

NATURAL RESOURCES AND ENVIRONMENT POLICIES AND PRACTICES



Institute of Strategy and Policy on Natural Resources and Environment

The background of the cover features a photograph of two industrial smokestacks. The stack on the left is taller and has red and white horizontal stripes. The stack on the right is shorter and also has red and white horizontal stripes. Both stacks are emitting thick white smoke that rises into the sky. The sky is filled with large, billowing white clouds. In the bottom left corner, there is a large, solid teal-colored triangle that points towards the center of the page.

**Air quality management
in Viet Nam**

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The articles presented in this series represent the various viewpoints of the authors, and do not necessarily concur with the views of ISPONRE or our related partners.

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Contents

03 FOREWORD

03 Foreword - ISPONRE

04 Foreword - GIZ

05 NEWS

05 International consultative workshop
on revision of the Law on Environmental Protection

05 Consultation workshop on air quality management

06 STUDIES

06 Air quality management in Vietnam:
Difficulties and challenges to be considered
in the amendment of the law on environment protection (LEP) 2014

11 Overview of Air quality Management Policies in Vietnam

16 Enhancing data on air pollution and health:
global challenge

20 INTERVIEW

22 PHOTOS



Foreword

Over the last few years, air pollution has become a significant issue, attracting the attention of the government and the people. The Ministry of Natural Resources and Environment's National Environment Status Reports show that despite efforts to reduce air pollution, air quality during 2000 - 2018 declined, impacting people's health, economic growth, and the social security of the country. Accordingly, there is a growing need to provide complete, accurate, and timely information on air quality and to apply international scientific and technological advances in the field of air quality improvement. In addition, state management should be enhanced through the development of a synchronized system of institutions, policies, and solutions for sustainable development.

In this context, the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH is implementing the Integrated Air Quality Management and Climate Change project under the framework of the International Climate Initiative (IKI), and funded by the German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU).

Within the framework of the project, the Institute of Strategy and Policy on Natural Resources and Environment (ISPONRE) is collaborating with relevant counterparts to develop a publication entitled Natural Resources and Environment Policies and Practices with the theme of Air Quality Management to create a forum for information sharing between management agencies, experts, scientists, and the public. The first volume of the series focuses on an overview of air quality management in Vietnam with the following volumes exploring urban air pollution in Vietnam, the impacts of air pollution, and mitigation of air pollution impacts in Vietnam.



We expect to hear the ideas and opinions of readers, which will be passed on to decision makers, management agencies, and environmental organisations to inform policy discussions. We believe that public participation will contribute to building an effective management system and will help to raise public awareness, promoting community action in a joint effort to reduce air pollution in Vietnam.

The articles presented in this series represent the various viewpoints of the authors, and do not necessarily concur with the views of ISPONRE or our related partners. The series reflects a range of perspectives and shares different insights on air pollution, enabling the informed debate necessary to achieve sustainable development and keep Vietnam green and clean.

Regards!

A handwritten signature in black ink, belonging to Assoc. Prof. Nguyen The Chinh. The signature is stylized and fluid, written in a cursive-like manner.

Assoc. Prof. Nguyen The Chinh

President

Institute of Strategy and Policy on Natural Resources and Environment



Source: Internet

Foreword

With this first newsletter providing the interested reader with an overview of current air quality management (AQM) in Vietnam, the German Development Cooperation GIZ on behalf of the German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU) is pleased to support a new series of topical newsletters published by Vietnam's Institute of Strategy and Policy on Natural Resources and Environment (ISPONRE). This series of newsletters will offer insights into effective solutions for cleaner air across the country.

Vietnam's rapid economic development, which has led to increased transport, building activity, industrialisation, and consumption, raises environmental challenges for the country's bigger cities. Air quality is an issue that has caught the attention of the authorities and the public.

Vietnam's current pollution levels are a major concern for people's health, with



associated respiratory and cardio-vascular illnesses on the rise. In addition, poor air quality also reduces agricultural productivity and undermines Vietnam's climate change mitigation goals. The associated economic costs are a threat to Vietnam's development. Hence, in accordance with recommendations from the World Health Organisation, the Government is developing strategies and concrete action to analyse the scale of the air pollution problem and generate sustainable solutions.

This new newsletter supports these efforts by informing both the public and government agencies about Vietnam's measures to improve air quality, contributing to the discussions and decision making vital for ensuring a healthier environment for the people of Vietnam.

With best wishes for clean air in Vietnam,

Ms. Kirsten Hegener
Deputy Country Director
GIZ Viet Nam

International consultative workshop on revision of the Law on Environmental Protection



*(Deputy Minister Vo Tuan Nhan spoke at the meeting
- As monre.gov.vn)*

Speaking at the consultation meeting with international experts on amendments and supplements to the Law on Environmental Protection 2014 held on 13 December in Hanoi, Deputy Minister Vo Tuan Nhan suggested amending the law, adding that, "the new Law on Environmental Protection must be suitable to the conditions of Vietnam, asymptotic and international integration, while at the same time ensuring economic growth."

Experts from international development agencies and organisations, including GIZ, the World Bank, and the International Union for Conservation of Nature, were among the attendees.

Speaking at the meeting, Deputy Minister Vo Tuan Nhan said that the Law on Environmental Protection (LEP) 2014 had made much progress, contributing to state management and environmental management. Businesses are contributing to the country's sustainable

development. However, the process of implementation over the past 5 years also revealed some shortcomings, including overlaps with other laws and environmental developments in Vietnam. In the face of practical requirements as well as guidelines and policies of the Party and State, it is necessary to amend and supplement the Law on Environmental Protection to improve state-managed environmental protection, and at the same time remove difficulties for ministries, localities, businesses, and related subjects.

To ensure that the amended law is compatible with international law and practice, the Ministry of Natural Resources and Environment (MONRE) drafted a law to amend and supplement several articles of the Environmental Protection Law and invited experts, scientists, and relevant organizations to comment on the draft law. The Deputy Minister expressed his hope that, "Experts, scientists and international organizations with their own experiences contribute comments to the Ministry of Natural Resources and Environment to complete the Law on Environmental Protection, ensuring consistency and synchronization with relevant laws, creating a legal corridor on environmental protection, and promoting sustainable development."

