Workshop Report

National Air Quality Awareness Raising Workshop and Stakeholder Mapping for Clean Air Plan Development

Dates: 27-28 August 2024
Venue: Souphattra Hotel, Luang Prabang City, Luang Prabang Province
Format: 2-day workshop with group discussion on the second day (Workshop Agenda is provided in Annex A)
Participants: 41 onsite participants from national and local government offices, international and local NGOs and universities (participant list is provided in Annex B).
Organized by: United Nations Environment Programme (UNEP), United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP), Natural Resource and Environment Research Institute - Ministry of Natural Resource and Environment (NRERI-MoNRE), Asian Institute of Technology (AIT)

1. Introduction

Air pollution is a growing global concern with far-reaching impacts on public health, the environment, and socio-economic development. In Lao PDR, rapid urbanization and industrial growth have intensified air pollution, posing significant challenges to sustainable development. To address these issues effectively, it is crucial to raise awareness and enhance the capacity of government officials and stakeholders to mitigate the harmful effects of air pollution and ensure community well-being.

In Lao PDR, level of awareness of air pollution is rising, driven by the impacts of seasonal haze typically observed during the dry season. In regions like Luang Prabang, air pollution often reaches unhealthy levels during the burning season, which can affect people's health, among others. Four provinces in the north—Bokeo, Phongsaly, Oudomxay, and Luangprabang—and Savannakhet in the south have been identified as pollution hotspots. The country experiences a significant number of forest fires, particularly in the northern regions. Additionally, Savannakhet and Oudomxay, along with Xayabury and Vientiane, have been identified as cropland fire hotspots1. This haze not only affects local community but also deters tourists due to poor air quality2. A 2023 study by the Food and Agriculture Organization (FAO) identified agricultural fires and forest burning as the main contributors to air pollution in Lao PDR, particularly during the dry season. Despite the increased visibility of the problem, there is still scope to have a more comprehensive understanding of air pollution and its sources.

To support the development of the clean air plan in Lao PDR to be initiated by NRERI, this stakeholder mapping activity is being conducted to help identify key stakeholders, assess their

interests and needs, and analyze their potential contribution to the clean air plan's viability. By effectively engaging with these groups, the development team can ensure a more consultative and effective implementation of the clean air plan. The stakeholder mapping and consultation will also help identify opportunities for city-to-city cooperation and potential common urban air quality mitigation measures within urban airsheds in Lao PDR. This awareness-raising workshop is an initial step towards providing a better understanding of the current situation regarding data and information related to air pollution in Lao PDR, and seeking solutions for improved air quality management among government agencies and other key stakeholders.

Workshop Objectives:

1. Raise awareness among government officials and stakeholders regarding the sources and impacts of air pollution in Lao PDR.
2. Share international best practices for reducing air pollution and managing air quality.
3. Facilitate stakeholder collaboration to develop a Clean Air Plan tailored to the Lao context.

Expected Outcomes:

- Enhanced understanding of air pollution and its impacts.
- Action-oriented recommendations for the Clean Air Plan.
- Strengthened collaboration among key stakeholders in air quality management.

2. Opening Session

The workshop began with significant remarks, setting the tone for discussions on the importance of addressing air pollution and improving air quality management in Lao PDR. The photos from the workshop is provided in Annex C.

2.1 Remark by Mr. Lienxay Bounmanivanh, Director-General of NRERI

Mr. Bounmanivanh opened the workshop by highlighting the growing awareness of air pollution in Lao PDR, driven primarily by seasonal haze during the dry season. He emphasized that this workshop was an essential step in identifying the sources of air pollution and working toward solutions that would reduce the health and environmental impacts.

Key Points:

- Collaboration is Crucial: He called for coordinated efforts between government agencies, international partners, local communities, and the private sector to effectively combat air pollution.
- Gaps in Monitoring: He pointed out that Lao PDR lacks a comprehensive air quality monitoring network, which hampers the government's ability to collect reliable data and formulate effective strategies.
- Clean Air Plan: He proposed the development of a Clean Air Plan that integrates policy, technology, and public engagement to guide air quality improvements across the country.

2.2 Remarks by Mr. Toscan Vermast, UNEP

Mr. Vermast focused on the global context of air pollution and its disproportionate impact on vulnerable populations in Lao PDR, such as children, the elderly, and low-income communities. He emphasized that air pollution is not only a public health issue but also an economic concern, as poor air quality can lead to increased healthcare costs and decreased productivity.

