities is their social cohesion. Generally, they also work together toward a common goal. The cohesiveness in communities is tightened with patriotism and a spirit of solidarity. The communities have the right to voluntarily participate in a certain mass organization. Besides, they have a close relationship with the environment. They may pose positive or negative impacts on the environment.

ADVANTAGES AND DISADVANTAGES OF CHAPTER XV, LAW ON ENVIRONMENTAL PROTECTION (LEP) 2014

Responsibilities of the VFF, socio-political organizations, socio-professional organizations and residential communities in environmental protection have been specified in three articles of Chapter XV under the LEP 2014, including Article 144 (Responsibilities and rights of VFF), Article 145 (Responsibilities and rights of socio-political organizations, socio-professional organizations) and Article 146 (Rights and obligations of residential communities). Accordingly, certain advantages of Chapter XV can be observed. Firstly, the Law protects the rights and interests of the residential community in which the residential community shall have the right to live in a healthy environment and to have responsibilities for environmental protection. These articles also create an important legal corridor for mass organizations and residential communities to take part in environmental protection. It helps to build close relationship among the environmental state management agencies and the VFF, Vietnam Trade Union, Hồ Chí Minh Communist Youth Union, Women's Union Vietnam, and Vietnam Veterans Association; Vietnam Union of Science and Technology Associations, Vietnam Union of Literature and Arts Association, Vietnam Union of Friendship Organizations and social-professional organizations. The Law has affirmed the role of mass organizations in mobilizing communities to engage in environmental protection, promoting democracy and people's creativity and socializing environmental protection work. Under



Recommendations for the Draft Law on Environmental Protection (revised) to enhance the roles and responsibilities of mass organizations and residential communities

Dr. TRẦN VĂN MIẾU - Vice Chairman
Vietnam Association for Conservation of Nature and Environment

the Law, the right to access to information and justice has been ensured while capacity building and community participation in environmental protection has been enhanced. Mass organizations organize communication activities to raise awareness, launch campaigns for environmental protection, build models, participate in social criticism, conduct the monitoring and supervision of public consultation, support community to involve in environmental protection and ensure gender equality in environmental protection activities.

On the other hand, there are a number of shortcomings in regulations defined in Chapter XV. To illustrate, the name of Chapter XV has not mentioned "the rights" of the entities involved whereas each Article of Chapter XV has stipulated both "the obligations and the rights". Furthermore, there seems to be no logical order in how the names of the articles are described. For example, some articles point out the obligations first while other articles determine the rights first.

In addition, these articles have not specified so that it has become difficult for mass organizations to take part in environmental protection. Article 145 provides general provisions on the responsibilities and rights of socio-political organizations and socio-professional organizations. However, these two organizations have different characteristics, functions, and tasks. The concept of "residential community" and the definition of "individual or organization representing the residential community" have not yet clarified. The reality showed only a few numbers of the households' meetings to select the representatives for the residential community. On the other hand, Chapter XV of LEP 2014 have not clarified specific rights and responsibilities of socio-political organizations and social-professional organizations as well as the responsibilities of the Government, state management agencies and authorities at all levels in supporting and encouraging mass organizations and residential communities to participate in environmental protection.

SOME RECOMMENDATIONS FOR REVISING CHAPTER XV OF LEP 2014

Based on the analysis mentioned above, some specific revisions have been proposed as follows:

The residential community may refer to the group of Vietnamese people living in the same villages, hamlets, quarters, or residential zones. The individual or organization representing the residential community is the VFF. Moreover, the concept of the residential



▲ Mobilize socio-political organizations and residential communities to participate in environmental protection



community and the organization representing the residential community should be included in the Interpretation of terms.

The name of Chapter XV should be revised as "Rights and responsibilities of VFF, socio-political organization, socio-professional organization, religious organization and residential community in environmental protection (hereinafter referred to as mass organization and community). The new revised Chapter should consist of six articles: Rights and responsibilities of VFF; Rights and responsibilities of socio-political organizations; Rights and responsibilities of social-professional organizations and other social organizations; Rights and responsibilities of state-recognized religious organizations; Rights and responsibilities of communities in environmental protection and Ensuring conditions for organizations and residential communities to conduct their environmental protection activities.

Such revisions help to eliminate the limitations and shortcomings of Chapter XV of LEP 2014. Accordingly, the new revised Chapter defines the rights and responsibilities of organizations and communities in environmental protection. It also separates the rights and responsibilities of socio-professional organizations from socio-political organizations and suggests a new entity, namely religious organizations registered in accordance with laws. The rights and responsibilities of each entity (VFF, socio-political organization, socio - professional organization, religious organization and population community) in environmental protection have been distinguished. Based on the nature, functions and duties of each entity, it should clearly define rights and responsibilities of each entity; prescribe responsibilities of each socio-political organization (Vietnam General Confederation of Labor, Vietnam Farmers' Union, Hồ Chí Minh Communist Youth Union, Vietnam Women's Union, Vietnam Veterans Association), socio-professional organizations, unions and other social organizations; stipulates the responsibilities of the Government, environmental state management agencies and authorities at all levels in encouraging and supporting mass organizations and residential communities to engage in environmental protection. The new provisions will not increase the number of civil servants and the State Budget for environmental protection as well as recognize the gender issues■

In order to achieve the most positive, effective and comprehensive results in environmental protection, countries must always use a combination of different environmental protection measures such as: Politics; Science and technology; Propaganda and education; Economics; Laws. Among the above measures, in recent years, many countries have tended to increase the application of economic measures in environmental protection (also called economic instruments). Although there are many different definitions and names, economic instruments can be simply understood as "the use of the market power by the State to guide environmentally-friendly behaviors of entities on the basis of linking economic benefits to environmental benefits". Compared to the imperative - administrative environmental management instruments, the economic instruments are considered more flexible, so the economic instruments are expected to bring higher efficiency in environmental protection. Some advantages that create flexibility for economic instruments are as follows: "Economic instruments allow integration of environmental costs into market prices; encourage consumers not to consume products that harm the environment and encourage manufacturers not to use materials that cause environmental pollution; encourage manufacturers and businesses to invest in new pollution control technologies and sustainable production methods; contribute to creating financial sources for environmental protection activities, encouraging compliance with environmental laws".

In fact, not so far economic instruments have just begun to be used in environmental protection. Since the 1992, Earth Summit in Rio de Janeiro with the participation of 179 countries, the countries agreed to recognize 27 principles, of which the 16th principle refers to the application of economic instruments in environmental protection with content as follows: "National authorities should endeavour to promote the internalization of environmental costs and the use of economic instruments, taking into account the approach that the polluter should, in principle, bear the cost of pollution, with due regard to the public interest and without distorting international trade and investment". Up to now, most countries have been applying many different types of economic instruments to environmental protection. With the appropriate and consistent enforcement measures and supporting measures, the economic instruments have brought very positive results in environmental protection for many countries. In Germany, for example, "tax policies for environmental purposes have contributed to helping Germany develop its economy without depending on energy, reducing 25% of gas emissions as committed by the Tokyo Convention"; In Thailand, the country has raised gasoline taxes to encourage the use of biofuels. "These fuels are not only cleaner and more environmentally friendly, but they also help Thailand reduce its dependence on imported gasoline, which now accounts for 60% of the country's energy needs".

On the basis of gaining experiences from many countries, although up to now there have not been any official



Recommendations on improvement of provisions on economic instruments in the Draft Law revising and supplementing some articles of the Law on Environmental Protection

MSc. NGUYỄN THỊ HUỆ

Faculty of Law, Trade Union University

legal document referring to the term “economic instruments” but in fact, Việt Nam has been applying economic instruments in many different methods for environmental protection such as: environmental protection taxes, natural resource taxes, environmental protection fees, environmental protection funds, ecolabels... The use of these economic instruments has contributed to diversifying Việt Nam’s environmental protection measures, helping Việt Nam better perform international commitments on environmental protection, also bring certain values in environmental protection such as: Environmental protection taxes contribute to guiding the behaviour of using environmentally friendly products and increasing revenues for the State budgets; Environmental protection fees help supplement financial resources to pay for environmental protection activities; Many entities implementing environmental protection activities have received financial support from the environment protection funds... However, it can not be denied that in Việt Nam, the effectiveness in environmental protection that these economic instruments brought is not really as expected, this comes from many different reasons such as: The legal regulations on economic instruments are still inadequate; The implementation has not been effective, lack of consistent support measures; Many people are still unaware of the existence of economic instruments as well as not aware much of environmental protection.

With the aim of further promoting the effectiveness of these instruments, the Draft Law revising Law on Environmental Protection has for the first time used the term “economic instruments” in Chapter X, also amends and supplements some provisions related to economic instruments. However, recognizing that the provisions

on economic instruments in the Draft Law still exist some irrational points, which need further adjustments. Details are as follows:

Regarding the layout of Chapter X. According to the current Draft Law, the content of “economic instruments” and the content of “resources for environmental management” are stipulated in the same Chapter. However, the “resources for environmental management” provision is a set of provisions on human resources, material resources and knowledge (technology, processes, management capacity) that are the foundation for the State and those who carry out environmental management, while the “economic instruments” provision is a set of provisions on environmental protection measures developed and operated based on “using market power to guide environmentally friendly behaviours of entities, on the basis of linking economic benefits to environmental benefits”. Therefore, “economic instruments” and “resources for environmental management” are two different contents but in the same Chapter that reduces the coherence and logic of the Law. This can be solved by separating Articles 115 - 122 of the current Draft Law into another Chapter on “economic instruments” and Articles 123 - 128 into other Chapter on “resources for environmental management”.

Structure of provisions related to current economic instruments. The Draft Law specifies each type of economic instruments in a separate Article of the Law, this is reasonable and ensures clarity and convenience for the application and development of guiding documents for implementation. However, the economic instruments prescribed in the Draft Law are incomplete because in addition to the listed instruments, Việt Nam is also applying some other types of economic instruments such as natural resource taxes, payment of forest environmental services, or public listing of facilities causing serious environmental pollution. Besides, in addition to these forms, in the future, Việt Nam may develop and deploy new economic instruments such as deposit - refund, transferable emission permits... Therefore, in the content of economic instruments, it is necessary to supplement provisions on natural resource taxes, payment of forest environmental services, and public listing of facilities causing serious environmental pollution. Also, in order to ensure the generalization and stability of the Law, in addition to the specific provisions on each type of economic instruments, there



must also be generalized and principled provisions guiding the development and implementation of existing economic instruments as the basis for the development of new economic instruments in the future. In terms of the form, the general provisions on economic instruments should be put into one article and placed at the beginning of Chapter on economic instruments, followed by articles that stipulate each economic instrument.

For the term “economic instruments”. Although in fact Việt Nam has applied the term “economic instruments” for a long time, but this term is not a common term, not easy to understand. This term is currently used by researchers only in research projects, not yet specified in legal documents. Besides, the current interpretation of this term of scholars is also very different and inconsistent. For example, economic instruments are “the use of the market power by the State to guide environmentally friendly behaviours of entities on the basis of linking economic benefits to environmental benefits”. But also another author said that “economic instruments in environmental management consist of two groups of instruments: management to adjust the behaviours of individuals and organizations in a way that benefits the environment through impacts on their financial resources; economic analysis to support the decision-making process on the environment”... In addition, many other explanations about economic instruments have been given, so to ensure a consistent understanding of economic instruments, to ensure consistency in most of the Law, the Draft Law should add provisions explaining the term “economic instruments” in Article 3 or the general provision of economic instruments.

Regarding environmental protection taxable subject. This is currently stipulated in Clause 2, Article 115, however there are still some unreasonable points that need to be amended as follows: This provision is not consistent with the provisions on taxpayers in Article 5 of the current Law on Environmental Protection Tax. Because according to Article 5 of the 2010 Law on Environmental Protection Tax, only the entities that produce and import goods under taxable

subject have to pay environmental protection taxes and the entities using these goods are only under environmental protection taxable subject. Therefore, the inclusion of the word “use” in Clause 2, Article 115 of the Draft Law is not accurate; In the entities of payment of environmental protection taxes in Article 5 of the 2010 Law on Environmental Protection Tax, apart from “organizations, individuals”, the Law also stipulates that the entities are “households”, so to ensure consistency with the Law on Environmental Protection Tax, need to add the entities as “households” to Clause 2, Article 115; Regarding goods subject to environmental protection taxes, the provisions of Clauses 1 and 2, Article 155 are not consistent. If Clause 1 identifies the object as “products, goods when used causing negative impacts on the environment”, Clause 2 identifies the object as “products, goods causing negative impacts on the environment” in general, not just at one stage, this affects the consistency in the provisions of the Law. On the basis of the above restrictions, it is necessary to amend Clause 2, Article 115 as follows: “Organizations, households, individuals that produce, import products, goods causing negative impacts on the environment when they are used must pay environmental protection taxes”.

Principles for determining environmental protection tax rate and adjustment of tax rate are prescribed in Clause 3, Article 115. This provision also has some points to be adjusted: Regarding the basis for determining environmental protection tax rate, although the Draft Law has clearly stated 3 bases for determining the environmental protection tax rate, but the phrase “levels of toxicity” must be changed to “levels of negative impacts on the environment” to ensure consistency with the provisions of Clauses 1 and 2, Article 115. In addition, the phrase “under taxable subject” should be supplemented to avoid misunderstanding about the collection of environmental protection taxes on all goods and products; Regarding the basis for adjusting the environmental protection tax rate, although it is also related to the environmental protection tax rate, in order to make this provision more clear, it is necessary to adjust Clause 3, Article 115 as follows: “The environmental protection tax rate is based on the types and levels of negative impacts on the environment and quantity or amount of products and goods under taxable subject. The environmental protection tax rate is adjusted to suit the requirements of environmental protection and the country's socio-economic development conditions in each period”.

Regarding provisions on environmental protection fees. Article 116 was developed on the basis of the provisions on environmental protection fees in Article 148 of the 2014 Law on Environmental Protection, so it is basically relatively appropriate. However, to ensure the terminology consistency with the provisions of Article 115 of the Draft, Clause 1 of Article 116 should replace the word “for” with the word “on”, Clause 2 of Article 116 should replace the phrase “prescribed on the following basis” with the phrase “based on”. In addition, it is advisable to adjust the phrase “environment where waste is received” in point c, Clause 2,



Article 116 to “waste receiving source” to ensure compatibility with Clause 37, Article 3 of the Draft Law as well as other provisions in the Draft. For Clause 3, should add the word “development” and remove the word “in” to ensure compatibility with the provisions on the basis for adjusting the environmental protection tax rate in Clause 3, Article 115. Therefore, Article 116 should adjust as follows:

“1. Organizations, individuals that discharge wastes into the environment or generate negative impacts on the environment must pay environmental protection fees.

2. The environmental protection fee rate is based on:

a) Amount of wastes discharged into the environment, scale of negative impacts on the environment.

b) Levels of toxicity of wastes, levels of harm to the environment.

c) Levels of sensitivity of the waste receiving source.

3. The environmental protection fee rate is adjusted to suit the requirements of environmental protection and the country's socio-economic development conditions in each period.”

Regarding deposits for removal of pollutants or contaminants, environmental rehabilitation and remediation in Article 117 of the Draft, there are some recommendations as follows: The title of this Article is not really consistent with the current situation, because Việt Nam is currently applying two types of deposits: Deposits for environmental rehabilitation and remediation for mineral extraction activities and deposits for imported scrap, in which deposits for imported scrap is aiming at “ensuring that organizations, individuals importing scrap are responsible for handling risks of environmental pollution which may arise from the shipment of imported scrap” rather than “removal of pollutants or contaminants, environmental rehabilitation and remediation”, besides, in the future, Việt Nam may issue new deposit instruments with new goals, so Article 117 should stipulate as “environmental protection deposits” instead of the current provisions; Depositors prescribed in Clause 1, Article 117, need to supplement the following sub-

jects: “Organizations and individuals importing scrap” to ensure the compatibility with current provisions; The term “mineral extraction project owners” should be changed to “mineral extraction organizations and individuals” to ensure compatibility with the provisions of point c, Clause 4, Article 37 of the Draft; The deposit level is specified in Clause 2, Article 117, this is a key factor determining the success of the deposit instrument but in reality, the deposit level is specified only by the cost of removal of pollutants or contaminants, or relatively depending on the types and quantity of imported scrap, so the deposit level is not strong enough to ensure the responsibility of environmental protection of the depositors, resulting in the failure to comply with environmental protection obligations, or accepting lost deposit amount. Therefore, it is necessary to consider more carefully the provisions related to the deposit level in the Draft Law to guide the development of the later guiding documents.

Provisions on funding sources for the operation of national and provincial environment protection funds in Clause 2, Article 118 of the Draft are changed from the 2014 Law on Environmental Protection. However, the removal of revenues from “environmental protection fees” and “compensations for the State for environmental damages” stipulated in the Law will make the operating capital of the environment protection funds limited, which affects the fund's operation in the future, when there is a growing demand for financial support for environmental protection and climate change adaptation activities. In spite of the fact that currently, funds from environmental protection funds do not receive these two sources, but only need specific guidelines and effective implementation measures, this will be an additional funding source for environmental protection funds, helping improve the effectiveness of these funds.

Regarding provisions of Articles 120, 121, 122, these provisions all refer to the ecolabels, so it is not necessary to separate them into 3 Articles as currently to avoid losing the logic in structure of content about economic instruments. Also, to ensure the consistency, provisions on ecolabels should be concise, in principle, like other provisions, including: What ecolabel is, the conditions for being ecolabeled, consumption and production orientation for ecolabeled products.