Consultation workshop on air quality management



The workshop attracted the participation of numerous representatives from various organizations. Source: GIZ

Air pollution has become a serious issue in Hanoi, posing risks to human health. The "Integrated Air Quality Management and Climate Change Mitigation" project, implemented by GIZ and funded by the International Climate Initiative (IKI) of the German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU) is supporting the Government of Vietnam to improve air quality management.

On 6 December 2019 in Hanoi, the Institute of Strategy and Policy on Natural Resources and Environment together with GIZ hosted a "Consultation workshop on Air Quality Management in Vietnam" to share research results from different provinces, share international experience, and to consult with different stakeholders to finalize the final recommendation paper.

The recommendation paper assesses air quality management issues in order to propose integrating air quality management into the amended Law on Environmental Protection. Representatives from the business sector, institutes, research centres, and universities made recommendations and suggestions for inclusion in the final publication.

(As GIZ)

Air quality management in Vietnam: Difficulties and challenges to be considered in the amendment of the law on environment protection (LEP) 2014

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I. Introduction

Over the past three decades, following the renovation (doi moi) policy, Vietnam has gained remarkable achievements in socio-economic development. However, the strong socio-economic development, industrialization, and urbanization in recent years, along with rapid population growth in urban areas, have been putting great pressure on the living environment, including air quality.

Being aware of the importance of environmental protection, from the early days of the renovation process, Vietnam has actively promulgated many legal instruments, and has implemented many activities to prevent and treat pollution to protect the environment. The Law on Environment Protection was enacted in 1993, amended and supplemented in 2005, and revised in 2014. However, the environment problem in general and the air quality problem in particular continue to be complicated and have worsened; in some areas, environmental pollution has become a pressing social issue.

The article aims to identify the issues, specify challenges in air quality management in Vietnam, and propose recommendations.

II. Status of air quality and pollution sources in Vietnam

The annual and 5-year national environment status reports of the Ministry of Natural Resources and Environment (MONRE) show that despite significant efforts, the quality of Vietnam's environment, including the air quality, has worsened during the past 10 years (2010-2018) with a gradual increase in pollution.

In Hanoi and other major cities, the number of days with poor AQI (101 - 200) and bad AQI (201 - 300) is still high; in some areas during peak hours, the air quality deteriorates to harmful and hazardous levels (AQI > 300).

Most of Vietnam's major cities are facing increasing air pollution. Pollution levels in cities vary widely depending on the size of the city, population density, construction, economic development, and traffic density. The 2016 National Environment Status Report shows that the main sources of urban air pollution include: transportation, construction, (industrial) production, and people's activities. Meanwhile, emissions from transportation account for the largest proportion of total emissions: dust (TSP, PM10, PM2.5), SO_x, NO_x, CO, etc.

The 2017 National Environment Status Report on waste management shows that the main sources of air pollution in our country include: transportation, industry, construction, people's activities, agriculture and craft villages, and waste dumping and treatment. Some primary emitting industries include cement production, thermal power, steel production, chemicals, and mining. Besides TSP, PM10, PM2.5, SO_x, NO_x, CO, emissions from industrial zones, industrial clusters, and craft villages also contain different inorganic and organic substances depending on the product type.

Air pollution due to dust is still the most prominent issue in urban areas and many industrial zones. The concentration of dust in urban air varies by region, time, and weather conditions throughout the year. The current population of Vietnam (2019) is 97,552,000 of which about 35.92% (34,658,961 people in 2018) live in urban areas. With the birth rate of 1.9%, Vietnam's population is expected to reach about 105 million by 2030, with about 41.6% of the population living in urban areas. According to a recent study by the International Burden of Disease Report, conducted by the World Health Organization (WHO), PM2.5 has been ranked fifth among 300 mortality reasons worldwide leading to about 4.2 million deaths per year.

Currently, urban development in Vietnam is considered to be unorganized, not complying with the principles of system planning and sustainable development. Urban development is not in harmony with rural development. Urban development management (including air quality management) needs to take into account the relationship between urban and rural areas as two integral parts of the development process.

Source: Internet

The Prime Minister's Decision No.880/QĐ-TTg dated June 9, 2014 approving the Master Plan for Vietnam's Industrial Development to 2020, with vision to 2030, shows that from now to 2030, Vietnam still needs to develop key industries to ensure the country's socio-economic development, including energy, mining, construction materials, metallurgy, mechanics, oil and gas, chemistry, electronics, and informatics, to achieve an average growth rate of over 10% in the period of 2020-2030 [7].

It is forecast that in the period 2020-2030, Vietnam's environment will continue to be under pressure from population growth and industrialization, urbanization, and livelihood activities, which will require new policies, and integrated, feasible solutions.

III. Difficulties and challenges

Controlling environmental pollution, including prevention, treatment and remedy, is a complex and challenging problem for developing countries, including Vietnam. There have been many studies on shortcomings in environmental management, causes, and solutions to reduce pollution, but the focus seems to be on the management of water and solid waste. This article clarifies some of the specific difficulties and challenges in air quality management in Vietnam with regard to policy review, implementation, and monitoring.

Laws and policies on air quality management:

The Law on Environment Protection 2014 set a relatively comprehensive framework for environment management, and Decree No.38/2015/ND-CP and related legal normative documents specifically guide waste management, including air quality management. However, the reality shows that Vietnam's legal system on air quality management needs to be improved to be more systematic and specific.



Source: PxHere

For example: Article 4 of the Law on Environmental Protection 2014 stipulates that environmental protection is the responsibility and obligation of every agency, organization, family household and individual. Unfortunately, in reality, the responsibilities of each agency, organization, household, and individual have not yet been specifically and clearly stipulated. This not only causes many difficulties in the process of law enforcement but is also a grey area for certain parties to take advantage and to avoid responsibility. Many negative impacts on the environment are rooted in the mistakes promulgating and implementing policies, either accidentally or intentionally.