Key Points:

- Health Risks: Air pollution has become a leading risk factor for mortality in Lao PDR, with significant public health implications.
- Economic Necessity: Addressing air pollution is essential for improving health outcomes and ensuring economic sustainability.
- Stakeholder Engagement: He called for the active participation of all sectors to ensure comprehensive and inclusive strategies for air quality management.
- Public Education: He highlighted the need to enhance efforts to educate the public about air pollution and its impacts.

3. Session Summaries

3.1 Session 1: Status of Air Quality and Health Impacts in Lao PDR

Presenter: Mr. Bounmany Soulideth (NRERI)/ Khamphao Sengchanh (MOH)

This session provided a comprehensive overview of the current air quality status in Lao PDR, with a particular focus on severe pollution during the dry season. Slash-and-burn agriculture, forest fires, and industrial emissions were identified as the major sources of pollution. The country's limited air quality monitoring infrastructure, with few monitoring stations, exacerbates the difficulty in assessing the full extent of the pollution problem.

Health Impacts:

High levels of $PM_{2.5}$ have been linked to respiratory and cardiovascular diseases, with the most vulnerable groups being children, the elderly, and individuals with pre-existing conditions. The exposure to high levels of air pollution also contributes to premature deaths and a significant increase in hospital admissions for respiratory problems.

Challenges Identified:

1. Limited Monitoring Infrastructure: The existing air quality monitoring system is concentrated in a few urban centers, leaving large rural areas without adequate data collection.
2. Data Gaps: The lack of comprehensive data on pollution sources hinders effective policy development and enforcement.
3. Public Awareness: While awareness of seasonal haze is increasing, there is still a lack of understanding about the long-term health impacts of poor air quality.

Proposed Solutions:

1. Enhanced Monitoring: The need for expanding the network of air quality monitoring stations was emphasized. Using the low-cost sensers which followed USEPA guideline was discussed to cover the limitation in the monitoring network. Integrating satellite data could also improve accuracy and coverage.
2. Policy Development: The government should strengthen regulations on open burning and forest fire management. A Clean Air Action Plan with clear standards and long-term goals was proposed.
3. Public Awareness Campaigns: Comprehensive campaigns are needed to educate the public on the health risks of air pollution and encourage sustainable practices.

Comments from Participants:

Participants expressed concerns about the lack of comprehensive data on pollution sources, particularly from forest fires and agriculture. They stressed the need for better data collection and analysis to inform decision-making and policy development.

3.2 Session 2: Overview of Air Quality Management

Presenter: Dr. Ekbordin Winijkul (AIT)

Dr. Winijkul introduced the concept of integrated air quality management, highlighting the importance of collaboration among multiple stakeholders. He emphasized that addressing air pollution requires a multisectoral approach, involving the government, private sector, civil society, and academia.

Key Tools for Air Quality Management:

1. Command and Control Regulations: Government agencies must enforce air quality standards and ensure compliance with pollution control regulations.
2. Market-Based Instruments: Introducing emission trading systems and other economic incentives can encourage industries to reduce their emissions.
3. Public Information Systems: Utilizing the Air Quality Index (AQI) can help inform the public about daily air quality levels and encourage individuals to take proactive measures to reduce their exposure.

Economic Aspects:

Economic costs of air pollution were introduced, including the strain it places on the healthcare system and the negative impact it has on labor productivity. Dr. Winijkul stressed the need to balance economic considerations with the benefits of pollution control.

Proposed Solutions:

1. Integrated Management: Foster collaboration between government, industry, and the public to create comprehensive air quality management strategies.
2. Public Engagement: Expand the use of AQI and implement public awareness campaigns to ensure the public is informed and engaged.
3. Economic Instruments: Introduce market-based instruments, such as emission trading systems, to encourage industries to voluntarily reduce emissions.

Comments from Participants:
Participants suggested that educational institutions should play a larger role in raising awareness and that air quality topics should be integrated into school curricula. They also noted the importance of localized air quality management strategies that take into account regional differences in pollution sources.