Through the above analysis, it is very necessary to include the content of economic instruments in the Draft Law revising and supplementing some articles of the Law on Environmental Protection, clearly demonstrating the State's views, objectives and efforts on environmental protection. However, for the economic instruments to be effective in practice when the Law comes into effect, it is necessary to continue to improve these provisions. Hopefully, the above recommendations can contribute to the improvement of economic instruments in the Draft Law, making positive results in environmental protection when implemented in reality■



Some measures to finalize the regulations on waste management in the Draft Law on Environmental Protection (revised)

Assoc. Prof. Dr. VŨ THỊ DUYÊN THỦY
Hanoi University of Law

After the enactment of the Law on Environmental Protection 2014 (LEP 2014), there have been positive changes in the perspective in which the Government protects the environment by laws. The LEP 2014 has become an important legal instrument in environmental pollution control, contributing to sustainable development in Việt Nam. There has been a separate section on waste management in the LEP 2014 that specifies the responsibilities of each entity in waste management and specific requirements for management of ordinary or hazardous waste. However, during the implementation in practice, a number of shortcomings of such provisions can be revealed. Accordingly, it is urgent to revise the regulations on waste management to address the new arising issues as well as respond to climate change.

In the Draft LEP (revised), there are many revised or supplemented regulations on waste management. For example, the management of radioactive waste is now regulated in the Atomic Energy Law instead of the LEP. The Draft LEP (revised) also further defines the classification of ordinary solid waste... These revisions reflect progressive changes that are consistent with reality. Reviewing the LEP 2014 and the Draft LEP (revised), this Article points out some specific measures to finalize the provisions, contributing to improving the efficiency of waste management in Việt Nam.

Firstly, the provision of waste exchange should be added.

Following the traditional approach in Việt Nam, a common management process, including reducing, sorting, collection, treatment and disposal are applied to all types of waste or materials discarded from human activities. Therefore, an economic perspective of waste has not been considered. Furthermore, waste seems to become a burden for society because of

environmental impacts and treatment costs. On the other hand, some of the discarded materials can be recycled, reused or be an alternative source for raw materials. When natural resources are increasingly becoming scared, this approach can be regarded as an effective measure to control environmental pollution, protect natural resources, and ensure sustainable development.

The LEP 2014 has stipulated a provision in which the recycling and reuse of waste in manufacturing establishments have been encouraged. In fact, this provision is too general and is understood as “voluntary” rather “mandatory”. Besides, waste management in practice in many countries has illustrated the economic and environmental value of waste exchange between manufacturing establishments. Accordingly, waste generated from a manufacturing establishment can become a source of raw materials for more than one counterpart. Consequently, it not only helps to reduce production costs but also prevents environmental pollution or over-exploitation of natural resources. Therefore, it is essential to develop new provisions on waste exchange to create a legal basis for waste exchange activities and thereby make better use of economic and environmental values.

Secondly, the Draft LEP (revised) should have a provision on specialized staff in charge of waste management at manufacturing establishments generating waste.

Waste management is specific work so that it requires the assigned staff at manufacturing establishments to have expertise in this field. However, the enterprises have not given priority to waste management, especially in the case of small and medium enterprises (SMEs). As a result, waste management is not effective. Therefore, the new provision should be supplemented in which it is mandatory to have professional staff in charge of pollution control in enterprises. This staff shall be provided training courses on environmental pollution control and waste management. For that reason, they will be able to detect environmental uncertainties in the enterprise before such uncertainties happen to ensure proactiveness in the prevention of environmental pollution while minimizing burdens on waste management related administrative procedures.

In the case of SMEs generating a small amount of waste, a staff specialized in waste management shall undergo relevant training courses, obtain necessary certifications and help to show the enterprise's corporate social responsibility. Besides, it also prescribes more strict requirements for the assigned staff if the enterprise discharges a large amount of waste into the environment that imposes seriously negative environmental impacts.



Thirdly, it should remove several overlapping provisions on waste management in manufacturing, trading and service activities.

Manufacturing, trading and service establishments in all sectors are the source of waste. Thus, it is crucial to implement waste management in such establishments and waste management becomes the responsibility of the owners of establishments. The LEP 2014 has introduced many provisions on environmental protection in each manufacturing, trading and service sectors together with requirements for waste management. Specifically, Article 38 regulates environmental protection during the exploration, extraction and processing of minerals in which “organizations and individuals conducting mineral exploration, mining and processing must take preventive measures and responses to environmental incidents and comply with requirements for environmental protection, rehabilitation, and remediation, for example, provisions on wastewater and solid waste collection and treatment”. In addition, Article 69 stated environmental protection in agricultural production in which “concentrated breeding zones must have an environmental protection plan and are required to ensure environmental sanitation for residential areas; collect and treat wastewater and solid waste in accordance with waste management regulations”. Article 79 defines environmental

protection in research institutes and laboratories. Accordingly, research institutes and laboratories must comply with environmental protection requirements such as “collection and treatment of wastewater under environmental technical regulations; classification of solid waste at source; collection and disposal of solid waste under laws on solid waste management...”.

The requirements for waste management in the manufacturing, trading and service sectors mentioned above are necessary. However, these requirements cause overlapping in LEP 2014. Accordingly, there are general provisions on responsibilities for management of wastewater, solid waste and emissions for all organizations and individuals that generate waste during their activities. Regardless of waste from agricultural production or research institutes and laboratories, or during mineral exploration, mining and processing, the owners of the establishments must follow general requirements for waste management. Therefore, it is not logical to restate these requirements in each sector within the same Law, except for specific requirements.

Fourthly, it should stipulate the responsibility of waste generators in waste classification.

Under LEP 2014, Article 86 prescribes reduction, reuse and recycling of waste in which “waste that can be reused, recycled and used as energy must be classified”. However, the responsibility for waste classification has not yet been specified. The question is who has obligations to classify waste: waste generator, individual or organization in charge of waste transport and disposal or authorities?

Based on the scientific and practical approach, it can be seen that waste sorting at source is an effective solution in terms of both economic and environmental aspects. However, the current general provision of waste classification cannot assign responsibilities to any entity in waste management. It is thought that responsibility for waste classification should be clearly



▲ *Encourage the collection and reuse of waste*



defined, firstly for the owners of waste sources and following by relevant entities such as owners of waste transport and treatment in the case the owners of waste sources do not fulfill this obligation for specific reasons. This content has been included in Article 44 of the Draft LEP (revised) on reduction, reuse, and recycling of solid waste. Nevertheless, this new provision does not specify who is in charge of waste classification. Besides, the waste generators are only required to reduce, reuse, recycle and recover energy from waste. As a result, it is more appropriate to integrate the waste generators' responsibility for waste sorting at source in the group of general provisions on waste management.

Fifthly, the current provision on manufacturing, importing, transporting, trading and using firecrackers and firework should be defined in other laws.

Provisions on management and control of noise, vibration, light and radiation in Clause 4, Article 103 of the LEP 2014 say: "It is prohibited to manufacture, import, transport, trade and use of firecrackers". The manufacture, import, transport, trade and use of fireworks are under the Prime Minister's Decision. This provision is necessary for the context of Việt Nam but should not be included in the group of regulations on management and control of noise, vibration, light, and radiation. Firstly, firecrackers and fireworks are not waste. Waste generated from the production, import, transport and use of firecrackers and fireworks is not a big issue that requires a specific management procedure. Secondly, such prohibition aims to contribute to explosive management rather than management of and control of noise or vibration generated during the manufacturing, importing, transporting, trading and using firecrackers as defined in regulations on waste management. Consequently, it would be more reasonable to regulate this matter in other laws, namely Law on Explosives Management.

In summary, there are a number of shortcomings in LEP 2014 after more than five years of implementation. Accordingly, it is crucial to eliminate these shortcomings to improve the effectiveness of environmental control in Việt Nam in the coming years■

In the composition of the air, 20,94% is Oxygen (O_2) which nourishes all the cells of the human body. Absolutely dry air without moisture, clean, contains three main gases in which 78,08% is Nitrogen (N_2), 20,94% is Oxygen (O_2), 0,93% is Argon (Ar). The remaining about 0,043% are usually CO_2 (0,04%), Ne (0,0018%), He (0,0005%), CH_4 (0,0002%) and H_2 (0,00005%). Except for the 3 main substances that make up the dry air mentioned above, other substances present in the air at very small concentrations, below the allowable standards are considered acceptable impurity. If they have concentrations above the allowable values, they are considered pollutants and the air in such a state is polluted air.

Human's production activities (industry, agriculture, construction, transportation...), waste incineration, cooking, domestic activities have released many different compounds into the air that make up two main groups of pollutants: Polluting gases such as NO_x , SO_x , O_3 (Ozone), CO, CO_2 , TVOC, Formaldehyde ... have extremely small molecular sizes, about less than 5 nanometers ($1\text{ mm} = 1.000\text{ }\mu\text{m} = 1.000.000\text{ nm}$); Dust particles, including airborne dust, are $\leq 100\text{ }\mu\text{m}$ in diameter, PM_{10} fine dust (diameter is $\leq 10\text{ }\mu\text{m}$), PM_5 fine dust (diameter is $\leq 5\text{ }\mu\text{m}$), $PM_{2.5}$ ultrafine dust (diameter is $\leq 2,5\text{ }\mu\text{m}$), and PM_{10} ultrafine dust (diameter is $\leq 1\text{ }\mu\text{m}$). The thickness of the hair is about $100\text{ }\mu\text{m}$ therefore these fine dust particles can not be seen by naked eyes. Dust particles smaller than PM_{10} exist in the air for a long time, directly affecting human's health.

1. BASES FOR ASSESSING THE LEVEL OF URBAN AIR POLLUTION IN VIỆT NAM

Bases for assessing the level of urban air pollution are to compare the actual air pollution monitoring data and allowable values in environmental standards according to National Technical Regulation on Ambient Air Quality QCVN No. 05:2013/BTNMT (Table 1).

As the Table 1 shows, the QCVN No.05:2013/BTNMT provides the allowable hourly, 8-hour, 24-hour (daily), annual average values. Therefore, it is necessary to compare the hourly, daily or annual average values collected by the monitoring system with the hourly, daily or annual average values in the National Technical Regulation. If we take the monitoring values for each instant measurement and compare with the average values in the Table 1 to assess the level of urban air pollution as some media have shown in the recent time, it is completely incorrect.

Next, it is necessary to assess the level of urban air pollution by the Air Quality Index (AQI_x) according to the Circular No. 1459/QĐ-TCMT dated 12th November 2019 of the Vietnam Environment Administration (VEA), that:

$$AQI_x = \frac{I_{i+1} - I_i}{BP_{i+1} - BP_i} (C_x - BP_i) + I_i \text{ (Formula 1)}$$

$$AQI_x = \frac{I_{i+1} - I_i}{BP_{i+1} - BP_i} (\text{Nowcast}_x - BP_i) + I_i \text{ (Formula 2)}$$



Assessment of urban air pollution in Việt Nam and suggestions for improvements

Prof. Dr. PHẠM NGỌC ĐĂNG - Vice Chairman
Vietnam Association for Conservation of Nature and Environment

AQIh values of parameters SO₂, CO, NO₂, O₃ are calculated according to Formula 1, AQIh values of parameters PM₁₀, PM_{2.5} are calculated according to Formula 2:

Good, moderate, unhealthy for sensitive groups, unhealthy, very unhealthy, hazardous AQI levels and their interaction with human's health are provided in Table 2.

AQI = 101 ÷ 200: Corresponding to air quality that is unhealthy for sensitive groups and unhealthy. AQI = 201 ÷ 300: Air quality is very unhealthy. AQI = 301 ÷ 500: Air quality is hazardous. Typically in Hà Nội, the number of days in 2014 with AQI as unhealthy for sensitive groups accounts for more than 50% of the total number of monitoring days in the year, even, there were days when air quality declined to a very unhealthy and hazardous threshold (AQI > 300).

2. DEVELOPMENT OF AIR POLLUTION IN SOME URBAN AREAS IN VIỆT NAM IN RECENT YEARS

So far, no locality has officially announced the environmental monitoring results in 2019. Based on the information of the Center for Environment Monitoring of the VEA in 2019, there are 3 typical graphs of the state of pollution development of air environment components in the last 6 years (2013 - 2018): Graph 1, Graph 2 and Graph 3 below.

From above graphs, problems of air pollution in some urban areas in Việt Nam in recent years are as follows:

PM₁₀, PM_{2.5} dust pollution: The PM₁₀ and PM_{2.5} fine dust monitoring data of 6 automatic air monitoring stations in Hà Nội, Hạ Long, Việt Trì, Huế, Đà Nẵng and Nha Trang cities show that dust pollution continues to be a prominent problem. However, the Graph 1 shows that PM₁₀ and PM_{2.5} fine dust pollution in the air in Hà Nội, Việt Trì, Phú Thọ cities has tended to decrease in recent years. The PM₁₀ and PM_{2.5} fine dust pollution in the

No	Parameters	1-hour average	8-hour average	24-hour average	Annual average
1	SO ₂	350	-	125	50
2	CO	30,000	10,000	-	-
3	NO ₂	200	-	100	40
4	O ₃	200	120	-	-
5	TSP	300	-	200	100
6	PM ₁₀	-	-	150	50
7	PM _{2.5}	-	-	50	25
8	Lead (Pb)	-	-	1.5	0.5

Table 1: Maximum values of basic parameters of ambient air (µg/m³) according to QCVN No.05:2013/BTNMT

AQI value range	Air quality	Effects on human's health
0 - 50	Good	No health risk
51 - 100	Moderate	Sensitive groups should limit their time outdoors
101 - 150	Unhealthy for sensitive groups	Sensitive groups should limit their time outdoors
151 - 200	Unhealthy	Sensitive groups must limit their time outdoors
201 - 300	Very unhealthy	Sensitive groups avoid going outdoors, others are limited to outside
301 - 500	Hazardous	Everyone should stay indoors

Table 2: AQI levels and their effects on human's health



air of Hà Long City has a little change and is approximating the allowable standard value. The concentration of PM_{10} and $PM_{2.5}$ fine dust in the air of Đà Nẵng City is lower than the allowable standard value. In general, according to the monitoring data of automatic monitoring stations in 6 cities (Hà Nội, Hà Long, Việt Trì, Huế, Đà Nẵng and Nha Trang), the fine dust variability from 2011 to 2018 has been improved. Specifically in Hà Nội, the ratio of the number of days with PM_{10} dust concentration exceeding the allowable standard value according to QCVN No. 05:2013/BTNMT in 2010 was 13,13%, in 2015 was 6,87% and in 2018 was 1,93%; $PM_{2.5}$ in the same years was 61,25%, 33,91% and 19,69% respectively. The air quality in the 3 Central coastal provinces (Huế, Đà Nẵng and Nha Trang) was still relatively good (almost without dust pollution). Specifically, the above ratio of 2015 for PM_{10} in Huế was 3,67%, Đà Nẵng was 2,86% and Nha Trang was 0,0%.

Total suspended particles (TSP) pollution: Construction activities are a major source of TSP. In the same City, TSP monitored at different locations will have different results and depend on the construction activities allocated in the city. In recent years, in Hà Nội City, the concentration of TSP at the monitoring stations on the roads of Phạm Văn Đồng, Trường Chinh, Vĩnh Tuy, Mai Động... was still at heavy and very heavy pollution level.

The fluctuation of dust concentration in the Northern urban areas is very

clear in a year from October to April, the dust concentration is greater between May - September, whereas in the Central coastal cities, the dust concentration varies by season not significant. The dust concentration varies by hour of day in the 6 cities mentioned above is similar, maximum at peak hours and smallest at noon (13 - 14 hours). The average $PM_{2.5}/PM_{10}$ dust concentration in the above cities is about 0,57 - 0,72.

Coastal cities all have better air quality than inland urban areas far from the sea. For urban areas in the South, the climate during the year is divided into dry and rainy seasons. Concentrations of PM_{10} , $PM_{2.5}$ dust have significant differences between the two seasons, the rainy season (May to November) and the dry season (December to April), the concentration of urban dust is often high in the dry season and low in the rainy season.

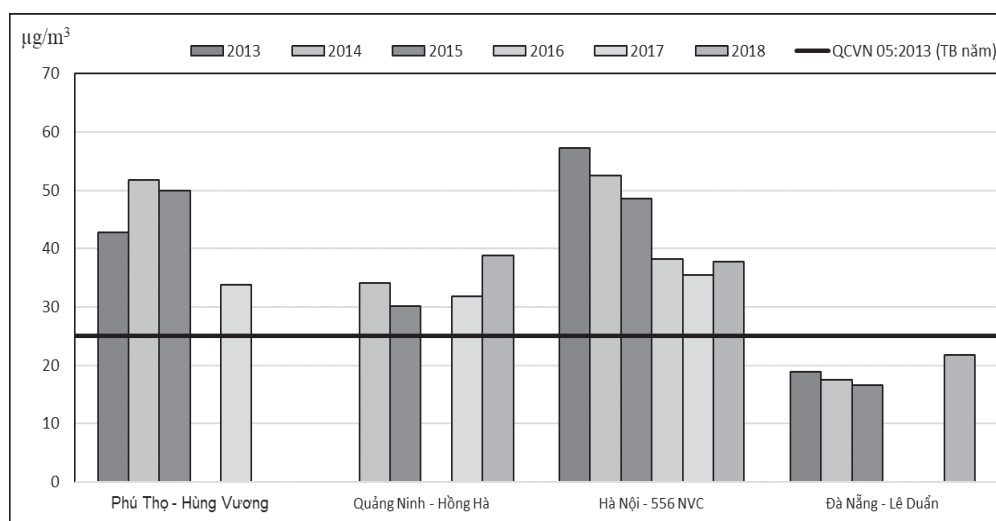
NO_2 , SO_2 , CO and VOC pollution: In urban areas, the sources of NO_2 , CO and VOC emissions are mainly from transportation activities, SO_2 emissions are from coal and sulfur-containing oil burning (buses, industrial production if any and cooking using honeycomb coal).

NO_2 concentration: NO_2 concentration in the air in some big cities such as Hồ Chí Minh City (Graph 3) in recent years has also exceeded the allowable limit. In many other urban areas, the NO_2 concentration is lower or approximately equal to the allowable limit.