In addition to the Law on Environmental Protection, the Law on Biodiversity promulgated in 2008 and the Law on Forestry (promulgated in 2019 replacing the Law on Forest Protection and Development 2004) provide more specific provisions on responsibility for protecting forests and biodiversity, a very important factor in protecting the air quality and responding to climate change. Unfortunately, for a long time, legal provisions on the protection

and development of forest resources and biodiversity have not been respected. For example, the following activities have all had serious negative impacts on natural forest ecosystems, an important factor in protecting the environment in general and air quality in particular: the abuse of land reclamation; new economic region development programs in Central Highlands; conversion of poor natural forests into rubber farms on sloping land; maximizing water rice cultivation areas in the Mekong Delta; illegal forest destruction; and forest fires due to loose management.

According to Article 4.8 of the Law on Environmental protection: any organization, family household, or individual who causes environmental pollution, emergencies, or degradation, is responsible for finding remedial solutions, paying damages and assuming other responsibilities as stipulated by the law. In fact, the implementation of this provision is difficult due to complexity in quantifying damage, inconsistent methods in determining damage, and an unclear dispute resolution process.



Source: Markus Winkler - Unsplash



Articles 62 and 64 of Law on Environmental protection 2014 stipulate: All waste gases discharged into the aerial environment must be assessed and controlled; waste gas emissions sources must be determined in respect of amounts, properties and features of these emissions. The examination and approval of projects and operations that emit waste gases must depend on the aerial environment's maximal load and ensure there is no threat to human and environmental health. Manufacturing or business establishments that are likely to emit a large amount of industrial waste gases must register polluting sources, measures, statistical reports, and inventories, and set up a database relating to the amounts, characteristics, and properties of waste emissions.

Manufacturers, business, and service facilities with large industrial gas emissions must install automatic and continuous emissions monitoring equipment and be licensed by a competent state management agency to discharge waste. However, at present, there are no specific regulations on responsibilities of enterprises in emissions inventory, monitoring, or reporting. The consideration and approval of a project's environmental impact assessment report in accordance with the provisions of Decree 18/2015/ND-CP and Decree 40/2019/ND-CP

are still based mainly on the current technical regulation system, which is not yet compatible with the environmental load. Vietnam has not applied the Environmental Permit System as many developed countries have done.

Environmental technical regulations:

Vietnam's system of standard and technical regulation on the environment in general and on air quality in particular still needs to be further adjusted to better meet environmental protection requirements (Law on Environment protection, Article 5.8). Currently, in addition to the general technical regulations for industrial emissions (QCVN 19:2009/BTNMT and QCVN 20:2009/BTNMT), Vietnam has developed a number of specific emissions standards for specific sectors. However, the number of industry standards needs to be further reviewed, paying special attention to emissions scale, source apportionment and location characteristics (to be more detailed and specific). It is necessary to develop an early roadmap to comply with international environmental standards on ambient air quality as well as emissions technical regulations; there is still a big difference between Vietnamese and international technical regulations (EU, WHO, Japan, Singapore) on some typical indicators of ambient air quality, especially PM₁₀, PM_{2.5}.

Some industries' emissions technical regulations are in a similar situation. Typical examples can be found in the thermal power industry – one sector with very high emissions and potentially high pollution. Regulations of such organizations as the World Bank, EU, etc., require total TSP concentration in thermal power emissions not exceed 30-50 mg/m³ (depending on the air quality of the project area), while according to QCVN 22: 2009/BTNMT of Vietnam, the cap value of TSP is currently at 200mg/m³ (4-6 times).

Implementation of the Law:

This is a very big problem. It is not difficult to see that Vietnam's legal system is not yet complete, but if the law is strictly implemented, Vietnam's environment will surely be less polluted than at present. Currently, the enforcement of the Law on Environment Protection still has many shortcomings.

In order to meet the environmental protection requirements, Articles 13-15 of the LEP clearly define responsibilities for conducting a strategic environmental assessment of

strategies and plans on socio-economic development, and urban and industrial development, etc. The strategic environment assessment needs to evaluate the appropriateness of strategies, master plans, and plans with environmental protection objectives, predict environmental impacts, and propose mitigation measures. The Strategic Environment Assessment Report must be strictly appraised by a competent authority. Unfortunately, after these plans are approved, additions and adjustments are often made, resulting in the fact that many environmental criteria are no longer met.

In many cases, the application of the law is also greatly affected by the focus on economic development, local GDP increase, which leads to false reporting, splitting the project to avoid implementing provisions of the law.

Awareness of many businesses is low. This is a specific problem in the early stages of development. Many businesses also deliberately seek to circumvent the law, violating the LEP whenever possible to maximize profits.



The capacity to inspect, supervise and handle environmental violations:

To a certain extent, the current LEP has defined central and local environmental management responsibilities. To conduct state management of natural resources and environment, including air quality, the Prime Minister signed Decision 90/QĐ-TTg dated January 12, 2016, approving the Master Plan for the National Natural Resources and Environment Monitoring Network for 2016 - 2025, with a vision to 2030. Localities are also gradually provided with additional equipment for monitoring ambient air quality and emissions when necessary and enterprises under Decree 38: 2015/ND-CP are responsible for self-monitoring of emissions within their scope of responsibility.

From 2015, for large emissions sources, enterprises are responsible for equipping automatic emissions monitoring systems, and transferring monitoring data to the provincial Department of Natural Resources and Environment. The reality shows that, in many cases, the local environmental management apparatus is confused in dealing with arising environmental issues. The common

explanation is due to the lack of human resources and facilities, which is the case. Besides, as mentioned, the quality of staff is not good, and the provisions on division of responsibilities between state management and enterprise management are not explicit. Sanctions are not sufficiently serious to deter violations, which is also a factor affecting the effectiveness of environmental violation inspection, supervision, and handling.

IV. Recommendations

Air quality management is only effective when there is a sufficient and specific legal and policy framework built on a holistic approach. In the near future, Vietnam needs to develop its own laws governing each environment component. In the upcoming revised Law on Environmental Protection, there is a need for more detailed regulations on air quality management and a separate Government Decree guiding the implementation of provisions on air quality management.