3.3 Session 3: Air Quality Management Efforts in Lao PDR

3.3.1 Air Quality in Luang Prabang

Presenter: Mr. Phiengkham Thammavong (Luang Prabang PONRE)

Luang Prabang faces significant challenges related to seasonal haze, particularly during the dry season from February to April. The haze is primarily caused by forest fires and agricultural burning, which have severe impacts on public health and the local economy, especially the tourism sector.

Achievements:
- Energy-Efficient Stoves: Luang Prabang has distributed energy-efficient stoves to reduce reliance on open burning.
- Low-Emission Modeling: The province has also participated in a low-emission modeling project aimed at reducing emissions by 2050.

Proposed Solutions:
1. Fire Prevention: Strengthen community training in fire prevention and management to reduce the frequency of forest fires.
2. Sustainable Agricultural Practices: Promote clean energy and sustainable agricultural practices to reduce the reliance on practices that contribute to air pollution.

Comments from Participants:
Participants raised concerns about the coordination between local and national agencies in responding to forest fires. They emphasized the need for better communication and more resources to support local efforts.

3.3.2 Air Quality in Vientiane Province

Presenter: Mr. Keochai Phommy (Vientiane PONRE)

Vientiane Province faces significant air quality challenges due to industrial activities, agricultural burning, and vehicle emissions. The proximity to urban areas exacerbates these issues, particularly during the dry season.

Challenges:
Despite efforts to monitor air quality and raise awareness, the province continues to struggle with pollution from both industrial and natural sources.

Proposed Solutions:

1. Task Force Creation: Establish a task force to monitor and prevent forest fires, with a focus on high-risk districts.
2. Regulatory Enforcement: Strengthen the enforcement of Environmental Impact Assessments (EIA) and Environmental Management Plans (EMP) for large-scale industrial projects.

Comments from Participants:
Participants highlighted the difficulties in enforcing environmental regulations, particularly in rural areas. They called for increased resources and training to support these efforts.

3.3.3 Air Quality in Savannakhet Province

Presenter: Mr. Sensack Phimmavongsa (Savannakhet PONRE)

Savannakhet has experienced significant air quality degradation due to industrial emissions, vehicle exhaust, and dust from construction and agriculture. Prolonged exposure to $PM_{2.5}$ and other pollutants poses serious health risks, particularly for vulnerable populations.

Proposed Solutions:

1. Monitoring Expansion: Expand the network of air quality sensors and improve data collection methods to provide more accurate information.
2. Public Awareness Campaigns: Implement targeted campaigns focused on health risks and the importance of reducing emissions.

Comments from Participants:
Participants emphasized the need for more comprehensive data collection on specific pollutants and better enforcement of pollution control measures. They also called for increased funding to support these initiatives.

3.4 Session 4: Emission Inventory Development

Presenter: Dr. Ekbordin Winijkul (AIT)

This session focused on the importance of emission inventories in understanding the sources and magnitude of air pollution. Accurate inventories enable targeted interventions and are crucial for the successful implementation of air quality management strategies.

Key Topics Covered:

1. Emission Source Identification: Participants were introduced to methods for identifying major emission sources, including industrial activities, vehicle emissions, and agricultural practices.
2. Data Collection Techniques: Dr. Winijkul discussed the use of satellite data, sensors, and surveys to improve the accuracy and reliability of emission data.
3. Tools and Software: Essential tools and software for developing emission inventories were presented, highlighting their importance in data analysis and policy development.

Challenges Identified:

1. Data Gaps: The difficulty in collecting accurate data, particularly in remote areas, was highlighted as a significant challenge.
2. Capacity Constraints: Local authorities often lack the technical expertise and resources to manage emission inventories effectively.

Proposed Solutions:

1. Capacity Building: Increase technical training programs and capacity building for government officials to enhance their skills in emission data collection and analysis.
2. Technological Investment: Invest in advanced monitoring equipment and software to improve the accuracy and reliability of emission inventories.
3. Regular Updates: Ensure that emission inventories are regularly updated to reflect new data and changes in emission patterns.
4. Additional Resources: The Thai PCD-CCAC-AIT online platform for calculating air pollutant emissions from open burning and forest fire in five countries in the Lower Mekong Sub-region on a near real-time basis was introduced, and the information from the website can be used to support air quality management in the region (www.beatingairpollution.com).

Comments from Participants:

Participants discussed the importance of involving multiple stakeholders in the development and use of emission inventories. They called for better integration of emission inventories with national and regional environmental policies to ensure that the data collected is used effectively in decision-making.