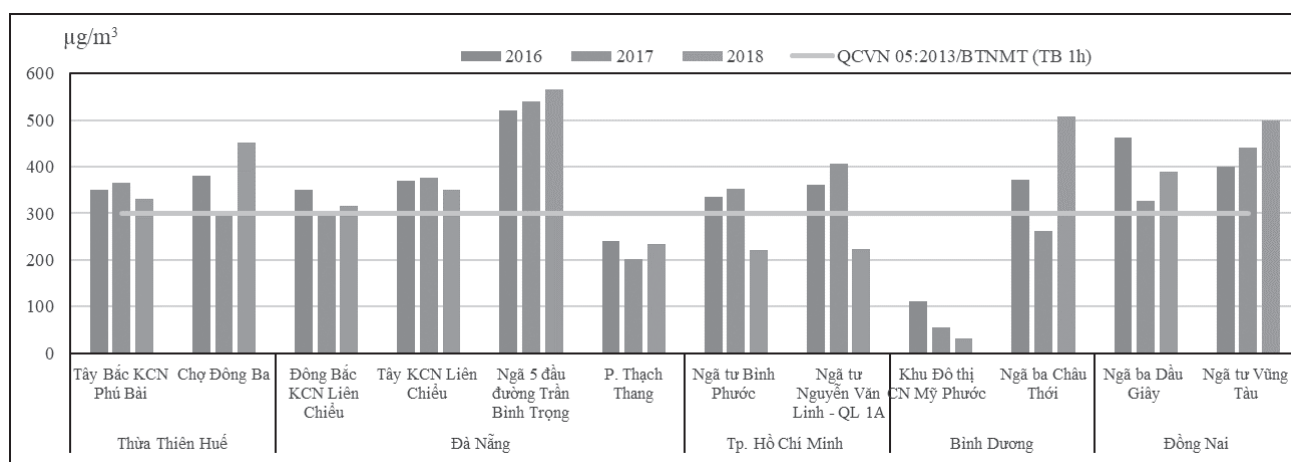
VOC concentration: In urban areas, especially in areas with high frequency traffic, the emission of this organic compound may be from the exhaust gas of the transportation system. In some localities such as Hà Nội, Đồng Nai, VOC concentration in the air monitored at some locations in the period of 2011 - 2015 has exceeded the allowable limit.

SO_2 , CO concentrations: In most urban areas, they are still within the allowable limit of National Technical Regulation.

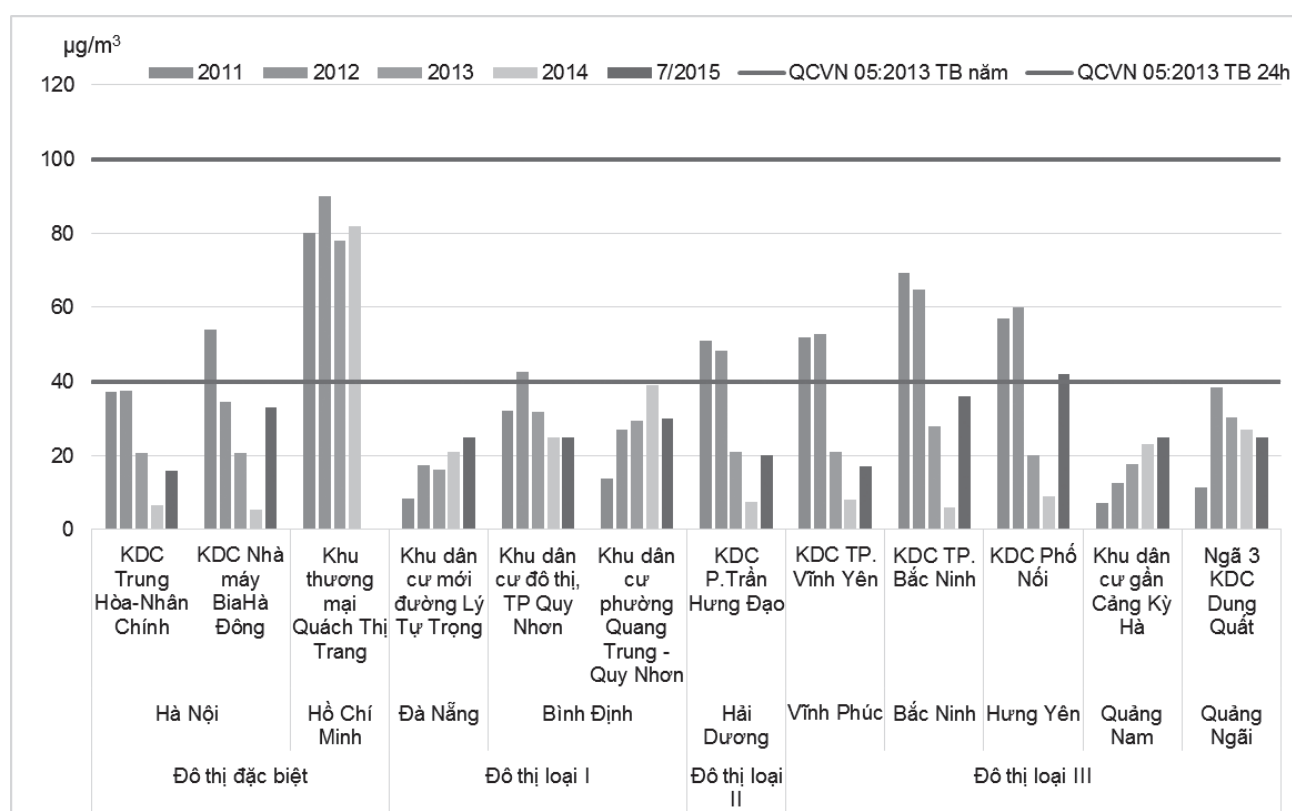
General assessment of urban air pollution: From 2013 to date, air pollution has been a downward trend in urban areas in Việt Nam, however, there has been a different in-



▲ Graph 1: Development of annual average concentration of $PM_{2.5}$ fine dust in automatic monitoring stations located in Hà Nội, Phú Thọ, Quảng Ninh and Đà Nẵng in the period of 2013 - 2018 (Source: VEA, March 2019)



▲ Graph 2: Development of TSP concentration in some urban centers of Thừa Thiên - Huế, Đà Nẵng, Hồ Chí Minh City, Bình Dương, Đồng Nai in the period of 2016 - 2018 (Source: VEA, March 2019)



▲ Graph 3: Development of annual average NO_2 concentration in some residential areas in the period of 2011 - 2015 (Source: VEA, Institute for Environment and Resources of National University of Hồ Chí Minh City Departments of Natural Resources and Environment, 2015)

crease/decrease in each time. In 2019, air pollution in Hà Nội and Hồ Chí Minh City is unusual compared to previous years with local pollution increased. In particular, in September 2019, $\text{PM}_{2.5}$ fine dust pollution increased due to the least rain in the past 6 years. In September 2019, with the phenomenon of

heat inversions, the suspended dust could not escape to high places. Besides, this time was in the rice harvest, the burning of straw in the suburbs has affected the air in the cities.

In addition, depending on the location of different stations, air parameters are different. Where traffic jams, construction density is high, air pollution parameter is higher than elsewhere. Therefore, the air quality parameters in the city depend on the density of the monitoring stations.



3. SOURCES OF AIR POLLUTION AND SUGGESTIONS FOR IMPROVEMENTS

In order to take effective actions to prevent pollution and improve urban air quality, it is necessary to first identify exactly the major sources polluting the urban environment. According to urban research in Việt Nam, especially in large cities, there are 8 major sources of pollution such as: Pollutants discharged from exhaust pipes of motor vehicles, especially from old vehicles and not regularly serviced and diesel vehicles; Emissions from new construction activities and repair of buildings, transport and urban technical infrastructure; Emissions from industrial and handicraft production facilities inside and around the cities; Poor street sanitation is a source of total suspended particles (TSP) and a part of fine dust (PM_{10} , $PM_{2.5}$); Emissions from honeycomb coal stoves are mainly pollutants such SO_2 , NO_2 , CO and TSP; Leaks and evaporation of petrol and VOC gases from petrol stations, from motor vehicles, paint and varnish production and painting and varnish places; Odors from sewers, ponds, rivers with polluted water environment; Straw burning during rice harvest season.

Here are some solutions to improve urban air quality:

- Promote the propagation, dissemination, education and guidance on the implementation of environment protection regulations. Mobilize the active participation of the community, every citizen, every production facility, every social organization in the air environment protection in particular and urban environment protection in general.

- Strictly control transportation pollution sources. Immediate solutions: Need to control and check the sources of wastes from motor vehicles; conduct periodic inspections in accordance with the environmental technical regulations on gas emissions for all motor vehicles (different types of cars, especially buses, trucks, cars using diesel oil and motorbikes); ban from circulation for all vehicles that do not meet the requirements of environment protection (including leakage of gasoline vapors); spray water to wash the roads on dry and sunny days. Long-term solutions: Complete a reasonable general urban masterplan, especially a smart urban transport masterplan; develop public

urban transport systems such as bus, metro, skytrain systems...; encourage the formation of walking and bicycle streets; encourage the development of motor vehicles using gas, liquefied gas and electricity...

- Focus on controlling, inspecting and strictly handling sources of dust pollution arising from new construction activities and repairing houses, urban technical infrastructure systems (transportation, water supply, drainage, electricity, gas, information cable systems...); apply less polluting construction technologies, such as not producing fresh concrete at the construction site but producing fresh concrete at the fresh concrete production stations and then transporting it to the construction site and pumping to the floors and columns of works.

- Strengthen the capacity of air environment management agencies in Hà Nội, Hồ Chí Minh City and other major cities, such as establish an air environment management division at the environment protection agencies, additionally provide professionally trained staff on air environment to the environment protection agencies, as well as other environment management divisions in districts; organize refresher courses to improve the air environment management expertise for officials in the environment management system at all levels of major cities.

- Strengthen inspection and control strictly of dust emission sources arising from transportation of bulk materials, especially transportation at night, vehicles transporting at night often violate environmental protection regulations.

- Maintain streets clean, civilized and modern. Clean roads and sidewalks regularly to ensure that dust is vacuumed or washed; perform the collection, transportation and treatment of 100% of urban wastes with hygienic techniques. Educate people to keep the streets clean, not throw garbage into roads or throw garbage into drains, watercourses.

- Strictly inspect and control volatile organic compounds (VOCs), especially gasoline vapors from petrol and oil trading stations, paint and varnish, petrol and oil production, processing and using facilities in urban areas; thoroughly treat water polluted rivers, lakes, ponds and drains; apply technical measures to treat dust generated from industrial and handicraft production in and around the cities.

- Apply incentive policies to achieve the goal that by 2030 there will be no coal stoves in urban areas; apply necessary technological development policies so that suburban farmers stop burning straw during agricultural harvest.

- Develop planting, tending and protecting trees in the cities, ensuring the norm of greenery area per capita to reach the prescribed values according to National Technical Regulation on Construction.

- Prioritize the investment in improving the air environment monitoring system, especially the fixed automatic air monitoring system in urban areas. In Hồ Chí Minh City, there have been 9 - 11 automatic air monitoring stations but 100% damaged. Previously in Hà Nội, there have been 6 automatic air monitoring stations, now 5 automatic stations damaged, those replaced by sensor monitoring stations■



Air pollution causes “huge” reduction in intelligence

Air pollution causes a “huge” reduction in intelligence, according to new research, indicating that the damage to society of toxic air is far deeper than the well-known impacts on physical health. The research was conducted in China but is relevant across the world, with 95% of the global population breathing unsafe air. It found that high pollution levels led to significant drops in test scores in language and arithmetic, with the average impact equivalent to having lost a year of the person’s education.

“Polluted air can cause everyone to reduce their level of education by one year, which is huge”, said Mr. Xi Chen at Yale School of Public Health in the US, a member of the research team. But the effect is worse for the elderly, especially those over 64 and for men, for those with low education. If we calculate... for those, it may be a few years of education”, he said.

Previous research has found that air pollution harms cognitive performance in students, but this is the first to examine people of all ages and the difference between men and women. “The damage in intelligence was worst for those over 64 years old, with serious consequences. We usually make the most critical financial decisions in old age. This report’s findings are extremely worrying”, said Mr. Xi Chen.

Air pollution causes seven million premature deaths a year but the harm to people’s mental abilities is less well known. A recent study found toxic air was linked to disorders and earlier work linked it to increased mental illness in children, while another analysis found those living near busy roads had an increased risk of dementia.

The new work, published in the *Journal Proceedings of the National Academy of Sciences*, analyzed language and arithmetic tests conducted as part of the China Family Panel Studies on 20,000 people across the nation between 2010 and 2014. The

scientists compared the test results with records of nitrogen dioxide and sulfur dioxide pollution. They found the longer people were exposed to dirty air, the bigger the damage to intelligence, with language ability more harmed than mathematical ability and men more harmed than women. The researchers said this may result from differences in how male and female brains work.

Mr. Derrick Ho at the Hong Kong Polytechnic University said, the impact of air pollution on cognition was important and his group had similar preliminary findings in their work. “It is because high air pollution can potentially be associated with oxidative stress, neuroinflammation, and neurodegeneration of humans”, he said.

Mr. Xi Chen added that air pollution was most likely to be the cause of the loss of intelligence, rather than simply being a correlation. The study followed the same individuals as air pollution varied from one year to the next, meaning that many other possible causal factors such as genetic differences are automatically accounted for. The scientists also accounted for the gradual decline in cognition seen as people age and ruled out people being more impatient or uncooperative during tests when pollution was high.

Air pollution was seen to have a short-term impact on intelligence as well and Mr. Xi Chen said this could have important consequences, for example for students who have to take crucial entrance exams on polluted days. But there is no shortcut to solve this issue. Governments really need to take concrete measures to reduce air pollution. That may benefit human capital, which is one of the most important driving forces of economic growth. In China, air pollution is declining but remains three times above World Health Organization (WHO) limits.

According to the WHO, 20 of the world’s most polluted cities are in developing countries. China, home to several of those cities, has been engaged in a “war against pollution” for the past five years. The results would apply around the world, Mr. Xi Chen added. The damage to intelligence was likely to be incremental, he said, with a 1 mg rise in pollution over three years equivalent to losing more than a month of education. Small pollution particles are known to be especially damaging. That is the same wherever you live. As human beings we have more in common than is different.

Mr. Aarash Saleh, a registrar in respiratory medicine in the UK and part of the Doctors Against Diesel campaign said: “This study adds to the concerning bank of evidence showing that exposure to air pollution can worsen our cognitive function. Road traffic is the biggest contributor to air pollution in residential areas and the Government needs to act urgently to remove heavily-polluting vehicles from our roads”■

ĐỖ HOÀNG

(The Guardian source)

Covid-19: A warning for illegal wildlife poaching and trade

NGUYỄN THỊ PHƯƠNG NGÂN
NGUYỄN THỊ PHÚ HÀ
WWF in Việt Nam

As of February 21st, 2020, the outbreak of coronavirus - starting in Wuhan City of Hubei Province, China in late 2019 - has killed more than 2.200 people and infected more than 76.700 others on a global scale. As the epidemic becomes pandemic, the Chinese Government has temporarily banned wildlife trafficking. Worldwide conservationists hope the ban would be permanent to shut down illegal animal trade completely.

The acute respiratory disease caused by the novel coronavirus (nCoV) is spreading very fast and the situation has become highly critical in China, forcing the World Health Organization (WHO) to declare the outbreak a pandemic. The novel coronavirus, which causes acute respiratory disease and can be transmitted from a person to one another, had not been identified until first infections were found at a live animal market in Wuhan, Hubei, China. There are six other types of coronavirus that have been learnt and all of them are person infectious.

The coronavirus is a betacoronavirus like the Middle East Respiratory Syndrome (MERS) and the Severe Acute Respiratory Syndrome (SARS). The virus can be hosted by different kinds of animal such as camel, cat and bat. Genetic analysis of the virus is being implemented to address its accurate origin. SARS coronavirus originated from civet while MERS coronavirus originated from camel.

The virus was first found in animals, but it can spread from a person to one another. It is important to note that person-to-person infection can happen on a continuum. Person-to-person spread happens when people cough, sneeze and shake hands, allowing the virus -which is contained in body fluids - to transmit from one to another. As of February 21st, 2020, the global death toll caused by the coronavirus has passed 2.000 and the number of infection cases outside China is increasing sharply.

Most of the infection cases outside China are people who travel from the epicenter Wuhan. Facing the new disease, WHO Direct General Tedros Adhanom Ghebreyesus has warned the disease can spark a global fire, calling the Governments to isolate the sparks and prevent them from spreading. The WHO on February 11th, 2020 named the novel coronavirus Covid-19.

Facing the unpredictable developments of the new virus, the Chinese Government has banned wild animal trade at markets, restaurants and online platforms. The negative impact of illegal animal trafficking on wildlife species and global biodiversity has been well-known, but the effects on human health have remained questionable, unconcerned. The disease caused by the novel coronavirus, SARS, MERS and other epidemics and pandemics prove that governments and international organizations must work harder to raise public awareness about potential health issues that could be caused by illegal wildlife trafficking.

Live and dead animal markets are popular in Asian countries, especially in the Mekong Sub-region - a part of which is covered by Việt Nam, the Golden Triangle (near China) - where the borders of Thailand, Laos and Myanmar meet. Traps are placed everywhere by poachers to meet increasing market demand for wild animals. Consequently, it become an issue for all countries in the region as Asian tropical forests are becoming empty and special species are vanishing, which require Governments to impose a permanent ban on animal



▲ A corner at Huanan market, Wuhan, China



trafficking. However, the ban which is legalized in many regional nations – has not been implemented strictly.