In the amended law, responsibilities for environmental protection of each ministry and local authorities needs to be more clearly



Source: Tyndall

defined; for example, who is responsible for meeting criteria for environmental protection; who is responsible for integrating sustainable development into developing socio-economic development strategies, plans, programs, and projects.

It is recommended to review and clarify responsibilities of state management at all levels and responsibilities of enterprises in environmental management in general towards increasing personal responsibility in state management; increase the autonomy and creativity of enterprises in their direct and daily management; increase corporate responsibility in compliance with environmental laws.

It is recommended to continue completing the system of environmental technical regulations to be more specific, with differences in waste quality requirements by type, volume, and geographical location. For some specific areas, new industrial production investment projects, production technologies and waste quality must be close to the world's advanced standards, built on the basis of application of BAT-Best Available Technology.

It is recommended to supplement and complete regulations on ensuring environmental load capacity, improve the system of technical

regulations with a specific roadmap for moving from a technical regulation basis to a discharge permit basis in environmental management, including licensing emissions.

There should be more specific provisions on economic instruments in environmental management, increasing the level of penalties for intentional violations.

Improve inspection and examination, focusing on big emitters with a high risk of environmental impact on the principle of 20-80 (examining 20% of big emitters can help control 80% of emission.) Change environmental management from passive response to proactive prevention. Clearly define responsibilities for applying information technology to improve environmental management efficiency.

Develop specific regulations on socializing environmental protection, increasing the participation of communities, especially in compliance monitoring.

Supplement and clarify the responsibilities for education and propaganda to gradually raise awareness to build a culture of environmental protection.



Source: ISPONRE

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Source: Internet

Overview of Air Quality Management Policies in Vietnam

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Environment (ISPONRE)*

I. Introduction

Air pollution is a matter of interest in Vietnam at present. In big cities like Hanoi, Ho Chi Minh City (HCMC), and Hai Phong, many air quality indicators have exceeded the permitted level by many times; dust pollution is a particularly serious problem. Basically, the concentration of such pollutants as SO_x, NO_x, CO have not yet exceeded the National Technical Regulations (QCVN) on the environment, but PM_{2.5} and PM₁₀ in some locations and at certain times have exceeded QCVN 05: 2013 by 2-3 times¹ and there are signs this is increasing.

Air pollution has caused harm to people's health, especially to respiratory systems. According to statistics of the Ministry of Health, in recent years respiratory diseases have the highest incidence rate nationwide. Air pollution due to dust, SO₂, NO_x, CO, has caused many diseases such as respiratory infection, asthma, tuberculosis, chronic bronchitis, and cancer, etc. Besides impacts on people's health and life, air pollution also causes significant economic losses through the costs of health care, loss of productivity due to illness, damage to crops and buildings and materials, and negative effects on tourism.

Air pollution in Vietnam is increasing, but the policy system for air quality management (AQM) and protection is considered inadequate and implementation ineffective. Some

measures to manage clean air are outlined in the Sustainable Development Strategy, the Environment Protection Strategy, the Law on Environment Protection and several other documents. However, these regulations are mainly used as guidelines; they have not yet been applied effectively in practice. Policies and laws on clean air are limited.

Policy makers have paid attention to the prevention and control of pollution sources, but they have not yet applied an integrated approach to AQM. The current air environmental monitoring system hasn't been able to meet practical requirements. The management system is still overlapping and ineffective; specifically, the Ministry of Natural Resources and Environment (MONRE) is responsible for state management of the environment, including the air environment, but the tasks of urban air pollution control and urban air quality improvement are overlap with the Ministry of Transport and the Ministry of Construction. Meanwhile, the mechanism for coordination and sharing of information on pollution control among Ministries and agencies, and between central and local levels is still limited.



Source: Internet

II. Legal Policy Framework for AQM

1. Legal framework

Along with the development of legislation on environmental protection in general, regulations on air environment protection have also been included in policy and legal documents: the Law on Environment Protection (1993), Criminal Code (1999, 2015 and Amendment in 2017) (section on environmental crimes); at the same time, Vietnam has joined and signed relevant international treaties (Vienna Convention of 1994 on Ozone Layer Protection, the United Nations Convention on Climate Change in 1994, and the Kyoto Protocol in 1998 on reducing greenhouse gas emissions).

In the Laws on Environmental Protection 2005 and 2014, regulations on air pollution control have been elaborated. Air quality assurance is also mentioned in such documents as the National Strategy on Environmental Protection to 2010 and Orientation to 2020 including a priority program "Program for Air

¹ Ministry of Natural Resources and Environment. Report on the Current Status of Environment in 2016. Topic: Urban Environment. Hanoi, 2016

Quality Improvement in Vietnam"; Decision No.328/2005/QĐ-TTg dated December 12, 2005 of the Prime Minister approving the National Plan for Environmental Pollution control to 2010, including the Plan for Air Pollution Control; the National Environmental Protection Strategy to 2020 with Vision to 2030; Vietnam Sustainable Development Strategy for 2011 - 2020; as well as guidelines for technical regulations on emissions from motorized vehicles, and on industrial emissions from thermal power and cement plants, etc.

The 1993 Law on Environment Protection (LEP) provided the first basic framework for the country's environmental policies. The 2005 LEP continues to expand environmental protection policies in greater detail, including air pollution control policies. In the LEP 2014, there is a separate section on protecting the air environment, with regulations on ambient air environment and the responsibility for inventory and air pollution control.

However, regulations on AQM are still insufficient. Vietnam has no separate law or decree on AQM, only the National Action Plan on AQM to 2020 with Vision to 2025 approved by Decision No.985a/QĐ-TTg dated June 1, 2016 of the Prime Minister. However, implementation results of this Plan have so far been modest.

2. Air quality standards

Vietnam's ambient air quality standards were first developed in 1995. The Vietnam Standard (TCVN) 5937:1995 sets the ambient air quality standards for six principal pollutant (CO, NO₂, SO₂, lead dust, O₃ and TSP). The additional standards for other harmful air pollutants – TCVN – 5938 were also established in the same year. The national standards underwent

two revisions in 2001 and 2005. In addition, three other relevant air quality standards were revised and issued in 2005².