3.5 Session 5: The Cost of Inaction on Air Pollution

Presenter: Dr. Ekbordin Winijkul (AIT)

In this session, Dr. Winijkul introduced the concept of the Cost of Inaction on air pollution, focusing on the economic, health, and environmental consequences of failing to address air pollution effectively.

Key Concepts:

1. Estimating the number of illnesses or deaths (economic loss and environmental degradation) that can be attributed to air pollution exposure if no mitigation measures are implemented.
2. Health impact from air pollution is an important data which is needed when conducting cost of inaction, but this data usually is not available in the country.
3. The assessment needs air quality modeling which may need capacity training for Lao, PDR.

Challenges in Lao PDR:

1. Lack of Local Data: One of the main challenges in assessing the cost of inaction in Lao PDR is the scarcity of local data on the impacts of air pollution.
2. Limited Institutional Capacity: There is a lack of capacity within local institutions to conduct comprehensive studies on the cost of inaction.

Proposed Solutions:

1. Improved Data Collection: Expand efforts to collect localized data on the health and economic impacts of air pollution.
2. Capacity Building: Strengthen the capacity of local institutions to conduct cost of inaction assessments.

3.6 Session 6: Sector-Led Efforts to Reduce Emissions

3.6.1 Transportation Sector

Presenter: Mr. Hongthong Sorinsay (Department of Transportation)

The transportation sector is a significant source of air pollution in Lao PDR, particularly in urban areas. The Department of Transportation is leading efforts to reduce emissions by promoting electric vehicles (EVs) and improving public transportation.

Key Initiatives:

1. Electric Vehicle Promotion: The department is working on a plan to transition to electric vehicles by 2030 to reduce emissions from the transportation sector.
2. Sustainable Urban Transport Project: Launched in 2018, this project aims to improve public transportation in Vientiane by enhancing the bus system and reducing reliance on private vehicles.

Challenges:

- Fuel Quality: Currently, fuel standards in Lao PDR adhere to Euro 3 standards, but there are plans to transition to Euro 5-6 by 2030 to further reduce vehicular emissions.
- Data Gaps: The lack of data on vehicle kilometers traveled (VKT) makes it difficult to assess the full impact of the transportation sector on air quality.

3.6.2 Industrial Sector

Presenter: Mr. Syamphone Keochampa (Department of Industry and Handicraft)

The industrial sector is another major contributor to air pollution, particularly due to emissions from factories and improper waste disposal.

Key Focus Areas:

1. Industrial Waste Management: Efforts are underway to improve the management of industrial waste, including annual monitoring of pollution control systems and issuing permits to ensure compliance with environmental standards.
2. Pollution Control: The department is working to enforce stricter pollution control measures for factories, particularly those that use fossil fuels.

Challenges:

- Limited Resources: The lack of advanced equipment for safe disposal of industrial waste is a significant challenge.

- Coordination Issues: Better coordination between government departments is needed to ensure that environmental regulations are effectively enforced.

3.6.3 Energy Sector

Presenter: Ms. Dona Soulivathai (Ministry of Energy and Mines)

The energy sector, particularly biomass and coal-fired power plants, is a significant source of air pollution in Lao PDR. The Ministry of Energy and Mines is responsible for monitoring energy projects, including renewable energy and coal-fired power plants.

Key Initiatives:

1. Renewable Energy Legislation: The ministry is preparing legislation to promote the use of renewable energy sources.
2. Energy Efficiency and EV Promotion: Efforts are underway to promote energy efficiency and the use of electric vehicles to reduce emissions from the energy sector.

Challenges:

- Air Pollution from Coal-Fired Power Plants: There are concerns about the environmental impacts of coal-fired power plants, particularly in terms of air pollution and public health.
- Electricity Demand: The transition to electric vehicles may increase demand for electricity, which could lead to additional pollution if the energy is generated from non-renewable sources.

3.7 Session 7: Data Availability and Improvement

In this interactive session, participants were divided into groups representing different sectors, including government agencies, the private sector, academia, and international organizations. Each group discussed key questions related to data availability, existing policies, and the future of air quality management in Lao PDR.