Illegal animal trafficking is not the only threat to wildlife animals. Trafficked animals are not checked and quarantined, then they become a threat to the health of human and pet animals and to the socio-economic development inside and outside the country. The coronavirus can infect animals and it can be transmitted from animals to people.

The virus lives in mammals and it can transform and transmit to people that stay close to the infected animals. It makes live animal market a good place for the virus to transform and infect people, causing serious damages. In addition, the rapid development of the transportation system and tourism allows infectees to carry the virus to larger places and spread the disease wider.

Việt Nam has seen its socio-economic development suffer critical damages caused by animal-originated diseases like SARS and now Covid-19 has appeared. To prevent a potential outbreak, the Government needs to shut down illegal wild animal market for good and enhance the Law enforcement on wildlife animal trafficking. In response to the spread of coronavirus, the Chinese Government bans wild animal trafficking and Việt Nam needs to act the same in order to help the global community prevent other animal-originated diseases from broadening in the future.

In the near future, the World Wildlife Fund (WWF) will work closely with Asia-Pacific Governments to strengthen their legal policies and encourage the public health sector to participate to end illegal wildlife trafficking and crack down unofficial markets.

To assure the national defense, economic security and community health as well as preserving precious local ecosystems, WWF also expects the Vietnamese Government to have stronger measures to stop all illegal trafficking and consumption activities in Việt Nam such as shutting down all illegal animal markets and restaurants; issuing mandates for e-commerce platforms, social network platforms and online media to monitor and remove all advertisements regarding illegal animal trading and consumption; developing regulations to strictly manage commercial animal farming; reforming legal procedures to prevent illegal animal trafficking crimes; and raising the awareness of Vietnamese people about potential risks and impacts brought by illegal wildlife trading ■

Proper waste control in Hạ Lôi Village to curb the COVID-19 spread

Hạ Lôi Village (Mê Linh District, Hà Nội City), with more than 11.000 people, has been placed under a lockdown since the night of April 7th, 2020 for 28 days after the first three infections were confirmed

Local authorities in Mê Linh District has requested Minh Quân Company, the garbage collection unit in the country's newest COVID-19 infection cluster in Hạ Lôi Village, to mobilise six permanent workers to collect garbage from the quarantine area with handcarts.



▲ Domestic garbage is collected in Hạ Lôi Village

Director of the District's Management Board Phạm Anh Tuấn said domestic waste from Hạ Lôi Village was a risk in spreading the disease if it was not treated properly. He has asked the Company to arrange workers to be in charge of collecting garbage from the area. These workers would collect garbage at every gate of the households in every lane of the village with handcarts.

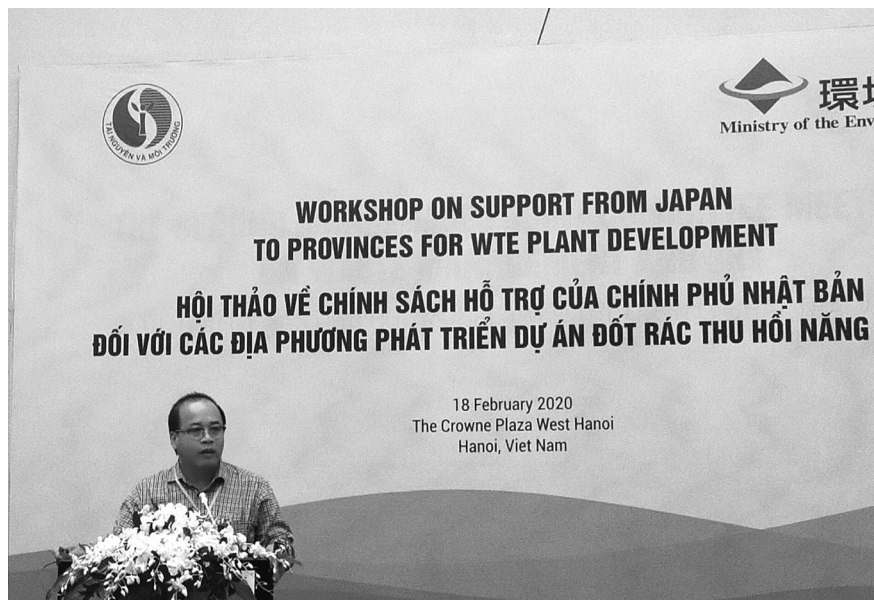
Collected garbage would be covered with sealed bags and transported to the waste treatment areas at 5 pm everyday. The process of garbage collection would be implemented until the end of isolation in the village.

In addition, the management board has installed three mobile toilets at three checkpoints. The Company would be in charge of mobilising workers to maintain sanitation of the toilets. The Company has been asked to sign a contract with the Urban and Industrial Environment No.13 Joint Stock Company (URENCO 13) under the Environment and Urban Company to organise the garbage collection at collection points and transport it to the treatment areas. The amount of waste discharged from Hạ Lôi Village was estimated to be about two tonnes per day.

Deputy Director of the Urban Environment Company (URENCO) 13 Tổng Việt Dũng said the Company has mobilised six drivers and three trucks to collect garbage. Each vehicle would make a trip per day at between 4 pm and 6 pm. The Company has also implemented disinfection spraying with Chloramin B on the trucks to prevent the spread of the disease ■

HƯƠNG ĐỒ (Vietnamnet source)

Bà Rịa - Vũng Tàu Province gradually converts its plan of domestic waste treatment from landfill to incineration and recycling



▲ Mr. Đặng Sơn Hải - Deputy Director of Department of Natural Resources and Environment of Bà Rịa - Vũng Tàu Province

Recently, the implementation of domestic solid waste management and treatment in Bà Rịa - Vũng Tàu Province has been interested, but so far there are still many difficulties and challenges. Under the pressure of increasing domestic solid wastes, Bà Rịa - Vũng Tàu Province is developing a roadmap to 2021, which will convert its plan of domestic solid waste treatment from landfill to incineration and recycling. Vietnam Environment Administration Magazine (VEM) has conducted an interview with Mr. Đặng Sơn Hải - Deputy Director of Department of Natural Resources and Environment of Bà Rịa - Vũng Tàu Province on the implementation of these solutions in the Province, gradually restricting domestic solid waste treatment from landfill.

VEM: Could you tell us the status of collecting, transporting and treating domestic solid wastes in Bà Rịa - Vũng Tàu Province in the recent time?

Mr. Đặng Sơn Hải: Currently, the amount of domestic solid wastes generated in the Province is about 950 tons/day. In particular, the amount generated on the mainland of 7 cities and districts, including Vũng Tàu, Bà Rịa cities, Phú Mỹ Town and Châu Đức, Long Điền, Đất Đỏ, Xuyên Mộc Districts is collected and hygienically land-filled at Tóc Tiên Centralized Solid Waste Treatment Area with an average amount of about 850 tons/day. The remaining amount in Côn Đảo Island District of about 12 tons/day is collected and transported to Bãi Nhát area for storage; some are burnt locally by small incinerators (about 5 tons/day), the rest continues to be stored here by dumping (up to now, the amount of residual wastes is up to about 72.000 tons).

The organization for collection and transportation of domestic solid wastes in Bà Rịa - Vũng Tàu Province is mainly conducted by urban environmental service companies, additionally by several private companies and collection teams established by local people (implemented mainly in densely populated urban areas). Means of collection and transportation used include many different types, in addition to specialized vehicles, there are light trucks converted, modified ... that ensure safety for this work.

VEM: As the Province has islands and mainland, so are there any difficulties in the process of investing in the construction of domestic solid waste treatment areas?

Mr. Đặng Sơn Hải: According to the Domestic solid waste planning of Bà Rịa - Vũng Tàu Province to 2025, vision to 2030 approved in Decision No. 1880/QĐ-UBND dated 20th August, 2013 and the Decision No. 2553/QĐ-UBND dated 19th September 2016, solid waste treatment is planned in three main areas: Tóc Tiên Centralized Solid Waste Treatment Area in Phú Mỹ Town with completed technical infrastructure in an area of about 137 ha; Láng Dài Centralized Waste Treatment Area in Đất Đỏ District with an area of 52 ha (Phase 1 of the project is planned with



an area of 20 ha to implement the domestic solid waste treatment project applying landfill method with roadmap for putting the project into operation in 2019) and the domestic solid waste treatment plant with burning technology in Côn Đảo District is being planned for investment.

In the recent time, thanks to timely planning with the support of the province on incentive policies, the socialization of waste treatment has been promoted, contributing to solving most of the environmental problems arising in the solid waste management and treatment in the Province. Since then, domestic solid wastes have been moved from open and unhygienic landfill sites to hygienic landfill sites, towards other environmentally friendly solutions, economical and efficient use of resources such as recycling (composting), incineration combined with exhaust gas treatment, electricity generation, ensuring compliance with environmental technical regulations.

However, the implementation of the Provincial policies also faces many challenges. With the business objective of maximizing profits, the investors of domestic solid waste treatment projects in the Province mainly choose the hygienic landfill method, because this type of project is easy

to implement, has lower investment and operating costs than other methods, requires less implementation time and skilled labour force with intensive training... Meanwhile, incentive policies on investment in waste treatment so far are no longer suitable, making difficulties to handle practical problems, especially since the exemption of land use fees is applied to all types of waste treatment without discrimination (priority, encouragement, restriction, ban...), that has become a major barrier and not motivated the implementation of the provincial policies.

Besides, waste treatment is a type of activity with many potential risks to the environment. In order to prevent and minimize impacts, the control and assessment of technology level of the project are required. However, due to the lack of information in defining criteria to prevent and eliminate outdated technologies with significant emissions and energy consumption, so the technology appraisal for selection of investment projects has faced many obstacles.

VEM: *How do you assess the projects of incineration to recover energy currently being implemented in some localities across the country? What is the Province's plan to implement a roadmap to convert waste treatment models as well as incentive mechanisms for businesses to invest in this area?*

Mr. Đặng Sơn Hải: The request for conversion of waste treatment method as (hygienic) landfill that requires large land funds to treatment by other methods that save more efficient use of land such as recycling wastes combined with composting to recover biogas or incineration to recover energy is an indispensable trend in waste management of localities in the country today.



▲ Domestic solid wastes collected in ward 10, Vũng Tàu City then transported to Tóc Tiên Centralized Solid Waste Treatment Area (Phú Mỹ Town)



The results of visits and surveys in some localities such as the two projects of waste treatment plants in Cần Thơ (Everbright International Company) and Quảng Bình (Vietnam Project Development Co., Ltd) in April 2019 show that these are waste treatment projects with scientific management processes, advanced technological equipment, environmentally friendly treatment solutions, rational and efficient use of resources, mostly land resources. Moreover, the project in Quảng Bình also has the advantage of combining solar power generation and the practice area of high-tech agricultural production model in the project space, increasing the efficiency of land use. This reality has completely changed the view that previously, waste treatment projects with advanced and modern technology lines fully transferred by investors from abroad for investment in Việt Nam are not feasible, due to the huge and inefficient investment costs (because wastes are not segregated at source). Therefore, these models can be considered as a basis for Bà Rịa - Vũng Tàu Province to call for investment and assess the feasibility of the projects (on environmental protection requirements and technology level of the projects) in deciding investment policies.

In terms of management, in order for the waste treatment to be effective, in parallel with the implementation of mechanisms and policies to encourage enterprises to invest in waste treatment according to regulations, the selection of investment projects under the provincial policies to convert the current domestic solid waste treatment method will be used as a basis for the selection of investment projects by Bà Rịa - Vũng Tàu Province.

VEM: *In the coming time, is there any solution of Province to improve the effectiveness of solid waste management in the area?*

Mr. Đặng Sơn Hải: All current domestic solid wastes in the province are hygienically landfilled in the landfill area of KBEC Vina Co., Ltd. (Tóc Tiên Centralized Waste Treatment Area). Therefore, in order to comply with the provincial policies on the roadmap for conversion from landfill to incineration, recycling and energy recovery, avoiding immediate and long-term environmental pollution, solutions to be applied to improve the effectiveness of solid waste management in the province are proposed as follows:

Based on the National Environmental Protection Planning, the Province will develop a plan on environmental protection and biodiversity conservation in the planning of Bà Rịa - Vũng Tàu Province for the 2021 - 2030 period, including a plan for waste treatment facilities. In the immediate future, review and adjust the solid waste management planning of the Province to 2025, with a vision to 2030 to meet the current and future needs.

Develop Criteria for selecting partners to perform pollution treatment in Bãi Nhát area, such as: Install on-site incinerators; burning time does not exceed one year (with priority to focus on implementation in the sunny season in the shortest time); wastes before being put into incinerators must be segregated; the emission of incinerators must meet the emission requirements according to the National Technical Regulation on domestic solid waste incinerators (QCVN No. 61:2016/BT-NMT). Also, develop Criteria for selecting investors to build domestic solid waste treatment plants with the application of incineration, recycling and energy recovery technologies in Tóc Tiên Centralized Waste Treatment Area as a basis for calling for investment at the request of the Province.

Convert the planning and management model of Tóc Tiên Centralized Solid Waste Treatment Area to the planning and management model of an industrial park; review, assess and adopt appropriate solutions to renovate and restore the environment of some temporary, unhygienic domestic solid waste landfill sites already closed.

VEM: *Do you have any suggestions to adjust policies and regulations related to the state management of domestic solid wastes?*

Mr. Đặng Sơn Hải: In addition to concentrating the Provincial resources to effectively implement solid waste management, Bà Rịa - Vũng Tàu Province also needs the support of the Central Government, therefore, we would like to propose the Ministry of Natural Resources and Environment as follows:

Firstly, review, amend and supplement legal documents on solid waste management, especially the review of incentive policies being implemented to make suitable adjustments with prioritization, discourage waste treatment by hygienic landfill methods; prioritize investment projects with advanced and modern equipment and technologies that have been successfully implemented and applied in practice... Also, allow the flexible application of special administrative and economic instruments (taxes, fees...), social instruments (propaganda and education) in accordance with the actual conditions of each district/city.

Secondly, provide guidance on the roadmap for implementation of reducing, towards not using the state budgets for solid waste collection, transportation and treatment.

Thirdly, guide the Department of Natural Resources and Environment (DONRE) to be the focal point to carry out the state management of solid wastes for the province to organize the implementation (transfer processes; regulations on functions, tasks; human and material resources mobilized from other agencies to DONRE..).

VEM: *Sincerely thank you!*

PHẠM TUYỀN (Implemented)



What are businesses doing to turn off the plastic tap?

Faced with the undeniable consequences of a toxic tide of plastic, people around the world are rejecting single-use plastics and pledging to live more sustainably. Governments are acting too: More than 50 countries have signed up to the UN Environment Clean Seas campaign, making this the largest global compact for fighting marine litter.

Businesses cannot afford to ignore the public outcry and many industries are drawing up plans to phase out single-use plastics, use more recycled plastic in their packaging and work on more effective recycling.

The pressure is not just coming from consumers. According to Bloomberg Report, a group of 25 investors, managing more than \$1 trillion in assets, were demanding that Nestlé, PepsiCo, Procter and Gamble and Unilever reduce their use of plastic packaging. The demand, backed by the non-profit As You Sow, asked the companies to disclose annual plastic packaging use, set reduction goals, facilitate recycling and transition to recyclable, reusable or compostable packaging as much as possible.

THE URGENCY IS UNDENIABLE

Humans have produced around 8,3 billion tons of plastic since the 1950s and that figure is predicted to rise to around 34 billion tons by 2050. Plastic production is forecast to grow 40 percent in the next decade with fossil fuel companies investing billions of dollars to build new generation plastic-making factories in the United States.

Companies that use plastics clearly have a pivotal role to play in changing this unsustainable dynamic. The consumer goods industry is particularly aware that customers are

already voting with their feet, shunning companies that do not stem their use of throwaway plastic.

With the economic rationale for inaction declining, the hope is this new reality could spark innovation and opportunity. Already many large and small firms are making changes. Here are just a few examples:

In April, 2019, Swiss food giant Nestlé pledged to make all its plastic packaging 100 percent recyclable or reusable by 2025. It wants to encourage the use of plastics that allow better recycling rates and eliminate or change the complex combinations of plastic that make recycling so difficult.

Rival Unilever has also pledged to ensure that all of its plastic packaging is fully reusable, recyclable or compostable by 2025. Unilever is also endorsing the Ellen MacArthur Foundation's New Plastic Economy Initiative and aims to publish the full palette of the plastic materials used in its packaging by 2020 to help create a protocol for the industry.

Around World Environment Day (June 5th, 2019), Volvo said at least 25 percent of plastics used in its new car models from 2025 will be made from recycled materials..

Drinks giant Coca-Cola, which uses around 120 billion bottles a year, launched its World Without Waste campaign in January, 2019 saying it would recycle a used bottle or can for every new one sold by 2030. It has also pledged to increase the amount of recycled content in plastic bottles to 50 percent by 2030 and is experimenting with different collection techniques for recycling its products, including backing government and industry efforts.



▲ Many countries are actively fighting marine litter



McDonald's has said it will make all its packaging from renewable and recyclable sources by 2025.

Dell aims to make its packaging 100 per cent waste-free by 2020, using materials from sustainable sources. It already uses recycled ocean plastics as well as other sustainable materials such as bamboo. It wants all packaging to be ultimately suitable for home composting or household collection.

Danone's Evian will make all its plastic bottles from recycled plastic by 2025; British grocer Iceland has promised to eliminate plastic packaging from its own-brand products by the end of 2023.

Procter and Gamble, which makes Head and Shoulders shampoo, produced the first recyclable shampoo bottle, made with up to 25 percent of recycled beach plastic last year. It has pledged to make all its packaging recyclable or reusable by 2030. Its washing up brand, Fairy Liquid, has already produced a new plastic bottle, made with 100 percent recycled plastic, including 10 percent ocean plastic. The bottles were developed in partnership with TerraCycle.

Swedish furniture chain IKEA has pledged to phase out single-use plastic products from its stores and restaurants by 2020. The firm says it is committed to phasing out oil-based plastics and ensuring that all its plastic products are made using recycled materials.