Recently, national air quality standards have been changed into national technical regulations (QCVN). On 7 October 2009, the Minister of Natural Resources and Environment signed and approved the change of TCVN 5937: 2005 and TCVN 5938: 2005 into national technical regulations on ambient air quality (QCVN 05: 2009) and national technical regulations on hazardous substances in ambient air (QCVN 06: 2009/ BTNMT). QCVN 05: 2009 was later replaced by QCVN 05: 2013 in 2013, adding a limitation to PM_{2.5} dust. TCVN 5939: 2005 and TCVN 5940: 2005 have been replaced by QCVN 19: 2009/ BTNMT and QCVN 20: 2009/ BTNMT. In addition, the QCVN 26: 2010/ BTNMT is the National Technical Regulation on noise levels.

² TCVN 5938: 2005 sets the threshold for some hazardous substances in ambient air, TCVN 5939: 2005 sets standards for industrial emission for dust and inorganic substances, and TCVN 5940: 2005 sets standards for industrial emissions for some organic matter.

Table 1:
Technical regulations for ambient air environment

Name of document	Content
QCVN 05:2013/ BTNMT	National technical regulation on ambient air quality
QCVN 06:2009/ BTNMT	National technical regulation on some hazardous substances in ambient air
QCVN 26:2010/ BTNMT	National technical regulation on noise level

Table 2:
Technical regulations on industrial emissions

Name of document	Content
QCVN 02:2008/ BTNMT	National technical regulation on emissions from medical solid waste incinerators
QCVN 19: 2009/ BTNMT	National technical regulation on industrial emissions for dust and inorganic substances
QCVN 20: 2009/ BTNMT	National technical regulation on industrial emissions of organic substances
QCVN 21: 2009/ BTNMT	National technical regulation on emissions from the chemical fertilizer industry
QCVN 22: 2009/ BTNMT	National technical regulation on emissions from thermal power plants
QCVN 23: 2009/ BTNMT	National technical regulation on emissions from cement production
QCVN 26:2010/ BTNMT	National technical regulation on noise
QCVN 30: 2010/ BTNMT	National technical regulation on emissions from industrial waste incinerators
QCVN 34:2010/ BTNMT	National technical regulation on emissions from the petrochemical industry for dust and inorganic substances
QCVN 51:2013/ BTNMT	National technical regulation on emissions from the steel production industry
QĐ 3733:2002/ QĐ-BYT	Occupational hygiene standards
QCVN 30:2012/ BTNMT	Regulations on medical solid waste incinerators



Source: Patrick Hendry - Unsplash

3. Division of responsibilities

- National level

According to the Government's Decree on functions and tasks of ministries, the MONRE is the highest-level functional agency directly responsible to the Government for air pollution control. They have responsibility for formulating legal documents, policies, strategies, master plans, national plans, 5-year and annual plans, programs, projects and tasks for air pollution prevention, control and reduction; formulating standards and technical regulations; national environmental monitoring network; control of environmental quality nationwide; developing national and territorial environmental pollution maps; transboundary environmental pollution, acid rain, and smog.

Ministries, ministerial-level agencies, and government agencies: within the scope of their functions, tasks and powers, are also responsible for implementing air pollution control. These are different regulatory bodies, but their activities are related to the air environment, such as the Ministry of Industry and Trade, the Ministry of Transport, the Ministry of Construction, and the Ministry of Science and Technology.

The Ministry of Transport has been assigned by the Government with the function of managing the traffic environment including the formulation of mechanisms and policies on traffic environmental protection; environmental standards and technical regulations, inspection and certification of environmental standards and technical regulations for vehicles; guiding and inspecting environmental certification and testing facilities for motorized vehicles, preparing environmental reports (SEA, EIA, Status Report), carrying out traffic environment monitoring, and developing databases.



Source: GIZ

In addition, the Government stipulates that the Ministry of Construction is in charge of environmental protection and management, climate change response in construction activities under its management in accordance with laws and regulations of the Ministry of Science and Technology – the agency that develops national standards for the quality of goods, unified fuel management, and appraisal of emissions treatment technology.

- Local-level

The Law on Environment protection stipulates responsibilities of People's Committees at all levels for state management of environmental protection in their respective localities. Among these is the authority of provincial and district people's committees on promulgation of environmental protection regulations, mechanisms, policies, programs, and plans. The law also provides for the establishment of specialized environmental protection agencies and appointment of environmental protection officials at provincial, district, and commune levels. At the provincial level, the responsibility lies with the Department of Natural Resources and Environment (DONRE) while at the district level, the responsibility lies with the Division of Natural Resources and Environment.

In addition, management boards of economic zones (EZs), industrial zones (IZs) and industrial complexes (ICs) also implement environmental protection activities, propaganda, and dissemination of laws on environmental protection in EZs. However, there is no unity or clarity in the regulations on decentralization of environmental management tasks of EZs, IPs, or ICs between EZ management boards, DONREs and District People's Committees, which leads to unstable focal points for environmental management, specifically in the areas of environmental impact assessment (EIA), environmental protection, environmental protection schemes; inspection and examination.

4. Air quality monitoring

Vietnam is making continuous efforts to improve and expand its air quality monitoring network nationwide. On 29 January 2007, the Prime Minister issued Decision 16/2007/QĐ-TTg on "Master plan for Natural Resources and Environment Monitoring Network to 2020". This plan aims to set up automatic air quality monitoring stations nationwide by 2020. Currently, there are about 35 automatic air quality monitoring stations nationwide operating under MONRE and DONREs. The

monitored parameters include PM10, CO, SO₂, nitrous oxide (NO_x), and ozone (O₃). In some cities (for example, HCMC), benzene-toluene-xylene (BTX) and PM2.5 are also monitored.

At the national level, the Vietnam Environment Administration (VEA) under MONRE is responsible for designing and organizing national air quality monitoring programs. The Centre for Environment Monitoring, a unit under VEA, organizes and implements national air quality monitoring programs, manages data, and acts as the focal point for the air quality monitoring network.