Group 1: Provincial Office of Natural Resources and Environment (PONRE)

- **Sources:** Main sources include waste burning, deforestation, agricultural residue burning, vehicle emissions, and industrial activities.
- **Existing Policy and Regulations:** Key regulations include Decree No. 15/NV (2023) on forest fire management, the Clean City Initiative, and national regulations focused on industrial emissions.
- **Action Plans:** The Provincial Action Plan (2025-2030), Land Use and Forest Conservation Plan (2022-2025), and the National Carbon Trading Plan were discussed.
- **Future Action Plan:** Plans to expand air quality monitoring, promote renewable energy, and create an Air Quality Management Strategy.
- **Implementation and Monitoring:** Expanding air quality monitoring, increasing industrial inspections, and engaging communities in monitoring.
- **Content recommendations for Clean Air Plan:** Sector-specific strategies, clear emission reduction targets, public awareness campaigns, and integration with climate change efforts.

Group 2: Other Ministries (Industry, Agriculture, Transport)

- **Sources:** Deforestation for agriculture, agricultural residue burning, industrial emissions, open waste burning, and non-standard vehicle fuels.
- **Existing Policy and Regulations**: Policies such as the Forestry Strategy 2035, National REDD+ Strategy, National Agricultural Policy, Industrial Emission Standards (2009), and electric vehicle promotion initiatives were mentioned.
- **Action Plans:** Transportation sector aims to expand electric vehicle (EV) usage and developing charging stations, based on regulations introduced in October 2021. By 2030, the goal is to reduce vehicle emissions through improved technologies and regular inspections, decreasing fuel emissions from 337 kg/vehicle/year to 180 kg/vehicle/year. The plan sets ambitious targets, aiming to lower emissions by 65% through EV adoption by 2025, and 80% by 2030.
- **Future Action Plan:** The future strategy targets emissions reduction in agriculture, forestry, and land use, integrating the **Reducing Emissions from Deforestation and Forest Degradation (REDD) Strategy 2025** to reduce emissions from deforestation. The plan encourages renewable energy, reduces slash-and-burn agriculture, and limits open burning. Additionally, it emphasizes strengthening environmental education and public awareness, particularly in schools. Collaboration between key sectors like agriculture and energy is vital for the successful implementation of this plan.
- **Implementation and Monitoring:** a key strategy for improving air quality through better pollution management. It emphasizes the adoption of emission standards for industrial plants, vehicle emissions control, and the promotion of electric vehicles (EVs). Additionally, they mention the need to implement energy-saving practices, reduce open burning, and encourage cleaner energy sources. The goal is to reduce air pollution by 25% from 2025 to 2030, with a target to decrease fuel consumption by 56 million liters over this period.
- **Content recommendations for Clean Air Plan:** There is a need to strengthen pollution control efforts through strict enforcement. It emphasizes the development of a clean air plan to monitor, respond to, and address emissions across sectors. Additionally, there is a focus on implementing targeted action plans during critical periods, such as peak burning seasons. Continuous monitoring and improvement of pollution control measures are essential to ensure progress.

Group 3: Ministry of Natural Resources and Environment (MONRE)

- **Sources:** Agriculture, particularly open burning of agricultural residual waste, is a major contributor to $PM_{2.5}$ emissions. Forestry and land-use changes are also key contributors to greenhouse gases.
- **Existing Policy and Regulations:** Key policies addressing air pollution include the 2030 Environmental Strategy and 2012 Environmental Protection Law, forming the legal framework. Other regulations include the 2022 National Air Quality Standards and 2017 Environmental Standards, which set pollution limits. Ongoing efforts aim to update air quality and vehicle emission regulations by 2030, promoting clean energy, sustainability, and education.
- **Action Plan:** The 2024-2030 plan seeks to reduce hotspots from 65,000 to 22,750, implement a Clean Air Action Plan, and create emission reduction roadmaps. Measures include fire control systems with real-time monitoring, mobile apps for alerts, inter-sector

coordination, sustainable land-use, waste management, and building local capacity with monitoring technology and public education.

- **Future Action Plan:** Key strategies include expanding forest coverage, reducing hotspots by 35% annually, strengthening pollution control measures, and raising public awareness about $PM_{2.5}$.
- **Implementation and Monitoring:** Monitoring will involve using satellite data to track hotspots, conducting evaluations every two years, and regularly updating policies on air pollution management.
- **Content recommendations for Clean Air Plan:** The plan aims to strengthen scientific knowledge on air quality through research and studies and promote the use of advanced technologies in air quality monitoring. It emphasizes monitoring pollution hotspots and developing an emission inventory, possibly using a mobile application. Additionally, it includes efforts to increase public awareness and education on air quality issues.