In Britain, the UK Plastics Pact seeks to harness this awareness of the need for change. Around 60 companies, including Coca-Cola, Pepsi, P&G, Unilever and Nestlé, have signed up to the pact, which includes targets to eliminate problematic or unnecessary single-use plastic packaging through redesign, innovation or alternative delivery models, and ensure that 70 percent of plastic packaging is effectively recycled or composted.

Working with the Ellen MacArthur Foundation, sustainability organization WRAP launched the pact in April, hoping to create momentum towards a systemic change in the way we use plastic.

"The pact is about making packaging simpler and designed for the end of life as well as for life and reducing the amount of unnecessary plastic. It's also

about making sure we keep that material going round and round in the economy, displacing virgin plastic and keeping it out of the oceans. It's not just about recycling because that is the shorter-term solution, but we need bold, new business models", said Mr. Peter Skelton, WRAP's Lead on the pact.

Some activists argue that because recycling targets tend to be voluntary, legislation is needed to compel businesses to use plastics more sustainably. Mr. Peter Skelton says legislation is an important part of the puzzle and Government support can be a powerful tool, but it is not the ultimate solution. "We are seeing a lot of people questioning what they are doing with their plastic strategy and businesses are really stepping up to the plate. It may cost them more to move out of some of the cheaper, less recyclable polymers, like PVC and polystyrene, but they are under so much pressure from their stakeholders, their shareholders, consumers and NGOs that they just want to know what the good solution is. They don't need more pressure in terms of legislation because they see that plastics are under threat".

Another way Governments could help harness this corporate awareness would be to offer financial incentives to companies exploring alternatives to plastic. These could include tax rebates, research and development funds, technology incubation, public-private partnerships and support to projects that recycle single-use items and turn waste into a resource.

IT'S ALL ABOUT ENCOURAGING BUSINESSES TO INNOVATE

In a recent report, UN Environment examined the potential of replacing conventional plastics with a range of natural material, such as paper, cotton, wood, algae and fungi, alternative technologies, such as new generation biopolymers made from biomass sources. It also spotlighted companies, from multinationals to start-ups, that are innovating in this field.

For example, a company based in New York has developed compostable packaging using waste organic material and fungal mycelium. The packaging can be shaped and has been used for shipping high value goods, including Dell computers.

The UN report concluded that corporations must include sustainability in their business models, sometimes taking their lead from local communities to find available plant and animal alternatives to some plastics. Innovation and entrepreneurship were critical, it said. Surely, this is precisely the domain where the world's leading companies should shine. The gauntlet has been flung down. It is up to businesses now to pick it up and the stakes are high for everyone.

"If we don't improve the system in the next couple of years, there will a lot of backlash with potentially unintended consequences, such as people moving away from plastics. We need to seize the moment; we need to harness the interest and enthusiasm to act"■

DŨC ANH (Source: *Unenvironment.org*)



Software for management, disclosure of automatic and continuous environment monitoring

VĂN HÙNG VỸ

Northern Center for Environment Monitoring

In order to improve the management, supervision, timely forecasting, warning and disclosure of changes in air quality, the Vietnam Environment Administration (VEA) has developed the Software for management of automatic environment monitoring data (Envisoft) with modern technology to deploy nationwide. Envisoft is a useful tool, helping with accurate data processing, assisting Departments of Natural resources and Environment (DONREs) in receiving, transmitting and managing data as well as strengthening capacity in operating, controlling, analyzing, processing and exploiting automatic, continuous monitoring data in order to synchronize and manage data consistently from the Central to local levels. With advanced features, Envisoft software is developed on both web and mobile platforms.

ENVISOFT SOFTWARE APPLICATION ON WEB PLATFORM

Envisoft software is developed on the basis of the monitoring data management software that has been available since 2003. Previously, because there was no automatic monitoring station, this 2003 software was only applied to install Windows form to manage periodic monitoring data of national monitoring stations. To date, Envisoft software has been expanded and developed on web and mobile platforms, helping manage data as well as strengthen capacity in operating, controlling, analyzing, processing and exploiting automatic and continuous monitoring data.

In 2019, the Northern Center for Environment Monitoring implemented the transfer of Envisoft software to 57/63 DONREs of provinces and cities across the country (the remaining 6 provinces/cities have not received the software yet because no automatic and continuous monitoring stations have been installed in their management area).

The Envisoft software application has helped environment management agencies

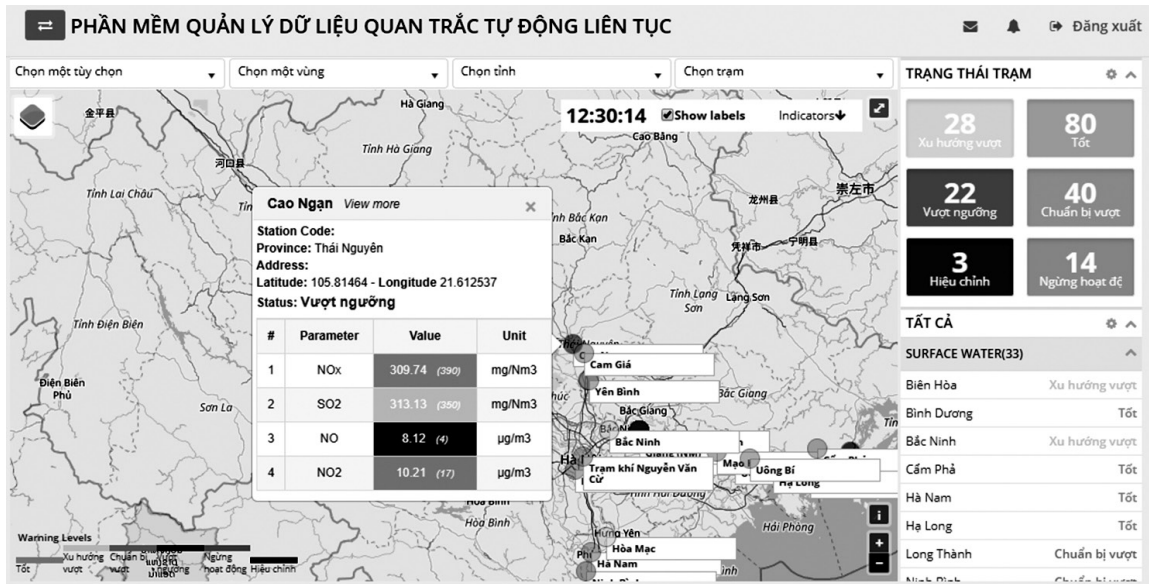
receive and manage data of 700 automatic monitoring stations nationwide; contributed to actively supporting the data reception of enterprises in the provinces/cities nationwide as a tool to manage, supervise, censor data and transmit data from DONREs to Ministry of Natural Resources and Environment (MONRE). It also helps exploit the environment monitoring data automatically, continuously and consistently between the environment management agencies at Central and local levels that basically solves difficulties and shortcomings in transmission, reception and management of automatic, continuous monitoring data. The software's copyright has been registered at the Copyright Office of Việt Nam (Ministry of Culture, Sports and Tourism) on 15th November, 2018.

Outstanding advantages of Envisoft software: Integrating different operations on the same software helps it run more effectively, managers can run and supervise the operation of automatic monitoring stations anytime, anywhere. The software can synchronize data from Central to local levels and enterprises, continuously and simultaneously transmit data and videos. It is technologically compatible with a wide range of equipment that helps for high-speed data collection and big data processing, it is also easy to upgrade and expand, has automatic data censorship mechanism, timely updates current policies and documents therefore localities do not have to invest in software purchase. The software has built-in automatic data backup tools as well.

ENVISOFT SOFTWARE ON THE MOBILE PLATFORM

Envisoft mobile application is a tool to support the exploitation and use of automatic and continuous monitoring data, serving the state management and information on environmental quality indexes to the community. Envisoft software runs stably on both popular mobile platforms Android and iOS, so it is possible to download the application and install it anytime, anywhere. The process of downloading, installing and upgrading the application is easy, so users can download, install and upgrade by themselves, it fully meets the requirements and demands for information about air quality index to the community and is an effective tool for managers when performing inspections, supervision or searching of automatic and continuous monitoring data.

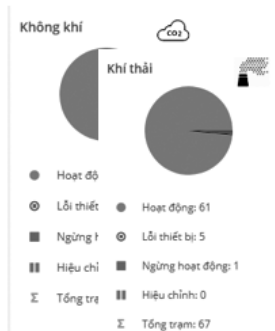
Envisoft application consists of two main modules: Module 1 - Disclosure of Air Quality Index (AQI), is a module for community use, no login account required; Module 2 - Automatic environment monitoring data management, is a module for managers and officials assigned to supervise station operation. For this module, there must be an account (authorized) to use it.



▲ The Evisoft software has helped environment management agencies receive and manage data of 700 automatic monitoring stations nationwide

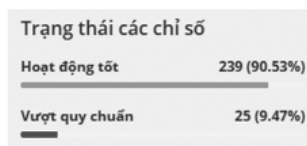
Giám sát thời gian thực, tự động, liên tục:

01 Tình trạng trạm

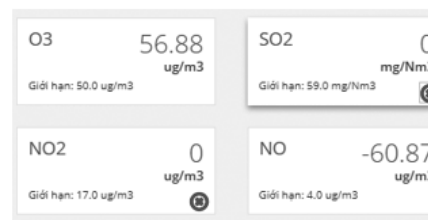


04 Camera giám sát trực tuyến 24/7

02 Tình trạng dữ liệu của các thông số



03 Tình trạng thiết bị: Chủ động báo hỏng và điều hành nghiệp gửi SMS, Email thông báo qua ứng dụng



05 Tình trạng truyền nhận giữa địa phương và trung ương, cảnh báo khi có sự cố xảy ra

▲ The Evisoft software has helped managers can supervise the operation of automatic monitoring stations anytime, anywhere

Module 1 - Disclosure of AQI, has a user-friendly interface design, simple and easy-to-use functions to help users easily track and look up information on environmental quality index with the following functions: Provide information on air quality index (AQI) of automatic monitoring stations nationwide; Allow selection of automatic monitoring stations of frequent interest and tracking of AQI; Automatically arrange the list of automatic

monitoring stations with AQI from high to low, (4) Display detailed information of an automatic monitoring station.

Module 2 - Automatic environment monitoring data management, is for managers. The application provides tools to track, manage data, monitor data exceeding standards, connection status and current status of data transmission. This module includes the following main functions:

-View general statistics about stations (users can know the status of connecting or losing data connection, which stations have parameters exceeding QCVN, faulty devices...);



▲ Evisoft software on the mobile platform

- View stations by each environmental component (wastewater, surface water, ambient air, exhaust gas, groundwater);
- View detailed results of each parameter (online) of each station by each environmental component;
- View statistics of the number of stations in each locality;
- View statistics of data loss events by component;
- View online data of each parameter of a station on the map (users can exchange base maps, filter the number of stations according to the component they want to see);
- View AQI of each parameter by hour, day;
- Provide notices;
- General setting function of the account.

Advantages of Evisoft software application on the mobile platform:

- User-friendly interface, easy to use;
- Run anytime, anywhere;

- Highly customizable following user needs;
- Integrated operations on the same software that helps it run more effectively;
- Available tools to control (QC) data before disclosing;
- Create an ecosystem in managing environment monitoring data in receiving and managing data from enterprises to DONRES and transmitting data from DONRES to MONRE, finally releasing the data to the public;
- Effective support tool for management levels from the Central to local levels in supervising environment monitoring activities;
- Wide range of data (covering the whole country);
- New technology applied;
- Manage monitoring data professionally;
- Easy to upgrade and expand;
- Strict process;
- Complete and accurate information.

In addition to information on AQI, it also displays more meteorological information such as temperature, humidity... collected from automatic air monitoring stations nationwide. This is the official data source from the VEA with high accuracy because it is measured by national monitoring stations and some local monitoring stations nationwide■



Surveying the public perception of the current situation of alum-iron water in Tri Tôn District, An Giang Province

NGUYỄN TRUNG THÀNH^{1,2*}, NGUYỄN HỒNG NHẬT^{1,2},
NGUYỄN THỊ QUỲNH ANH^{1,2,3}, PHAN PHƯỚC TOÀN^{1,2},
TRẦN NGỌC THẠCH⁴, TRẦN LÊ BA^{1,2,3},
TẠ CÔNG KHIÊM^{1,2}, NGUYỄN NHẬT HUY^{2,3,*}

¹An Giang University

²Vietnam National University

³Hồ Chí Minh City University of Technology

⁴Department of Natural Resources and Environment

ABSTRACT

The paper aimed to understand the water use situation and how the public perceived the current situation of alum-iron water. By using the stratified semi-purposive sampling process, the study explored the perception of people residing in Tri Tôn District, An Giang Province. The applied method involved a structured questionnaire. Perception about sources of pollution was shaped by personal experience. People did not perceive diffused sources of alum-iron pollution that could affect surface water quality. It was found that respondents attributed their risk perception to connect with their direct dependence on the surface water used for their daily needs. The paper suggested behavioural change strategies to focus on social, governing, and technological drivers.

Keywords: Iron-alum pollution, Mekong Delta, surface water.

1. INTRODUCTION

The Mekong Delta with a total area of about 4 million hectares, of which the alum-iron contaminated area occupies an estimated 1,6 million hectares, is distributed mainly in Long Xuyên Quadrangle, Đồng Tháp Mười, Cà Mau Peninsula and Hậu river basin (Võ Tòng Xuân and Matsui, 1998). It was reported that the content of Fe^{3+} and Al^{3+} in this area is about 10,78 and 4,28 mg/100g soil, respectively (Hồ Quang Đức et al., 2011). Besides, the content of these metal ions in surface alum-iron water is also relatively high as compared to the National Technical Regulation on drinking water quality - QCVN No. 01:2009/BYT and the National Technical Regulation on domestic water quality - QCVN No. 01-1:2018/BYT (total iron content is about 25 ppm, total aluminium is about 8,5 ppm (Lương Thị Kiều Trinh, 2013). These ions in water would then cause adverse impacts on the life, production, and health of the community.

Alum-iron soil in An Giang Province with a total area of about 30.136 ha, of which Tri Tôn makes up 67%, is distributed more in Tri Tôn, Tịnh Biên and part of Châu Phú District which are adjacent to Kiên Giang Province. Therefore, the research team conducted a survey in Vĩnh Phước and Tân Tuyến, communes in order to assess the public perception of the status of alum-iron surface water.

2. MATERIALS AND METHOD

2.1. Site description

Tri Tôn is the largest district in An Giang Province with a natural area of roughly 60.039,74 ha accounting for nearly 17% of the province's area. It has 2 towns and 13 communes. There are 4 main soil groups in Tri Tôn including alluvial soils, acid sulphate soils, peat soils and mountain sandy soils. Since the area of acid sulphate soils in Tri Tôn District accounts for 67% of the total acid sulphate soil area of the whole Province, the District was chosen for the study. Among the communes, Vĩnh Phước and Tân Tuyến are accounted for 23% of acid sulphate soil group in the District, therefore, they were chosen for the survey. Vĩnh Phước Commune has an administrative unit area of about 54,04 km² with a population density of 33 people/km². In addition, Tân Tuyến commune has an administrative unit area of approximately 83,35 km² with a population density of 79 people/km² (Statistical Office of Tri Tôn District, 2018).

2.2. Data collection and analysis

A total of 100 questionnaires were distributed evenly to Tân Tuyến and Vĩnh Phước communes. Also, the evaluation form of the current water use status and opinions of the people on the status of alum-contaminated water were implemented by the face-to-face interview method with the help of a self-designed pre-tested semi-structured questionnaire. Prior to the interview, informed consent was obtained from the participants. The households were chosen randomly using a random sampling technique. In this sampling technique, every household in the population has an even chance and likelihood of being selected in the sample. Here the selection of households completely depends on chance or by probabil-

ity and therefore this sampling technique is sometimes known as a method of chances.

In 100 questionnaires, 40% of the respondents were male and 60% of the respondents were female. The average age of the respondents in the study area was 48,9 years old, in which the oldest was 96 and the youngest was 25. Regarding occupations (Table 1), the group of people working in agriculture accounted for the majority (45%) of the total number of the respondents. This is a group with high water demand for production needs. Therefore, collecting general information about personal characteristics such as age, gender, and occupation would involve giving opinions on the quality of domestic water, water use demand, and opinion on water use was different. Thus, information can be gathered objectively from individual characteristics (Lê Đức Anh et al., 2018).

Occupation	N	Percentage (%)
Farmer	45	48.0
Traders	12	12.0
Employee	18	18.0
Housewife	25	25.0
Total	100	100.0

Table 1: Occupation of the respondents

3. RESULTS AND DISCUSSION

3.1.Current situation of water exploitation in the study area

Depending on family economic conditions, water for rural activities in the study area was mainly exploited from natural water sources such as water from rivers, streams and lakes. Additionally, it was determined that rainwater became the main source of water supply. In order to assess the current situation of water exploitation in rural areas in An Giang Province, the research team conducted a survey of 100 questionnaires (in October 2019) for the subjects of water exploitation. The surveyed area included two communes in Tri Tôn District (Tân Tuyến and Vĩnh Phước communes).

3.1.1. Water sources for daily life and production

According to the survey results of households in the study area, it was shown that the source of water used for drinking

was mainly from the tap water (88%). Among this 88% of the households surveyed, 7% of households used tap water and rain-water in parallel, 11% of households used tap water and river water in parallel. When asked about water for other purposes such as bathing, washing..., 84% of households used tap water for this purpose. 16% of households, on the other hand, used other sources of water such as (river water, groundwater, and rainwater). Besides, among 84% of households surveyed, 5% of households used rainwater in parallel with tap water while 20% of households used river water and tap water in parallel. From the above data, it can be seen that most people had access to clean drinking water in rural areas, which, to some extent, can ensure the hygiene and safety of drinking water. However, there were still a significant number of people who were using water directly from rivers, streams, lakes and rain, etc. to serve their daily needs, including the need for drinking water. These are sources of water that do not meet safety standards, could have a negative impact on the health and activities of the community. At the same time, the study also conducted a survey of water sources used by households for irrigation and production purposes. According to the survey results, 80% of households used water for production and irrigation purposes, including 88% of households exploited river water and the remaining 12% used tap water and river water in parallel to meet production and irrigation needs.