At the local level, DONRE in each province/city carry out air quality monitoring and checks compliance with ambient air quality standards. The Environment Monitoring Centre under DONRE conducts air quality monitoring in cities and provinces.

In general, air environment monitoring programs are mainly concentrated in urban areas and near industrial zones, but not in rural areas or craft villages. On the other hand, monitoring activities have not followed a unified process. With a lack of uniformity between levels, the implementation of QA/QC is weak, while the air monitoring equipment in many places is already outdated. Air environment monitoring data are still scattered and are not shared comprehensively, making it difficult to use the information.

III. Strengthening AQM

As mentioned above, Vietnam doesn't have a clean air law focusing on air pollution management. Currently, regulations on air pollution control are mainly stipulated in the Law on Environment Protection – in some

general principles – and in Vietnam Technical Regulations. The enforcement of legal documents related to the air environment is not proper, while the system of technical regulations on the air environment is still inadequate. In addition, the air environment monitoring system and information sharing are currently limited.

Although there are some challenges related to the legal framework, the recent reorganization of state agencies (notably the VEA) and more active participation of the private sector, non-governmental organizations and community groups, has improved the issue of air pollution control in Vietnam; however, is still much room for improvement. In general, air quality concerns in society are currently at a very high level, requiring the resolution of secondary pollutants such as PM2.5 and O₃, which are rapidly increasing.

New approaches, such as multi-pollution multi-effect, airshed management, AQM through land-use planning, are applicable measures that can promote the role of AQM in Vietnam in the coming period. However, initial measures should:

Continue to improve the system of policies and laws: It is necessary to improve the system of AQM policies and laws through identifying appropriate approaches, formulating specific policies and laws, and reviewing and revising regulations that no longer conform to current regulations with clear goals and roadmaps for reducing air pollutants. In the current context, it is necessary to develop a specific normative document on AQM (law or by-law) focusing on controlling and preventing air pollution due to socio-economic development activities as the basis for strict control of fuels and materials



Source: Internet

and emissions sources; clearly defining the functions and tasks of organizations in managing the air environment and avoiding overlaps; developing coordination regulations for AQM and information disclosure mechanisms; air environment management planning; strengthening sanctions, etc. In addition, it is necessary to review and improve the current system of technical regulations on air quality in line with the current situation.

Strengthen management capacity and professional skills of state agencies at all levels, assign responsibilities, and develop coordination mechanisms between focal points: MONRE is responsible for the unified management of air environment protection; coordination of air environment protection activities among ministries, agencies and mass organizations; promoting the inventory of waste sources; monitoring and controlling the air environment in urban areas and industrial areas; and strengthening the construction of air environment monitoring stations. At the local level, it is necessary to set up a division in charge of air environment management at the local state management unit on the environment.

Invest in and expand monitoring networks to improve data collection and update:

It is necessary to promote investment in modern technical infrastructure, machinery, equipment, and technology for monitoring stations, especially for monitoring dust and fine dust (focusing on the automatic, fixed and mobile air monitoring station system); and to conduct the roll-out nationwide, especially in urban areas and industries with a high level of emissions (thermal power, cement, steel, etc.). In addition, an inventory of pollutant emissions sources should be taken.

Attract the contributions of regions and social sectors for air management: Expand forms of propaganda and information dissemination to the community about the impact of air environment quality on public health; develop periodic programs for publicizing information on air quality in urban areas (via the AQI); enhance community consultation on environmental protection; promote the role of the community in the inspection and control of sources of air pollution.

Promote the application of scientific and technological advances towards green production:

Use of clean vehicles and fuels and renewable energy; reducing greenhouse gases emission; economical and efficient use of resources; and encouraging the development of green industry and green agriculture.

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Source: Internet

Enhancing Data on Air Pollution and Health: Global challenges

Dr. TRINH THAI HA

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Abstract

Air pollution is the leading global health risk, causing 7 million premature deaths each year. At the same time, air pollution is closely related to climate change /because the main driver of climate change is the consumption of fossil fuels, which is also a major driver of air pollution. Given this situation, air pollution has become a priority on the global agenda. Air pollution monitoring data and estimation of air pollution exposure and burden of disease at national, regional, and global levels are considered important factors to develop policies to improve air quality, protect community health and adapt to climate change.

In terms of air quality monitoring and reporting, strengthening cities' capacity to monitor air quality with standard, reliable methods, good quality measurement equipment, and sustainable operating mechanisms are key. In addition, epidemiological studies and the long-term and acute exposure effects should be strengthened in accordance with local, demographic, and population features; pollution components; nutritional status; and economic conditions and cultural features.

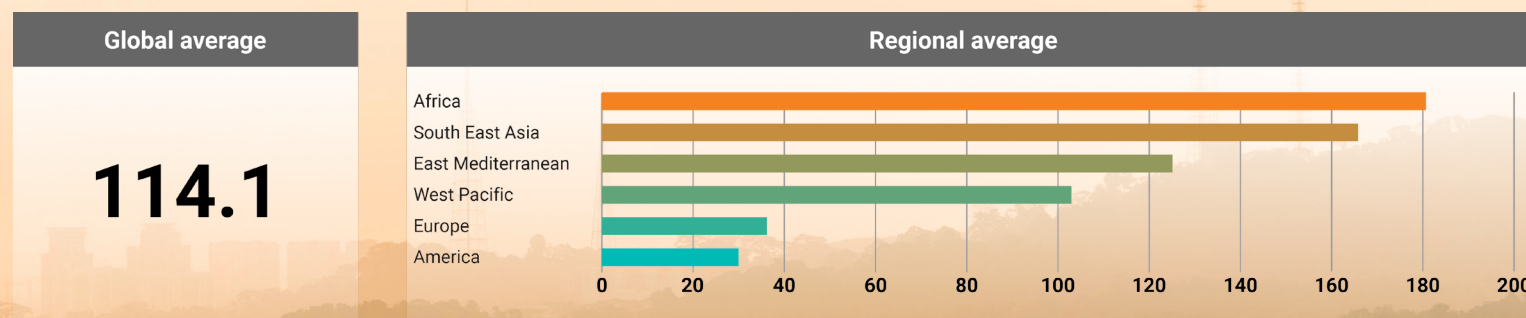
International efforts to develop the Air Pollution Database

Gathering information about types and concentrations of air pollutants is an essential step to protect people from the health effects of exposure to those pollutants. The network of monitoring stations is the main data source for estimating the population's overall exposure to air pollution and the total

burden of disease. Investment in air quality monitoring systems is a smart investment for public health. However, many countries around the world do not collect or have scarce data on ambient air quality – typically in sub-Saharan Africa, low and middle-income countries in the Western Pacific (including Vietnam) and Eastern Mediterranean. A lack of data impedes efforts to target air pollution sources, particularly in developing countries.