Group 4: Private Sector & International Organizations

- **Sources:** The group identified key sources of air pollution, including open burning for agriculture and waste, deforestation, vehicle emissions, and emissions from industrial activities.
- **Existing Policy and Regulations** The private sector follows various regulations promoting sustainable practices, such as the 3R strategy (Reduce, Reuse, Recycle) and the circular economy. These policies are aligned with the national goal of reducing environmental impact.
- **Action Plans:** The action plan includes promoting the use of electric vehicles (EVs), improving forest fire management, and adopting sustainable land-use practices to mitigate emissions. Companies are encouraged to integrate cleaner production processes.
- **Future Action Plan:** Future initiatives will focus on supporting research into air pollution, increasing public awareness, and enhancing sustainable business practices. The private sector will also collaborate more closely with the government to align with national air quality goals.
- **Implementation and Monitoring:** Reporting systems will be established to track progress on air pollution control measures. Regular assessments will be conducted to ensure that implemented strategies are effective and continue to meet air quality standards.
- **Content Recommendations for the Clean Air Plan:** The group emphasized the need for more public awareness campaigns, stronger collaboration with government agencies, and more investment in cleaner technologies. They also suggested using mobile applications for real-time monitoring of emissions and pollution sources.

Group Recommendations:

1. Expand Monitoring Networks: There is a need to install more air quality monitoring stations across the country, particularly in rural and industrial areas.
2. Sector-Specific Action Plans: Each sector, including transportation, industry, and agriculture, should have tailored action plans for reducing emissions.
3. Public Education and Awareness: Increasing public engagement through awareness campaigns and educational initiatives is essential for promoting behavior change and reducing air pollution.

4. Closing Remarks

Presenter: Toscan Vermast (UN Environment Programme)

In his closing remarks, Mr. Vermast highlighted the importance of coordination across sectors to address air pollution in Lao PDR. He emphasized the need for better implementation of existing policies, improved public awareness, and investment in air quality monitoring equipment and capacity building.

Presenter: Mr. Lienxay Bounmanivanh (NRERI)

In his closing remarks, Mr. Bounmanivanh summarized the key takeaways from the workshop, emphasizing the urgent need for a collaborative and multisectoral approach to addressing air pollution in Lao PDR. He called for international support to expand the country's air quality monitoring infrastructure and implement the proposed recommendations.

Next Steps:

1. Clean Air Plan Development: NRERI will lead the development of the Clean Air Plan, with input from all relevant sectors.
2. Capacity Building: Training programs will be implemented to enhance the capacity of local authorities to manage air quality effectively.
3. Technological Investment: Funding will be sought to improve air quality monitoring infrastructure across Lao PDR.

Annex A:
National Air Quality Awareness Raising Workshop and Stakeholder Mapping for Clean Air Plan Development

Time	Topic/Theme	Speakers
Day 1		
08.30-09.00	Registration	
09.00-09.10	**Opening Remarks**	DG of NRERI UNEP
09.10-09.30	**Meeting Objectives and Participant introductions**	AIT
09.30-10:30	**Session 1. Status of air quality and its health impacts** Air quality status and monitoring Health impact from air pollution Efforts on air quality management in Lao PDR	NRERI Ministry of Health NRERI (Environment Lab Responsibility for AQM in Laos)
10:30-10:50	Coffee Break	
10:50-12.00	**Session 2. Overview: Air quality management** Overview: Air quality management, including clean air plan development and stakeholder roles Introduction of Airsheds concept Some lesson learned on action planning to reduce air pollution	AIT UNESCAP
12.00-13.30	Lunch	
13.30-14.50	**Session 3. Air quality management efforts in Lao PDR** Status of air quality management, challenges and support needed National Province-level: Presentation from the PONRE 3 provinces	Luang Prabang Vientiane Savannakhet
14.50-15.10	Coffee Break	
15.10-15.50	**Session 4. Emission Inventory Development (Part 1)** Introduction on emissions inventory and its role for clean air plan Overview of emissions inventory development tools	AIT
15.50-16.00	Summary of day 1	NRERI
Day 2		
08.30-09.00	Registration	