3.1.2. Current status of water uses in the survey area

It can be seen from the survey results in Figure 1a that the demand of water for drinking in the survey area was in moderate level. On average when the level of water use was at level 1 (less than 100 L/day), this demand accounted for 51%. In contrast, this demand occupied 39% when the level of water use was at level 2 (from 200 L/day to less than 400 L/day).

At the same time, the survey also conducted an analysis of other domestic water demands such as bathing and washing. As a result, the level of water demand for these purposes was high. To more precise, the proportion of water demand at level 2 made up 39% while that at level 3 accounted for 27% (from 400L to less than 600L/day) (Figure 1b). From the above results, it was shown that the demand and consumption of water in the survey areas were relatively high. It is, therefore, necessary to have a hygienic and safe source of water.

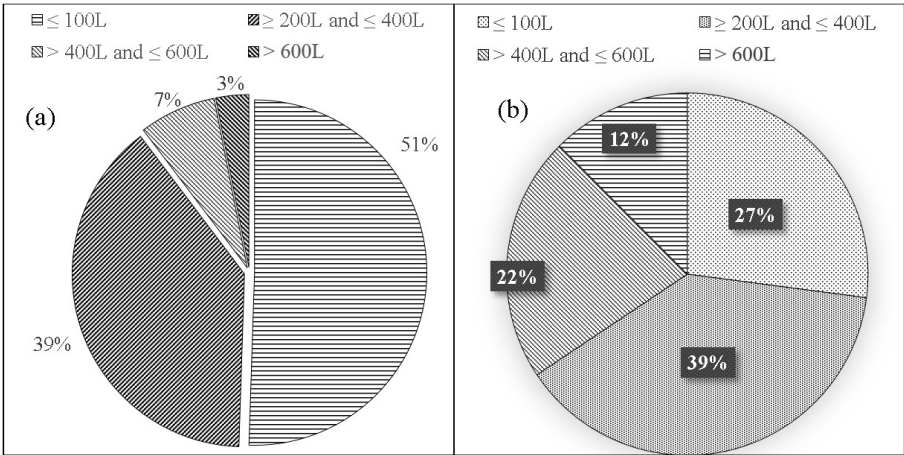
The analysis results in Table 2 presents a different percentage of respondents' views on surface water quality. Overall, 38% of

Water quality assessment	Percentage (%)
Used well for drinking, other activities	38
Only used well for other purposes (bathing, washing, and production)	25
Not good for drinking and daily activities	4
Only used for production	33

Table 2: Community views on surface water quality



Figure 1: Percentage of water demand for (a) drinking and (b) other domestic water demands



people said that the surface water was suitable for drinking and washing, 25% thought that it could only be used for other purposes and 33% agreed that it could only be used for production purposes.

3.2. The status of alum-iron water and the public perception of alum-iron water impacts

According to the characteristics of sulfate acid soil distribution in An Giang, acid sulfate soils concentrated in areas adjacent to Kiên Giang Province, located in Tri Tôn, Tịnh Biên District and part of Châu Phú, with a total area of about 30,136 ha in which Tri Tôn accounted for 67%. Therefore, the research team conducted a survey in Vĩnh Phước and Tân Tuyến communes in order to assess the public perception of the status of alum-iron surface water. The survey results showed that in 100 households interviewed, there was 90% of households stating that local surface water sources were contaminated with alum-iron while only 10% said that surface water in the survey area was not contaminated with alum-iron.

Regarding the awareness of households interviewed about the level of alum-iron contamination of water sources for domestic use (Table 3), for the tap water, 59% of the households believe that the tap water quality was still good and had no sign of alum-iron contamination. On the other hand, the households saying that the tap water had signs of acidity accounted for a high proportion of 38%. Although the level of alum-iron contamination based on people's opinions was low, this factor still indicated that the current tap water supplied to the households was not good enough.

For surface water sources around the survey area, the level of alum-iron contamination according to people's opinion is shown by the survey results as follows:

high alum-iron level was 26%, alum is low at 64%, and 10% of people believed that surface water was not contaminated with alum-iron. This was consistent with the initial survey of people on alum-iron contamination of surrounding surface water. Because the soil characteristics in the survey area were those of the latent acid sulfate soils, people's judgment on the level of alum-iron contamination was also consistent with the characteristics of this soil group.

From the perspective of awareness of the households interviewed about the effects of alum-iron water on their lives, the survey results in Table 4 indicated that 19% of households thought that alum-iron water yellowed clothes and utensils, 39% of households said that it caused itching, drying, and skin burns and 5% of them caused intestinal diseases. Moreover, there was 25% of households judged that alum-iron surface water also caused negative impacts on production activities, but some households believed that alum-iron water did not affect health as well as production, which occupied 22%.

Water source	Alum-iron contamination level (%)		
	High	Low	Non
Tap water	3	38	59
Surface water	26	64	10

Table 3: The public perception of the alum-iron contamination level of tap water and surface water in the survey area

Most people's perception of negative impacts resulted from alum-iron water sources was mainly from traditional and personal experiences, which accounted for 90%. In addition, 10% of the households interviewed had not complete information about the negative impact of alum-iron water on health and production. In this connection, it is transparent that people's knowledge is based entirely on personal experience and word of mouth without having access to information from the press or mainstream scientific information on the impacts of alum-iron water on the community.

When asked about the perception of alum-iron water, most people perceived it by color (64% of people thought that alum-iron water was yellow) and 23% of people said that water had a sour taste. Nevertheless, these sensory criteria come from traditional and personal experiences.



Although respondents had experience in recognizing alum-iron water as well as the impacts of alum-iron water, when interviewed about alum-iron water treatment, up to 79% of them did not know how to treat alum-iron water, only 16% of them used stove ash to settle alum-iron water, the number of them who knew how to use filter columns or build simple settling tanks accounted for a very low proportion (Table 6). This shows that the respondents had not been propagated or instructed on how to treat alum-iron in water from the locality. Also, access to scientific information was still limited.

4. CONCLUSION

Through the initial survey results, most rural people had access to supplying water (88% of the households interviewed used the supplying water for drinking purposes, 84% for other purposes). Besides, people also exploited surface water from rivers, lakes, and rain in parallel to serve other drinking and living needs. However, there

Impact	N	Percentage (%)
Yellowing clothing and utensils	19	19
Causing itching, drying and skin burns	39	39
Causing intestinal diseases	5	5
Causing a negative impact on production	25	25
Not having influence	22	22

Table 4: The public perception of the impacts of alum-iron water on their lives

Sensory criterion	N	Percentage (%)
Fishy smell	6	6
Yellow	64	64
Sour taste	23	23
Turbidity	4	4
Unknown	8	8

Table 5: Sensory criteria of people about alum contaminated water

The public knowledge	N	Percentage (%)
Not knowing the treatment method	79	79
Treatment by installing filter columns	2	2,0
Treatment by aeration and sand filter	1	1,0
Using lime	2	2,0
Settling by ash	16	16

Table 6: The public knowledge about alum-iron water treatment

were still 12% of households using unqualified water sources for drinking and other daily needs and 50% of households interviewed had not implemented water treatment before using. At the same time, the research team received information from 90% of the households who said that the surface water source was currently contaminated with alum-iron. In addition, alum-iron water was having negative impacts on people's health and life, in which 39% caused itching, drying and swelling of the skin, 19% yellowed ion clothes and utensils, 5% caused intestinal diseases. Besides, 25% of the alum-iron surface water amount based on people's opinions also caused negative impacts on production activities. People, however, still did not have access to knowledge about the treatment of alum-iron water. Accordingly, the proportion of people who did not know how to treat alum-iron water was very high (79%). Thus, local authorities and officials need to take measures to support the community in accessing scientific information and train people on water treatment before using it for drinking purposes other daily activities with the aim of mitigating negative impacts on the health and life of the community■

ACKNOWLEDGMENTS: *This research is funded by Vietnam National University - Hồ Chí Minh City under grant number A2020-16-01.*

REFERENCES

1. Võ Tòng Xuân and Matsui, S. 1998. Development of farming systems in the Mekong Delta: JIRCAS, CTU, CLRR, Việt Nam.

2. Hồ Quang Đức, Nguyễn Văn Đạo, Trương Xuân Cường và Lê Thị Mỹ Hào, 2011. Evaluation of change in salty saline and acid sulphate soils in Mekong Delta after 30 years of land use (in Vietnamese). *Journal of Vietnam Agricultural Science and Technology*, Vol. 1 (22)/2011.

3. Lương Thị Kiều Trinh, 2013. Study on the application of iron oxide catalysts from acid sulfate soil for textile wastewater treatment. Student thesis, An Giang University.

4. Statistical Office of Tri Tôn District. 2018. Annual Abstract of Statistics 2018. Statistical Office of An Giang Province.

5. Lê Đức Anh, Hồ Hữu Lộc, Lương Quang Trường, Trần Thành, 2018. Assessment of water use and groundwater quality in District 12 - Hồ Chí Minh City. *Journal of Water Resources and Environmental Engineering*, Vol. 62 (9/2018), 66 - 71.



Đà Nẵng City pilot's vetiver grass waste treatment system

A group of scientists and biological researchers from Đà Nẵng's Teacher Training and Engineering College has developed a vetiver (*Vetiveria Zizanioides*) grass-based system to treat leaks at Khánh Sơn dump in Đà Nẵng City.

The system, which was developed on a small scale at the dump in 2018, would be applied to other dumps in the City and neighboring provinces as well as polluted

lakes and sewage systems. Head of the research team Trần Minh Thảo said the sample was designed to treat 200 liters of waste water that leaks from the dump each day, and at least 90 percent of the waste was completely cleaned by the grass system and other biological solutions before being safely discharged.

Mr. Trần Minh Thảo said they have been testing the system before the City approves its deployment. The system is a non-toxic chemical treatment, while the grass roots act as a natural filter of pollutants in the waste. Four square metres of vetiver grass could soak up 200 liters of polluted waste and discharge it each day. It also helps clear bad odors, while reducing sludge after treatment. The vetiver grass-based system could be used to clean 750 cu.m with an investment of VNĐ 50 billion (US\$ 2,2 million) - half that of a chemical-based treatment system - and the system costs only VNĐ 50.000 (US\$ 2,1) to clean 1cu.m of polluted waste.

The group has been testing the vetiver grass-based system and biological solutions at some polluted lakes in the City and Quảng Nam Province. The biological sewage treatment model was used to filter 10 cu.m of toxic sewage from the college's laboratory each day from 2014 and over 90 percent of heavy metals contained in the sewage dissolved in the process.

He said continuous tests of the grass system on wastewater treatment were carried out by the group daily from 2014. Đà Nẵng City plans to build the first solid waste treatment complex project on a 100-ha area in Hòa Vang District with total investment of VNĐ 138 billion (US\$ 6,13 million) in the first stage later this year. The complex will include a dump leakage treatment plant, waste recycling and waste-to-energy system■

PHƯƠNG TÂM (VNS source)



▲ Vetiver grass is used to treat waste leaks at the Khánh Sơn dump in Đà Nẵng

Japan supports Hải Phòng to handle the environment of Cát Bà Island

JICA has agreed on a non-refundable grant of 49 million Japanese yen for Hải Phòng City to implement a project to strengthen the management of the waters of the Cát Bà archipelago and surrounding areas.

The main items of the project are to develop mechanisms related to wastewater treatment on Cát Bà Island, Cát Hải District, to operate the wastewater treatment system effectively, to monitor the quality of coastal water environment properly...

As expected, the project is implemented in 2 years (2/2020 - 2/2022). It is known that Cát Bà currently has 441 aquaculture facilities, 9.507 aquaculture farms, including 1.598 housing cells, about 16.000 foam floats, more than 100 tourist boats and more than 1.000 people. Wastewater, domestic waste of more than 1.000 people living in rafts are discharged directly into the Bay without any treatment system. The level of marine environment pollution in Cát Bà has become a pressing problem. If there is no timely preventive measure, the environment of farming area in particular and Cát Bà sea area in general will be broken■

AN VI (Monre source)



Quảng Ngãi to spend 120,5 million USD on wastewater treatment system

Quảng Ngãi Province plans to invest 2,8 trillion VND (120,5 million USD) in a wastewater treatment system from 2020 to 2025. The system is expected to collect and process at least 70 percent of the Province's urban wastewater at 14 treatment plants. Wastewater pipelines and pumping stations will also be constructed.

The Provincial People's Committee has approved the project's first phase in Quảng Ngãi City with an investment of 300 billion VND (12,9 million USD). The Province has suffered severe pollution for years. Local residents living around Quảng Phú Industrial Zone in Quảng Ngãi City have complained several times about untreated wastewater being discharged directly into nearby streams.

The MD Solid Waste Treatment Plant in Đức Phổ District in February 2019 was reported to have received trash to process while the plant's construction has not been totally completed and emission standards not met, negatively impacting people's health and triggering public uproar.



▲ Quảng Phú Industrial Zone - Quảng Ngãi City

In October 2019, local authorities announced the removal of the Plant after it treated some 22.500 cu.m of solid waste but still the local residents disagreed with the decision■

ĐỨC SINH (VNA source)

Hà Nội to build 70 more air monitoring stations

Hà Nội will complete a system of 81 air quality monitoring stations by the end of 2020. The system would contribute to environmental protection and management, as well as the supervision of air quality in the City.

At present, Hà Nội has 11 stations. The remaining 70 will soon be completed. The Hanoi Department of Natural Resources and Environment is coordinating with the French Development Agency (AFD) to give more training to workers about the system and air monitoring data management.

The Department's Leader said to improve air quality in Hà Nội and conduct environmental protection measures effectively, police and inspectors should improve monitoring and punish any firms transporting construction materials or waste violating environmental regulations. The Department of Health should cooperate with the Department of Natural Resources and Environment and the Department of



▲ A worker checks air quality at an air monitoring station in Hà Nội

Information and Communications to give recommendations to residents about health protection measures during days with bad air quality.

Concerned organizations should educate residents on proper disposal of rubbish■

CHÂU LONG (VNA source)

Đà Nẵng to host ASEAN environmental meetings

The 21st Meeting of the ASEAN Working Group on Coastal and Marine Environment (AWGCME) is slated to take place from May 13 - 15, 2020 in Đà Nẵng City. The City will also host the 31st ASEAN Senior Officials on Environment Meeting (ASOEN 31) and other meetings which are scheduled for August 16 - 22, 2020.

Đà Nẵng has been selected to host a series of environmental events in 2020 by the

ASEAN Secretariat and the Vietnamese Ministry of Natural Resources and the Environment because the City has left a deep impression on foreigners from previous events, according to the Ministry.

Đà Nẵng is the second City in Việt Nam to win the ASEAN Environmentally Sustainable City Award in 2011. It is also one of the country's three cities to join the ASEAN smart city network in 2018■

TRẦN TÂN (VNA source)



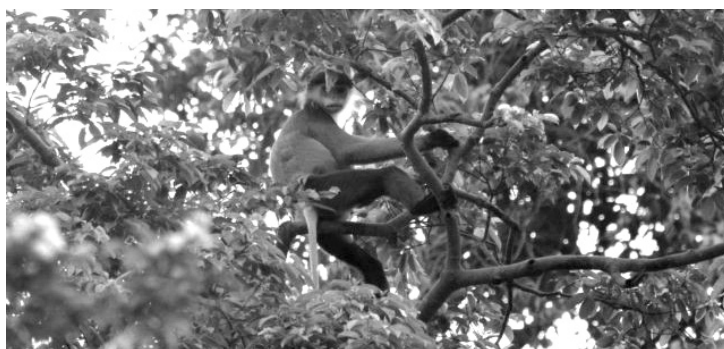
▲ Đà Nẵng is the second city in Việt Nam to win the ASEAN Environmentally Sustainable City Award in 2011

JWWF - Việt Nam, GreenViet work to protect endangered primates

The World Wide Fund for Nature (WWF) - Việt Nam and the Centre of Biodiversity Conservation, GreenViet will work together on a project to protect the gray-shanked douc langurs in the Quảng Nam Province's Núi Thành District in 2020.

Director of GreenViet Trần Hữu Vỹ said the one-year project would help improve forest patrol skills to protect a herd of gray-shanked douc langurs (*pygathrix cinerea*) - a critically endangered species - living in Đồng Cổ village of Tam Mỹ Tây Commune. The project, with funding of VNĐ 350 million (US\$ 15,000) from WWF - Việt Nam, will help provide knowledge and skills for a team of 10 volunteers from the village.

"It is a significant effort made by the community to protect the endangered primates. They (local villagers) patrolled the 30 ha primary forest area - where the primates live - following irregular visits at nearby log farms", Mr. Trần Hữu Vỹ said. "We provided equipment, the Spatial Monitoring Reporting Tool (SMART) for conservation and protection of wildlife, data recording during jungle trips over a total of 150ha of protective zone", he said.



He added the project would include improving awareness among the community and illegal hunters on wildlife and protection of biodiversity. A fire-free zone was set up on a 70-ha log farm - a safe habitat for the gray-shanked douc langurs.

Chairman of the Quảng Nam Provincial People's Committee Lê Trí Thanh said the Province had been seeking a fund of US 4,4 million to restore a 100-ha area as a safe habitat for the gray-shanked douc langurs.