To address rising air pollution, the WHO has cooperated with nearly 50 local and international organizations to develop the **Global Platform on Air Quality and Health**. This Global platform brings together local and international experts, scientists and policy activists to strengthen monitoring and reporting measures on air pollution in a transparent and coherent manner. A key task of the Platform is to develop a database to support countries and cities to reduce air pollution exposure and burden of disease while contributing to a more effective resolution of harmful air pollution sources. One of the current key areas of the Global Platform is to improve methods for (1) integrating air pollution data from satellite, terrestrial

Figure 1: Number of deaths due to air pollution by region in 2016 (per 100,000 people)



Air pollution was estimated to cause 7 million deaths in 2016

Source: Internet

monitoring and chemical models; and (2) reflecting more clearly the characteristics of air pollution sources (such as transport, industry, and agriculture.)

To date, the WHO's urban air quality database has monitoring data for suspended particles on the surface of about 3,000 cities and towns. However, the coverage of the monitoring network varies significantly between regions. Only 10 out of 47 countries in sub-Saharan Africa have data for about 40 cities. In addition, the quality and reliability of data has also

changed due to different monitoring methods and mechanisms. The most relevant data to assess health risks is the data on PM_{2.5}, which is only recorded in 11% of cities worldwide, mainly in high-income countries.

For 33 member countries and 6 European Environmental Agency (EEA) cooperating countries, WHO Database Platform data are extracted from the EEA-managed AirBase database. These data, as well as all relevant metadata sets, are collected and published in accordance with the EU's legal requirements on air quality and information exchange. These are data from all measurement stations, from the general environment monitoring base point for rural areas to urban traffic locations.

Meanwhile, for more than 15 years, Clean Air Asia has consolidated data and information on air quality, climate change, and transportation in Asia. Clean Air Asia collects and shares with WHO air quality monitoring data from 22 Asian countries covering over 400 cities from 1993 to 2016. Data is provided by local focal points and collected from information available on websites of local statistics offices or environmental agencies. Although data availability has been enhanced over the past few years, the sustainability of these efforts remains an ongoing challenge.

In developing countries in Asia, investment costs for air quality monitoring networks are often allocated primarily at the initial procurement and installation stage. But then the resources allocated for operation and maintenance are limited, resulting in many stations ceasing operations after a certain period of time. This has always been a difficult problem in maintaining the traditional air quality monitoring network in developing Asian countries.



Luckily, a new generation of monitoring and modelling tools (including remote sensing satellites, low-cost sensors, emissions inventory, and air pollution models) allow for analysis of air quality and influencing factors in many parts of the world more comprehensively. Rapid changes in monitoring technology have the potential to significantly improve environmental protection planning and enforcement. Low-cost sensor technology enables automatic, continuous, and high-resolution monitoring of pollutants in terms of space and time.

Sensor data can be used in many air pollution management tasks such as: (i) filling in the gaps of traditional air quality monitoring networks; (ii) improving understanding of the link between pollutant exposure and human health; (iii) emergency response management, hazard leakage detection and compliance monitoring of pollution sources; and (iv) increasing public awareness and participation in air quality issues.

Many fixed and mobile, low-cost sensor networks to monitor air pollution such as Airvisual, AirBox, Plume, PRAISE-HK, AQMesh, AirCasting, etc., have been established in

many countries such as the United States, the United Kingdom, Taiwan, and China. Even mobile phones, drones and cars are equipped with air pollution sensors and have become mobile monitoring stations. More specifically, low-cost solar-powered sensor (RAMP) devices have shown their usefulness when monitoring many air pollution parameters such as CO, NO_x, SO₂, and dust in places that lack electricity for a long periods due to natural disaster impacts.

Estimation of air pollution exposure and burden of disease at national, regional, and global levels

Epidemiological studies over the past three decades have established a strong link between long-term exposure to ambient air pollution and indoor air pollution with early mortality related to ischemic heart disease, stroke, chronic respiratory disease and lung cancer, greatly reducing lifespan. Most health burden assessments use the most updated datasets of mortality and morbidity provided or certified by local partners. However, in many cases, these evaluation studies are limited by the availability and accuracy of data sets.



Most of the current evidence used to assess the burden of air pollution-related diseases depend on long-term cohort studies that have been mainly conducted in North America and Europe for many years. In the Asia-Pacific Region, epidemiological studies have been conducted on acute exposure to air pollution from a few days to a few weeks and show that the results of assessing impacts on premature deaths are consistent. However, more epidemiological studies on exposure to O₃ and PM_{2.5} in Asia, such as cohort studies, should be conducted to address potential uncertainties due to differences in demographics, pollutant composition, nutrition status, and other disease-specific co-factors. Epidemiological research data are the basis for enhancing the accuracy of health risk estimates due to air pollution. Moreover, improving local morbidity and mortality datasets is critical to improving health impact estimates identifying air pollution as causing millions of premature deaths in Asia and across the globe.

Since 2014, the WHO has assessed the global disease burden of air pollution based on the modelling of PM_{2.5} concentrations and population statistics. Spatial and time coverage as well as data quality of fine dust concentrations are limited, as mentioned above. In addition, incomplete population data make exposure estimates of air pollution potentially uncertain. The first reason is that census data for urban and rural areas in rich countries are more accurate than in poor and middle-income countries. Rural and urban delineation also varies by country, which also makes it difficult to synthesize data on a global scale.