Time	Topic/Theme	Speakers
09.00-09.10	Recap of the Day 1	NRERI
09.10-09.40	**Session 4. Emission Inventory Development (Part 2)** Introduction on emissions inventory and its role for clean air plan Overview of emissions inventory development tools	AIT
09.40-10.10	**Session 5. Cost of inaction on air pollution** Introduction: Concept of cost of inaction on air pollution and available tools to assess	AIT
10.10-10.30	Coffee Break	
10.30-12.00	**Session 6. Sector-led efforts to reduce air pollutant emissions** Ministry of Industry and Commerce Ministry of Public Work and Transport Ministry of Energy and Mines Ministry of Agriculture and Forestry	
12.00-13.30	Lunch	
13.30-14.30	**Session 7. Discussion on data availability and improvement**	All participants
14.30-14.50	Coffee Break	
14.50-15.50	**Session 7. Discussion on data availability and improvement** Group presentation	All participants
15.50-16.00	**Closing Remarks**	NRERI

Annex B: List of participants

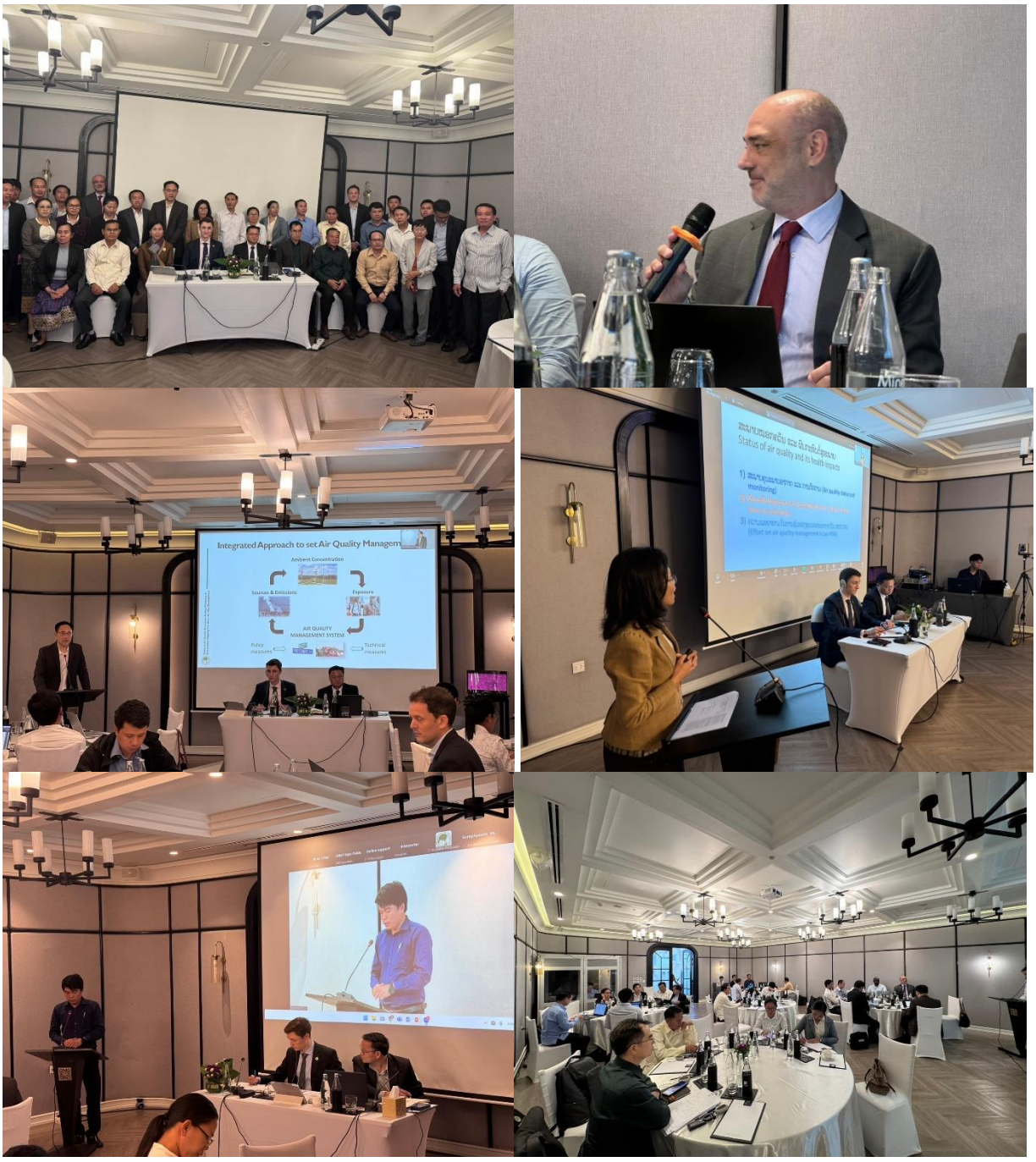
No	Organization	Name
1	NRERI	Lienxay Bounmanivanh
2	Modelling Division, NRERI	Bounmany Soulideth
3	Modelling Division, NRERI	Pankham Soundala
4	NRERI	Vanhna Phanphongsa
5	Remote Sensing and Mapping Division, NRERI	Bounhome SuanNhaphanh
6	Statistic Division, NRERI	Sonevilay Keomeuangxong
7	Environmental Laboratory, NRERI	Darounny Vilaythong
8	Department of Environment (DOE)	Keosangkhom Phommaseng
9	Department of Climate Change (DCC)	Malabou Baylatry
10	Department of Planing and Finance (DPF)	Dr Souksamone Pathammavong
11	Department of Natural Resources and Environment Inspection (DNREI)	Khounsamay Silapheth
12	Cabinet, MONRE	Noyphoxay Nolintha
13	Department of Transportation	Hongthong Sorinsay
14	Department of Hygiene and Health Promotion, MOH	Khamphao Sengchanh
15	Department of Industry and Handicraft, MOIC	Syamphone Keochampa
16	Department of Forestry, MAF	Somphon Thammavongsa
17	Department of Agriculture, MAF	Khonesavanh Chittarath