Currently, the herd of the langurs has gathered in a 10 ha-area of primary forest due to the development of acacia log farms. According to a report by the Provincial Forest Protection Division, a herd of about 50 gray-shanked douc langurs was found living in the area in 1997. The local community and district rangers established a voluntary team to protect the endangered primates from being hunted■

CHÍ VIỄN (VNS source)



Japan finances Hồ Chí Minh City's upgrade of sewer system

The Japanese Government will provide a non-refundable aid worth 1,88 billion JPY (16,84 million USD) for Hồ Chí Minh (HCM) City to upgrade its existing sewerage system using trenchless technologies.

Trenchless technologies such as boring tunnels and using drive and receptor shafts will add 50 years to the life of the network. It will improve the drainage capacity and load-bearing capacity through the upgrade of ageing drainage and sewer pipes.

Under an agreement signed in HCM City this week, the project will take 24 months starting next year and the work will be done by Japanese companies. HCM City's rapid urban growth requires urgent development of environmental infrastructure in tandem with meeting the demands of safe water supply and water environment protection, according to the Japan International Cooperation Agency (JICA).

The City has made great efforts to build a new sewerage system, including building waste water treatment plants and laying pipes, to improve the water environment, but the work of rehabilitating old sewer pipes laid during French colonial times remains a great challenge, especially in the downtown Districts 1 and 3.

In 2015, JICA funded a project carried out by the Osaka City Department of Construction and Sekisui Chemical to upgrade pipes under the Cống Quỳnh - Nguyễn Cư Trinh roundabout in District



▲ A view of MOU signing

1 using trenchless technologies. It proved to be efficient since it did not disturb day-to-day activities or the road surface in the traffic-heavy districts.

Of the City's 2,600 km sewer system, 932 kilometers of old pipes need constant upgrades. There are some 100 km of concrete sewers built during the French era, which are also in urgent need of replacement to prevent flooding. By reducing the need to dig up the entire length of the sewer, the project will cause fewer road closures and disturbances to the public.

JICA has been helping HCM City improve its wastewater system since 1999 starting with the implementation of a sewage and drainage master plan. Based on the master plan, the first phase of the HCM City Water Environment Improvement Project in Tàu Hủ - Bến Nghé river basins was carried out in 2017, with a wastewater treatment plant with a daily capacity of 141,000 cubic meters being built and drainage capacity improved in the Tàu Hủ - Bến Nghé canals and new interceptors and sewer pipes being installed.

The second phase of the project is scheduled to be completed in 2022, with a new wastewater treatment plant with a daily capacity of 330,000 cubic meters being built and interceptors and sewer pipes being laid in the Đôi - Tẻ river basin. In the second phase, pipe-jacking technology will be used for interceptor construction to minimize traffic interruption in the busy districts 4, 5, 6, 8 and 10■

PHƯƠNG LINH (VNA source)

World Bank's new strategy helps Việt Nam better utilise solar power

The World Bank (WB's) new approaches to bidding and deployment for solar projects will help Việt Nam substantially boost and effectively manage its abundant solar energy resources.

Such approaches could boost Vietnam's solar generation capacity from the current 4,5 Gigawatts to the tens of gigawatts range in ten years, while creating thousands of new jobs, according to the new World Bank Vietnam Solar Competitive Bidding Strategy and Framework report. The deployment of new solar generation will be a critical factor for the Government of Việt Nam to meet its Nationally Determined Contribution (NDC) climate change target and reduce its need for new coal generation.

The report comes as Việt Nam is considering moving from a feed-in-tariff (FIT) policy to a competitive bidding scheme for solar projects to reduce the cost of solar generation. The FIT has been successful in recent years, spurring the fast deployment of projects at a time when Việt Nam has also become a world leader in solar module manufacturing. However, this success has also given rise to new issues, including curtailment - or underuse of solar generation capacity.

The report, supported by the Global Infrastructure Facility (GIF) and the WB's Energy Sector Management Assistance Program (ES-



▲ Việt Nam is considering moving from FIT policy to a competitive bidding scheme for solar projects

MAP), recommends two new deployment schemes for projects: competitive bidding for solar parks and "substation-based bidding" - competitive bidding based on available capacity at electrical substations. These approaches would address the curtailment issue as well as improve risk allocation between public and private investors.

The first pilot tenders - 500 MW for substation-based bidding and another 500 MW for ground-mounted solar parks- are being planned for later in 2020 with the technical and financial support of the WB's.

Besides, the report recommends setting yearly and medium-term solar deployment targets and revisions to the legal framework covering the competitive selection of independent power producers. The report estimates that the expansion in solar generation capacity in Việt Nam could generate as many as 25.000 new jobs in project development, services and operations and maintenance annually through 2030 and another 20.000 jobs in manufacturing provided Việt Nam maintains its current share of the global solar equipment market.

The WB's support to the Government's effort in shifting from FIT to a competitive bidding mechanism for solar power projects contributes to the sustainable and transparent development of renewable energy in Việt Nam by harmonizing the interests of private investors, the Government and customers■

NGUYỄN HẰNG (VNS source)



Fostering eco-industrial parks in Việt Nam

Since the beginning of this century, Việt Nam has experienced years of rapid economic growth, driven mainly by the processing and manufacturing sectors. By 2013, the Government had established 173 industrial zones (IZs), with an average of 90 companies in each zone. Basic environmental legislation had been passed but regulation and enforcement capacity were weak. As a result, approximately 70% of effluents from IZs was directly discharged without prior treatment causing severe pollution of surface and groundwater, as well to the marine ecosystems. Untreated solid waste with a high proportion of hazardous material was also on the rise in IZs. The fast-paced economic development depended on a high consumption of natural gas, electricity and especially coal, resulting in a rapid increase of greenhouse gas (GHG) emissions.

While the creation of IZs has been recognized as an effective way of increasing synergies among industrial activities, thus increasing resource use efficiency and offering shared infrastructure and services, it is now largely understood that IZs can potentially also have negative impacts.

In this context, the United Nations Industrial Development Organization (UNIDO) and Việt Nam's Ministry of Planning and Investment, with support from the Global Environment Facility (GEF) and the Gov-

ernment of Switzerland, teamed up to transform conventional IZs in Việt Nam. Together they implemented an eco-industrial park (EIP) initiative for sustainable IZs, which was successfully completed in mid-2019. The project focused on increasing the transfer, deployment and diffusion of clean technologies and practices for the minimization of hazardous waste, GHG emissions and water pollutants and the sound management of chemicals in industrial zones of Việt Nam.

Broadly, an EIP can be defined as a dedicated area for industrial use at a suitable site that ensures sustainability through the integration of social, economic and environmental quality aspects into its siting, planning, management and operations. Over time, the EIP concept has evolved to address additional inter-related aspects, including resource-efficient and cleaner production, industrial symbiosis, climate change, pollution, social standards, shared infrastructure, improved spatial zoning and management.

UNIDO's five-year project aimed to increase the transfer, deployment and diffusion of clean and low-carbon technologies, the minimization of GHG emissions, persistent organic pollutants (POPs) and water pollutants, as well as improving water-efficiency and sound management of chemicals. The project promoted and supported the gradual transformation of IZs into EIPs. In parallel, it also raised enterprise awareness on making optimum use of natural resources, minimizing environmental pollution, while providing positive socio-economic benefits to workers and communities nearby.

An important part of the UNIDO project related to Government policies in support of EIPs. The project played a key role in the preparation of Decree No. 82/2018/ND - CP, published in May 2018, which defines, inter alia, the conditions and requirements for recognition as EIPs in Việt Nam (Articles



▲ The EIP initiative was implemented successfully in Việt Nam



40 - 44), as well as prescribing the planning, establishment and operation of policies on and State management of industrial parks and economic zones.

While welcoming the Decree, Director General of Economic Zones Management of Ministry of Planning and Investment Trần Duy Đông said: “The implementation of the Decree offers a lot of opportunities, but also faces constraints in Vietnamese legislation, as concrete opportunities to develop symbiosis are still limited by regulation”.

UNIDO experts worked with 73 companies located in four IZs, namely Khánh Phú and Gián Khẩu IZ (Ninh Bình Province), Hòa Khánh IZ (Đà Nẵng Province) and Trà Nóc 1, 2 IZs (Cần Thơ Province), to identify opportunities to optimize their production process and to tackle inefficiencies. Training was also provided to improve the companies’ capacity to implement possible industrial symbiosis. By the end of the project in June 2019, out of a total of 18 industrial symbiosis opportunities and corresponding feasibility studies, 12 opportunities had already been implemented, were under implementation and or were planned. If all opportunities are implemented, 70,5 kilotons of CO₂/year, 885.333 cubic meters of freshwater and 84.444 metric tons of waste are expected to be saved every year. The payback time for these opportunities ranges

between three months and eight years.

In addition, a total of around one thousand resource efficiency and cleaner production (RECP) options were identified, of which 546 were implemented in 57 companies. These RECP options implemented led to reductions in the use of electricity (19.274 megawatt hours per year), fossil fuels (142 terajoules per year), GHG emissions (30.570 metric tons of CO₂ equivalent per year), water (488.653 cubic meters per year), and of materials/chemicals (3.121 metric tons per year). The options resulted in financial savings of € 2,9 million per year, with an average payback time of seven to eight months.

Deputy Head of the Cần Thơ IZ Authority Nguyễn Thị Kiều Duyên said, 30 enterprises in Cần Thơ have been guided to apply cleaner production, safer and sustainable manufacturing in their production processes, resulting in VND 46,56 billion worth of savings per year. She added, more than 70 other enterprises have benefited from capacity-building activities, such as training courses on the management of chemicals, RECP identification, implementation and loan support.

The main environmental impact of the project will be a significant reduction in GHG emissions as a result of the innovations and technologies adopted by the enterprises directly involved in the project and by others, not directly involved but which become aware or are informed of the benefits. It is estimated that a total of more than 2.901 kilotons of CO₂ equivalent of direct and indirect reductions will be achieved over the next 15 years. This includes a replication factor of three based on the assumption that existing reductions are likely to increase threefold as other enterprises and EIPs follow suit as they see that the practices and technologies introduced by the project have high economic returns and are well within their reach■

ĐỖ HOÀNG (Source: GEF)

Khánh Hòa looks to halve marine plastic waste by 2025

Khánh Hòa Province has issued an action plan on marine plastic waste management, aiming to cut down half of its plastic debris at sea in the next five years. Aside from the overall target, the Coastal Province hopes that by 2025, 50 percent of lost or discarded fishing tools will be collected; 80 percent of local tourist sites, tourist accommodation establishments and



▲ Khánh Hòa plans to reduce 75 percent of plastic waste at sea by 2030

other tourism service providers in coastal areas will stop using disposable plastic products or non-biodegradable plastic bags and 80 percent of plastic waste will be slashed in its marine reserves.

Khánh Hòa plans to reduce 75 percent of plastic waste at sea and achieve 100 percent of the remaining aspects by 2030. To do so, it is promoting communications to raise public awareness of plastic products and marine debris. It will also boost the collection, sorting and treatment of waste in coastal areas and at sea; arrange more waste containers in public places and build a database of marine plastic waste, according to the plan issued by the provincial People’s Committee■

NAM VIỆT (VNA source)



Towards a pollution - free world: 7 steps to circularity

WHAT WOULD IT LOOK LIKE, A ZERO-WASTE ECONOMY?

Among the many things competing for our attention at the dawn of the new decade was a little noticed fact coming out of Davos: Our global economy had reached a burn rate of 100 billion tons/year of natural resources.

Numbers like this are hard to digest - it's like 450 Eiffel Towers every minute (4,5 million tons per minute), or 40 kg of materials per person per day. Not that it's anywhere near equitable enough to justify mentioning a per capita average - in Bangladesh it's around 4 kg per person per day, whereas in Singapore it's closer to 220 kg.

We could be forgiven for overlooking the importance of this 100 billion ton milestone - while the global risk report released by WEF notched up the five top risks as being environmental, this one went by unnoticed. But step back and look at the bigger picture, and you see that it is our voracious appetite for natural resources and the growing ability to metabolize them that underlies most if not all the five risks. And certainly, at the root of the climate and nature challenge, lies the rate at which our economies metabolize resources as we produce and consume, to lift incomes and quality of life.

The science is clear on this. Earlier in 2019, the International Resources Panel launched its Global Resource Outlook, which estimated the climate impact of resource

extraction to be around one third of total and of impacts on nature and biodiversity, a whopping 91% come from resource extraction, including conventional agriculture.

So, if we want to make our economies more circular and if we want to make 2020 a super year for nature, a good way to start would be to look at the

footprints of how we produce and consume.

Many tools exist to help us with this. Also launched in 2019 at the last UN Environment Assembly, the Hot Spot Analysis tool brings together 25 years of data from 183 countries on the carbon, water, nature profiles and footprints of their economies. And as with any habit or addiction, the first step to changing course is to recognize that a pattern exists.

7 STEPS TO CIRCULARITY

Step 1 - Know and measure your footprint. And see how circular your economy really is!

The other steps follow pretty closely and logically and they are nothing new for those who focus on the economy as a driver of sustainability (or unsustainability, as the case may be):



▲ Mr. Steven Stone - Chief, Resources and Markets Branch/UN Environment



▲ Singapore stands ready to contribute to a pollution-free world



Step 2 - Build in circularity at design and production stage. Promote policies which support design for reuse and/or recyclability (increased recyclable and recycled material content), as well as more broadly design innovation for circularity. This is where rethinking everything comes into play: What kinds of products and services would be needed for a zero-waste economy?

Promote industry standards for circularity. Introduce chemicals regulations to keep the chemicals of concerns away or easy-to-separate from recycled streams and to ensure there is no damage to health and the environment; Develop and engage private sector in the implementation of end of life policies (such as Extended Producers Responsibility); Include incentives for circular economy applications in nascent growth sectors, particularly those related to technology and innovation.

Step 3 - Align prices for circularity and shift demand. Market prices often hide true costs of products and services in the economy and reinforce short term investment and consumer behavior. Government, retailers, brand-owners and consumers all play key roles in creating and reinforcing resource efficiency in consumption and production. And while markets are slow to reflect scarcities and risks in pricing, we need now more than ever market instruments that are fit for purpose and reflect full-cost pricing. Policy options include: Gradually remove price distortions for food, fuel and clothing with large externalities/footprints.

Report progress using new, universally adopted methodology led by UNEP on fossil fuel subsidy reform; Implement “polluter pays” while avoiding abrupt price movements. Regulate or tax consumer products with high associated plastic losses (responsible for microplastics); Promote economic incentives to increase the use of second-



▲ *Circular and green economies require new skill sets, revolving around renewables and energy efficiency*

ary materials over primary materials. These can include import duties on raw materials and polymers; Legislate and require reliable sustainability information to consumers; increase consumer awareness through behavioral economics and “nudging”.

Step 4 - Spend and invest wisely. Governments represent some of the largest global consumers and investors, reaching 20 - 50% of GDP and their expenditure sends important market signals to suppliers. Sustainable public procurement is one area where Government expenditure can align and reshape markets with relatively friction and social capital costs. Policy actions include: Create legislation for sustainable public procurement and adopt guidelines to enhance circularity in public purchasing; Create commissions for sustainable infrastructure, focusing on investment gaps and creating space for public-private initiatives, including industrial symbiosis; Invest in research and development (R&D) and innovation that supports circularity, such as material science and sustainable applications of emerging technologies such as AI.

Step 5 - Think beyond national borders. Align trade and trade-related policies with objectives of circularity and sustainable development for increased revenues, growth and job creation; Promote trade agreements and partnerships that increase resilience and sustainability; Create export opportunities and market access for green products and technologies.

Circular and green economies require new skill sets, revolving around renewables and energy efficiency, water saving and recycling...

Step 6 - Invest in education and training. Circular and green economies require new skill sets, revolving around renewables and energy efficiency, water saving and recycling, secondary materials and recycling,



remanufacturing and retooling among others. They require a complete rethink of how chemicals are deployed and recovered across their life-cycle. Policy options include: Strengthen and reform vocational and technical training programs at national level to reskill populations and train for tomorrow's green collar jobs; Reform and adapt university curricula to include circularity and resource efficiency in business, banking, MBAs, engineering and natural sciences; build capacity to tackle tomorrow's sustainability challenges; Remember that not all information comes from education, a lot of it comes from entertainment. Engage media and entertainment sectors to normalize sustainable behaviors and provide information in an entertaining way; Engage faith-based communities to bring contemporary environment issues into their communities.

Step 7 - Be inclusive. To avoid social upheaval and associated costs, each country must plan for a "just transition," which involves youth, business, faith, civil society. Policy options include: Create national roundtables on just transition, involving labor, business, policy and youth; Introduce social protection and flanking measures to ensure social floors and access to education, health and basic needs - including pollution-free air and water; Protect workers in industries that are traditionally influential in policy



▲ *Building capacity to tackle tomorrow's sustainability challenges*

making and that may be affected by the transition to a circular economy. Protect people, not jobs.

7 steps to circularity. Because in the beginning, nature was entirely circular - waste did not exist. And so nature has a lot to teach us as we look for and develop economies that are circular, green and inclusive.

Imagine an economy without waste. What would it look like? And what would we need to do to get there? But here's a bonus step. The 8th step is to rethink about what we are getting out of removing 100 billion tons of stuff from nature every year. Measuring wellbeing of society beyond GDP can unlock less material intensive views of prosperity and foster aspirational paradigms around wellbeing, work-life balance and quality of life in harmony with nature. Countries like Bhutan, Finland, Japan and Thailand are embracing development paths that go beyond eternal growth.