Discussion

According to WHO estimates, over 90% of the world's urban population is living in polluted air, concentrated in Western and Southeast Asia. Approaches to air pollution and health data have certain advantages when combined to improve the capacity of air quality monitoring around the world, assessing and reporting on the health burden in the most transparent and consistent way. Asynchronous and inadequate data will prevent policy makers from making the right decisions to address air pollution and reduce the burden of the disease locally, regionally, and globally. Therefore, stakeholders from local and international governments, researchers, businesses and communities need to work together to understand the characteristics of air quality monitoring, and the importance of air pollution and health data for comprehensive policies on the environment, health, and climate change.

In terms of air quality monitoring and reporting, strengthening cities' capacity to monitor air quality with standard, reliable methods, good quality measurement equipment, and sustainable operational mechanism are key. With the rapid development of new sensor technology and the increasing availability of air quality data, environment managers, air quality experts, and data management units need to work closely towards the common goal of producing comprehensive data.

In terms of assessing and limiting the negative health effects of air pollution, it is necessary to strengthen epidemiological studies on long-term and acute exposure effects in accordance

with local characteristics of population, demographics; pollution components; nutrition status; economic conditions and cultural practices (transportation, cooking tools, farming methods, etc., especially in difficult areas where air pollution often exceeds the permitted level).



Source: Isporre

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Source: Unsplash

The community assess air pollution in HCM city

Interviewer:
Hoang Anh Duc

Photo:
Duc Hoang



1. Ms. Nguyen Tuyet Nhung
Tourist from Hanoi

I have just been in Ho Chi Minh for a few days, and I find the environment here quite pleasant compared to Hanoi, which is quite sticky and smoggy because it is not hot and smoggy here. Although there is a lot of traffic, there seems to be less congestion, more empty roads. However, environmental pollution from dust and smoke from vehicles as well as the construction of roads and high buildings is unavoidable.

I think that to improve the situation of environmental pollution, we need to limit the use of private means of transport and encourage cycling. I also ride a bicycle, and my children go to school by bus.



2. Ms. Duong Thi Thuy Linh
An office employee

I see an increase in air pollution. In my opinion, it is due to the increased volume of vehicles and manufacturing companies. Modern buildings also contribute to the greenhouse effect. In my opinion, resolving this problem requires green space, which means planting a lot of trees along the roads to limit airborne dust and using more public means of transport like me; I still go by bus to work every day. I think limiting private means of transport is a bit difficult because the first thing is to improve the quality of services then design many more routes, like in other countries, to attract people to public transport.



3. Ms. Huynh Thi Ngoc Tuyen
Ben Tre City, Ben Tre Province

I have been living in Ho Chi Minh City since the beginning of this year. My job is indoors, but every time I go onto the street, I find the atmosphere quite sticky and smoggy, especially during rush hour in the morning, noon, and afternoon. It is easy to get stuck in traffic here, plus hot weather cannot be avoided. I think the first thing to do to reduce pollution and improve the environment is to expand green areas such as parks and restrict the cutting down of trees. The second thing is prioritizing public transport. But I think that the current quality of public transport should be improved. If I am lucky, I can catch a nice bus, if not, I get on a very poor quality bus and I'd rather go on foot. These poor-quality buses release more smoke than other means of transport.

Source: Internet

Expert's opinions about air pollution and solutions

Ms. NGUYEN THI ANH THU

■ Could you please give a general assessment about air quality in Vietnam?

According to our observations and assessments over the past 3 years in Hanoi and Ho Chi Minh City, the air quality in Hanoi requires more attention. According to the latest data we collected in the Air Quality Report 2018 and analysis of results from state agencies and private measuring points, the annual average concentration of PM2.5 in Hanoi in 2018 was high ($40.1 \mu\text{g} / \text{m}^3$), exceeding about 1.5 times the permitted level in QCVN ($25 \mu\text{g} / \text{m}^3 \cdot \text{year}$). Data from 10 monitoring stations managed by Hanoi People's Committee also show that Hanoi's inner city area is being polluted with dust and PM2.5. Some worrying locations include Pham Van Dong, Minh Khai, Nguyen Van Cu, where concentrations of PM2.5 exceeded the National Technical Regulations for 25-35% of the total days per year.

In Ho Chi Minh City, air quality is generally better than in Hanoi.

■ What do you think are the main causes of air pollution?

Air pollution may come from various sources, such as the rapid increase of motor vehicles, construction activities, and people's daily activities (such as beehive stoves, burning waste, etc.).

In addition, there are external sources, especially coal-fired power plants, industrial zones, and transboundary air pollution from neighbouring countries affecting Northern Vietnam in general and Hanoi in particular. Air pollution has many sources, but there is not enough research to identify the main sources and their effects on air quality. Therefore, more in-depth studies are needed.

■ What are the current measures to prevent air pollution?

Our's recommendations for people to cope with the current pollution situation include: each individual should actively improve their understanding of this issue to find a way to protect their own health and the health of their family members, especially children. Choose a mask that can prevent fine dust and avoid doing outdoor activities when the air is polluted, and the air quality index is at a level that is harmful to health.

In addition, people should change their living habits, such as switching to use public transport, limiting the use of coal stoves, using energy efficiently and applying measures to reduce emissions.

■ What solutions do you think need to be implemented at the macro level?

There have been many efforts by different parties to improve air quality. However, in order to fully solve this problem, we recommend:

- Developing the Clean Air Law to provide a specific legal framework and guidance on air quality management in Vietnam.
- Setting up more automatic air quality monitoring stations while promoting the application of low-cost air quality sensors to help raise people's awareness and warn people about air pollution.
- Controlling sources of emissions, especially large sources such as industry (thermal power, cement, steel, chemical production), and transportation, etc. Considering using financial tools to control these sources.
- Promoting low emissions economic sectors and promulgating policies and mechanisms to support the application of green technologies, especially in energy, transport, and industrial sectors.

Source: Internet

PHOTOS

Domestic waste in Hoa Binh Park, Hanoi

1. Open waste burning
causing air pollution

2. Burning waste in the street
nearby Hoa Binh Park, Hanoi

3. Waste and waste burning -
air pollution source in Hanoi



Source: Internet



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