18	National Agriculture and Forestry Institute (NAFRI), MAF	Chaloun BOUNITHIPHONH
19	Department of Energy Management, MEM	Dona SOULIYATHAI
20	National Statistical Bureau, MPI	Vanpheng PHENGSAVATH
21	Ministry of Education and Sport (MoES)	Bouavanh Chanthanongdeth
22	Faculty of Environment Science, NUOL	Somlith Lithsana
23	National Institute for Economic Research (NIER), PMO	Latsavong Bounsiphom
24	Ministry of National Defence (MoND)	Vanpheng Khamphavong
25	PONRE, Luang Prabang Province	Phiengkham Thammavong
26	PONRE, Vientiane Province	Keochai Phommy
27	PONRE, Savannakhet Province	Sensack Phimmavongsa
28	PONRE, Huaphanh Province	Keopasith Neukmanivong
29	PONRE, Xayabouly Province	Dr. Veophet Sibounma
30	PONRE, Xiengkhouang Province	Oun Phonthavy
31	PAFO, Luang Phabang Province	Bounmy Savath
32	Private sector (Malayphone Trading Sole Co.,Ltd)	Pheng Sengdala
33	Caritas Luxembourg	Ladsamy Phanthamixay
34	National Expert	Lonkham Atsanavong
35	UN Environment Programme	Toscan Vermast
36	Asian Institute of Technology	Dr. Ekbordin Winijkul
37	Asian Institute of Technology	Pongsakon Punpukdee
38	UN International Children's Emergency Fund	Soheib ELSHEIKH
39	UN International Children's Emergency Fund	Simon Nazer

No	Organization	Name
40	PONRE, Xiengkhouang Province	Sithanu Dasaophong
41	Food and Agriculture Organization	Phommachanh Phothichanh

Remarks:

MONRE	Minittry of Natural Resources and Environment	MPI	Ministry of Planning and Investment
MPWT	Minittry of Public Work and Transport	NUOL	National University of Laos
MOH	Ministry of Health	PMO	Prime Minister Office
MOIC	Ministry of Industry and Commerce	PONRE	Province of Natural Resources and Environment
MAF	Ministry of Agriculture and Forestry	DoPF	Department of Planing and Finance
MEM	Ministry of Energy and Mine	PAFO	Provincial Agriculture and Forestry Office

Annex C: Photos



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