The team at UN Environment Program has worked in the space of sustainable living, consumption and production for many years, and brought together this rich expertise in one easy-to-access place: The UNEP Circularity Hub. It shows through living examples how nature can inspire design, industrial value addition and consumer loops to reduce material waste and retain value. Its deep dives into the second step to circularity - rethinking the productive base of our economy, so that it meets our needs without accumulating risks or liabilities. They say a journey of a thousand miles begins with a single step. And reimagining the basis of our economy is the very first step■

HÔNG NHUNG (UNEP source)



▲ *Ecosystem-based adaptation is now being undertaken by more and more Governments and organizations all over the world*



UNEP, IUCN to launch new € 20 million program on ecosystem-based adaptation

The UN Environment Program (UNEP) and the International Union for Conservation of Nature (IUCN) are jointly launching the Global Fund for Ecosystem-based Adaptation (2020 - 2024), which aims to provide targeted and rapid support mechanisms through seed capital for innovative approaches to ecosystem-based adaptation. At the recently concluded UN Climate Change Conference (COP 25) in Madrid (Spain), the Federal Environment Ministry of Germany (BMU) announced that it would provide € 20 million for the new UNEP - IUCN program, officially titled “Support for the Implementation and Upscaling of Ecosystem-based Adaptation”.

Ecosystem-based adaptation (EbA) refers to the set of approaches that involve the management of ecosystems to reduce the vulnerability of human communities to climate change. The restoration of mangroves and coral reefs, for example, protects coastal areas from the impacts of rising sea levels, while planting and restoring vegetation on hillsides and mountains prevents erosion and landslides during extreme rainfall.

EbA is a key pillar of the movement to promote ecosystem-based, or nature-based, measures for climate change adaptation, which have gained scientific and policy interest over the past few years due to their multiple benefits for people and the planet.

Through its International Climate Initiative (IKI), the BMU is now increasing its financial commitments for ecosystem-based adaptation by around € 60 million, which includes the new UNEP - IUCN program.

Germany's Federal Environment Minister Svenja Schulze commented: “Nature often provides the best solutions for climate action and adaptation to climate change. In addition to climate action and nature conservation, such projects often bring social benefits as well: They help people in vulnerable developing countries in particular to adapt to climate change. People in these countries are often much more directly dependent on nature. This is equally true for agriculture and for coastal protection”.

The multi-year Global EbA Fund, established by UNEP and IUCN, will draw on and support the growing momentum

behind nature-based solutions and EbA, along with major movements such as the UN Decade on Ecosystem Restoration. The Fund will have a specific focus on working with local NGOs and INGOs with relevant EbA experience and local presence and with governments on specific gaps in technical knowledge and understanding.

“Nature-based solutions are increasingly recognized as integral to global climate action”, said Executive Director of UNEP Inger Andersen. “With this new program, we are using the power of ecosystems to help societies adapt to climate change. Ecosystem-based adaptation is now being undertaken by more and more Governments and organizations all over the world. This work demonstrates that it's not only us that protects nature, but also nature that protects us”, she added.

Nature-based solutions, including ecosystem-based adaptation, were a central pillar of the UN Climate Action Summit in September 2019, with the Global Commission on Adaptation (GCA) launching its eight Action Tracks for adaptation, along with a landmark report that argued for the increase of nature-based and ecosystem-based measures for climate change adaptation. UNEP will be leading the Action Track for nature-based solutions, and the results of the Global EbA Fund will contribute to addressing the barriers identified by the GCA process.

“In 2009, IUCN framed the concept of ecosystem-based adaptation, and since then has globally promoted its use to increase society's resilience to climate change”, said Dr. Grethel Aguilar, Acting Director General of IUCN. “Ecosystem services and biodiversity are our best allies against climate change and if we all use them wisely, both the planet and humanity will thrive. The generous contribution of the German Government will help us scale up actions that put nature at the center of sustainable development.

UNEP and IUCN will be supporting target countries in implementing EbA measures to meet their global plans and commitments. The measures funded by this program will be supported by specific expertise- and capacity-building, while strengthening information, knowledge and political will for nature-based solutions to adaptation. To do so, IUCN and UNEP will draw on their extensive existing networks, tools and expertise, including Friends of Ecosystem-based Adaptation (FEBA), supported by IUCN and the Global Adaptation Network, supported by UNEP.

The two organizations will serve as catalytic conveners by engaging key stakeholders to proactively scale up commitments through strategic partnerships, building on key high-level political processes. The partnership between UNEP and IUCN will leverage a long history of EbA approaches and projects. Together, IUCN and UNEP have been involved in more than 80 EbA-related projects since 2010■

HOÀNG ĐÀN (Source: UNEP)



SCG: Resource optimisation, young people training keys to circular economy

As one of Southeast Asia's largest enterprises in cement-building materials, chemicals and packaging, SCG Group is taking one step at a time to meet the standards of a circular business model as it tries to make the best use of natural resources in the value chain from production to consumption and post-production recycling. SCG's Vietnamese division started operating in 1992 and the national unit has established more than 20 member companies in the country and employed more than 8,600 workers. Among many of its investment projects in Việt Nam is the Long Sơn Refinery and Petrochemical Complex (Long Sơn RPC) in Vũng Tàu City.

MAXIMIZING THE USE OF NATURAL RESOURCES

At a meeting with the Deputy Minister of Natural Resources and Environment Võ Tuấn Nhân in early February 2020, SCG's Vice Chairman cum Director General Piayong Jriyasetapong said the development of a Thai circular econ-

omy has always been the group's priority for years. SCG's factories have released no landfilled waste since 2012 while solid waste is re-produced into energy batteries to serve cement and power plants. "We know it is impossible to develop a circular economy without a well-constructed infrastructure", Mr. Piayong Jriyasetapong said.

Accordingly, SCG has been practicing the rules of circular economy and realized the "SCG circular business model" as resources are used entirely from production to consumption and the group contracts to collect the outputs that are disposed by users. For the development of a circular economy, collaboration between the Government, local authorities and the business community is the key. A developed circular economy will foster the use of high-tech products and services to maximize the use of resources.

In Southeast Asia, SCG is among the most-experienced enterprises in plastics-free production and it is also well-known for making environmentally-friendly, easily-recyclable packages. The SCG has held a conference every year in the last 10 years on its business operation. The group acknowledges that all of its three core business fields - packaging, petrochemicals and building materials - are very harmful to the environment and if the company does not act soon to show its social responsibility commitment, media crisis will rise someday. SCG



▲ SCG and other enterprises' representatives join the environmental protection alliance



reports show in the past few years, the enterprises have merged the circular economy principles into its business activities on a three-stage scheme. *First*, the SCG cuts the amount of raw materials, limit the use of natural resources in the production chain and develop new products with longer life cycles such as wrinkled bags - which are eye-catching, durable and paper-saving. *Second*, SCG upgrades production technologies to replace raw materials with other efficient materials to reduce the level of material consumption and make the products more recyclable, for example, Fest grocery bags that are recyclable and can be swapped for styrofoam boxes. *Thirdly*, the group increases the recyclability of the products, for example, working with retail stores and supermarkets to collect used paper boxes and paper for reprocessing and developing production formula that raise the percentage of reprocessed plastics.

SCG in 2018 reproduced about 313.000 tons of industrial waste into renewable raw materials and turned 131.000 tons of industrial waste into renewable energy. In 2019, the group continued applying circular economy rules in production, targeted to cut the percentage of used single-use plastics to 20 percent in 2025 from 46 percent and increase the percentage of recyclable and biological plastics to 100 percent in 2025.

During the early stage in Việt Nam, SCG first concentrated on helping employees fully understand the importance of using environmentally-friendly materials and the recyclability of its plastic products. Then the company popularized its philosophy and made alliances in the country. As the major investor of the Long Sơn RPC, SCG plans to make the complex an example of circular economy model in Việt Nam, in which all contractors and constructors are required to comply with the circular economy rules such as energy saving, environmental protection and closed-loop product life cycle. The Complex is expected to help local authorities encourage schools and educational facilities to join the circular economy model.

According to Deputy Minister Võ Tuấn Nhân, if SCG wants to develop a circular economy model at the Long Sơn

RPC, it has to make sure the outcomes are “circular”, meaning waste gas and water are treated completely. Post-production solid waste must be retrieved and re-used to create new values. The Long Sơn RPC may be a good example to encourage other enterprises in Việt Nam to operate in a circular model.

VALUABLE LESSONS AND EXPERIENCES LEARNT FROM PRACTICES

Recent environmental crises like air pollution in Việt Nam and fire in the Amazon rainforest have made environmental protection a global concern. Thus, young generations are the hope of the world, expected to resolve environmental issues in the future. To foster the youth, SCG - as a leading corporation in sustainable development - hosted the SCG Sharing the Dream ASEAN Camp 2019 in Bangkok (Thailand), bringing together 73 students from seven countries across the ASEAN, including Việt Nam, to learn from each other and find possible solutions for urgent issues faced by the region. The students not only attended training programs - in which they were instructed by SCG's Board of Directors at first hand - but also had the opportunities to join company's sustainable development projects. One of the outstanding projects was the “Recycled Plastic Road” that was carried out by SCG and Dow Chemicals. The project was a smart, sustainable solution that had helped many countries deal with the rising amount of plastic waste.

The SCG Sharing the Dream ASEAN Camp 2019 was also a forum for the students to share their views on top-priority environmental matters that their nations had encountered and deliver their own solutions. Among the presentations, the “Say No to Single Use Plastic” project of the Vietnamese students was well-received by the audience, including SCG Group and international participants. An SCG high-ranking officer said: “I was really impressed with the Vietnamese students' incisive view. The problem is not about plastics, it is about whether people can change their habit in consuming single-use plastics. Plastics will become beneficial for the environment if they are used in the correct way”.

The group of Vietnamese students then got the sponsorship from SCG Vietnam to realize the idea in Việt Nam. At the moment, the students have completed organizational structuring and developed a preliminary promotional plan for the project. The students at the SCG Sharing the dream ASEAN Camp 2019 have given Việt Nam the hope about young generations that are becoming more responsible, dynamic, knowledgeable and spirited with environmental and community-related issues.

Besides the above-mentioned programs, SCG has launched others for young people such as the SCG International Internship Program and the SCG Young Leaders Program. As it visions to become an international corporation in sustainable development, those social-responsibility programs have helped SCG raise the standards for young generations■

HỒNG GẮM



Thừa Thiên - Huế takes measures to protect wild birds

Chairman of the Provincial People's Committee Phạm Ngọc Thọ has requested all local authorities strengthen the protection of wild birds to gradually build Huế into a green city and a safe haven of wild animals. He urged localities to control, prevent and strictly punish all acts of trapping, hunting, shooting, trading, transporting, storing and slaughtering of wild birds and animals living in and around residential areas such as parks, ponds, lakes and lagoons.

He asked them to hold programs on disseminating, educating and introducing about regulations and laws on the management, control and conservation of wildlife, particularly wild birds and support all actions to prevent the abuse and killing of the birds. He also appealed for businesses in the area to sign commitments to not buy, sell, use, consume, display or advertise wild birds. Local authorities should regularly conduct inspections to discover violations. The Provincial leader also requested pro-



▲ *The appearance of wild birds has been reported as a good sign for the Thừa Thiên - Huế Province's ecological environment*

hibiting cadres, civil servants and authority officials of localities from using products derived from wild animals and wild birds.

Earlier, a large amount of wild birds including flocks of white storks were seen flying along canals and paddy fields to search for food in the Province. The appearance of wild birds has been reported as a good sign for the local ecological environment but has also resulted in increased illegal wildlife hunting and trading in the Province ■

GIA LINH (VNA source)

Rare primate returned to nature in Tuyên Quang

A rare primate was released in Phiêng Bung Natural Reserve in Nặng Khả Commune, Na Hang District of the Northern mountainous Province of Tuyên Quang.

The Indochinese rhesus macaque, also known as "golden monkey", is an endangered and rare species listed in Việt Nam's



▲ *The Indochinese rhesus macaque released into nature in Tuyên Quang*

Red Book. The monkey and 12 wild bamboo rats were found and seized in the household of Mr. Triệu Văn Dũng, residing in Bản Thác Hamlet, Yên Hoa Commune of Na Hang District.

District police made a record of Triệu Văn Dũng's violation of the Law for possessing the wild animal. The wild animals would survive in nature because they were released back to the forest in a very healthy condition given that they were captured not too long ago, according to the local authorities.

In Bình Phước Province, 25 wild and rare animals have been released into Bù Gia Mập National Park in 2019. Before returning to nature, the animals were well nourished and treated to recover their wild instincts after being domesticated in household farms. The Park's Wild Animal Rescue Centre continues to monitor the health and adaptability to the natural environment of the animals.

Established in 2016, the Wild Animal Rescue Centre has received 104 wild animals and released 85 of them to nature. The rest are being cared for and rehabilitated at the Centre. Most of the wild animals were handed over by local people and forest rangers.

Bù Gia Mập National Park is located on an area of nearly 25,600 ha and is home to 400 species, of which there are 30 endangered mammals, 10 rare birds and 16 reptiles in the Red Book ■

TRẦN TÂN (VNS source)



The element of Ecolodge make the attraction for tourism

The element of Ecolodge make the attraction for tourism

Along with the trend of green living, ecotourism is also favored by many domestic and international tourists. Green vacation, eco-holiday or Ecolodge is understood simply as traveling but still protecting the environment and maintaining the peaceful life of the local people. Ecolodge is clearly differentiated from the model of staying at hotel and resort through construction and operation. An Ecolodge must cover 4 basic elements: close to nature, environmental protection, culture, sustainable tourism.

CLOSE TO NATURE

Accordingly, the Ecolodge-built tourist area must be separated from urban residential areas, giving priority to places with good terrain, high terrain, space in front of a wide field or river bank. Space Ecolodge is surrounded by natural environment, away from other artificial facilities. The architecture must be a whole to enhance the beauty of the Ecolodge, as well as complement the natural beauty, available harmony of the local landscape area.

This resort often prioritizes the use of natural materials, manual processing, but must ensure subtle elements, expressing the elegance of service standards. In interior and exterior decoration, it is necessary to combine and integrate daily life items and local cultural symbols.

ENVIRONMENTAL PROTECTION

Investors should make the most of environmentally friendly appliances, using clean energy such as solar energy, energy saving lamps and implementing the overall energy saving process from the investment phase to operate, fully understand the daily waste treatment process. Training on environmental protection activities for staff members as well as relatives in local communities such as cleaning, planting trees at Ecolodge and for the community, or investing in public properties to protect environmental protection... is also a necessary activity that ecolodge resorts should implement.

HONORING INDIGENOUS CULTURE

This element is shown by trying to combine local dishes into the menu or organizing indigenous cultural events on the premises of Lodges such as: local cuisine, traditional cultural performances...

In addition, the uniform of the staff can also incorporate motifs or features in the indigenous people's costumes. Many Ecolodge areas also invest in building a native indigenous cultural space and cooperating with a number of local vocational institutions, supporting the sale of non-profit products of the people, to tourists in Ecolodge to buy and support. These craft facilities.

SUSTAINABLE TOURISM

The Ecolodge zones need to use at least 90% of the local residents in the process of providing services to visitors, creating jobs and stable income for residents. At the same time, support the consumption of fresh farm produce grown in the area and carry out many meaningful activities for the community such as helping disadvantaged students, building

clean water pipes for people in the village.

In addition, green eco-zones need to coordinate with tourists and state experts and agencies to raise awareness about environmental protection and cultural preservation at Ecolodge.

Currently in Việt Nam, there are some Ecolodge models attracting many tourists like Mai Châu Ecolodge (Mai Châu Town, Hòa Bình Province), Topas Ecolodge (Lào Cai Province), Hội An Ecolodge (Quảng Nam Province)...

XUÂN THẮNG



▲ *Hội An Ecolodge and Spa, Quảng Nam Province*



Green tourism in Yên Đức village

Yên Đức village tourism is a unique tourism product, contributing to promoting the image of Vietnamese villages, especially connecting international tourists to heritage tours - the Natural Wonder Hạ Long Bay.

Yên Đức is located in Đồng Triều District, Quảng Ninh Province, about 2 km from National Road 18A. Nestled in vast paddy fields, Yên Đức village is almost separate from the bustling urban life. Like many other northern villages, Yên Đức also has bamboo ranges, straight areca rows, ancient houses, small ponds between the village, gentle farmers and children merry to play in a happy laugh.

International tourists to Yên Đức tourist village admire and experience all production activities, daily activities of farmers. The most unique and interesting feature of community tourism is that visitors are guided by the farmers in Yên Đức village; directly go to cultivate rice, pound rice, throw fish and catch fish or grow vegetable beds by themselves... The experience that foreign tourists like the most in Yên Đức is to join in to catch fish, this job only for those who are quick-eyed, quick-hand-



▲ Tourists can experience the daily life of local farmers by being real farmers with many activities

ed and not afraid of mud and fear of dirt. Visitors after wearing protective gear and fishing gear will be waded into a shallow lake (in the countryside or "pond") that is stocked with fish. You need to be quick to see the fish between the mud and water, fast to catch the fish and must be strong to lift the fish out of the bag. Snuggling, catching fish is indeed a fun-filled experience and delight.

Tourists to Yên Đức often ride bikes to enjoy the fresh air, inhale the smell of new rice, cross the straight roads and scowl or crept through small lanes just enough to fit a bicycle. On that journey, visitors will meet on the way the grandparents who are looking after the children under the bamboo shade, listening to them say "Hello" with friendly waving hands, will visit the Temple of Cảnh Huống calmly where people are people find their place in sacred places or chat and listen to introduce about the traditional culture of Vietnamese people in houses over 100 years old. In addition, visitors can enjoy cultural activities, arts and folk games typical of the wet rice culture such as cheo singing, water puppet dance, singing "Quan họ Bắc Ninh"... ■

HIỀN NHÂM



▲ Yên Đức village attracts many tourists with the peaceful natural scenscenery

WORLD WILDLIFE DAY 2020 HIGHLIGHTS THE IMPORTANCE OF BIODIVERSITY



World Wildlife Day is celebrated this year under the theme "Sustaining all Life on Earth", highlighting the unique place of wild fauna and flora as essential components of the world's biodiversity, as well as a key pillar of livelihoods for people, particularly among communities that live close to nature.