

Fire, Smoke, and Haze

The ASEAN Response Strategy

Edited by S. Tahir Qadri

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Message

1997 and 1998 were crisis years for the Association of Southeast Asian Nations (ASEAN). The financial turmoil that hit ASEAN countries' economies during this period was compounded by the haze that enveloped a good part of the region. The pernicious practice of burning forests to clear land for commercial purposes and the unusually dry weather that caused even the earth to catch fire combined to produce a pall of catastrophic proportions. The loss in terms of agricultural production, transportation, tourism, and other economic endeavors has been estimated at more than \$9 billion. The cost to human health, loss of biodiversity, destruction of forests, and general environmental degradation is immeasurable.

ASEAN's response was swift. ASEAN Ministers met frequently to draw up measures to deal with the problem. They adopted a Regional Haze Action Plan (RHAP), with corresponding national action plans and implementation measures, prescribing urgent action on three fronts—monitoring, prevention, and mitigation. Resources were mobilized and action undertaken to carry out these plans.

The ASEAN Specialized Meteorological Centre in Singapore has been strengthened to more effectively detect hot spots, predict the weather, and provide early warning of fires. Firefighting mechanisms have been organized in fire-prone areas and operational exercises have been carried out. Meetings with plantation owners and forest concessionaires have been organized to impress upon them the seriousness of the zero-burning policy that ASEAN has adopted. And the ASEAN Secretariat has set up a special unit to coordinate efforts to deal with the haze problem. Meanwhile, in the long term, the ASEAN Environment Ministers have agreed to work on an ASEAN Agreement on Transboundary Haze Pollution.

In all this, ASEAN has received the support of the Asian Development Bank (ADB), Global Environment Facility (GEF), United Nations Environment Programme, United Nations Development Programme, individual governments, and nongovernment organizations (NGOs).

This publication, a joint effort of ADB and ASEAN, brings together the current knowledge about land and forest fires, examines their causes and impacts with particular reference to Southeast Asia, and suggests what could happen in the future. It describes and assesses ASEAN's response to the haze phenomenon and the role of ADB and other international bodies. Finally, it lays down a blueprint for future national, regional, and global action to deal with the haze problem in Southeast Asia.

This work should, therefore, be of great interest to many—national governments, regional and international organizations, NGOs, and the media, which wrote so much about the disaster when it occurred but little about the measures that have been taken to address it.

I wish to extend to ADB ASEAN's congratulations and appreciation for this publication, a most valuable contribution to the reasoned discourse on a serious international problem, with constructive proposals for action to deal with it. I would also like to reiterate ASEAN's thanks to ADB for its unremitting support for ASEAN's response to the haze crisis. In so doing, I reaffirm ASEAN's commitment and resolve to ensure that this disaster does not happen again on such a devastating scale.

RODOLFO C. SEVERINO Jr.

Secretary-General

Association of Southeast Asian Nations

Foreword

Every year, millions of hectares of the world's forests are consumed by a large number of fires, resulting in billions of dollars in suppression costs and causing tremendous damage, health problems, and even deaths. The forest fires that have hit the Association of Southeast Asian Nations (ASEAN) countries, especially Indonesia, have been particularly severe, with the United Nations Environment Programme labeling the blaze of 1997-1998 among the most damaging in recorded history. The environmental, economic, and social dimensions and impact of these catastrophic fires, and the associated transboundary atmospheric haze pollution, were profound.

Most tropical fires are set or spread accidentally or intentionally by humans. When severe droughts over the last two decades have combined with large-scale logging in the rain forests and indiscriminate use of fire for land clearance, the results have been devastating. As a result of these and other contributory factors, all areas of ASEAN are prone to wildfires, which are likely to remain a serious threat for some time.

As a partnership for sharing experiences, information, responsibilities, and benefits, and working toward common good through joint efforts and approach, ASEAN is in a strong position to address its fire problem at the regional level. Following the 1997 fires, the affected ASEAN countries assumed a more operational stance toward the fire and haze disasters. Major initiatives in response to the 1997-1998 fires included national strategies for coordinated action and collaborative regional efforts. At the ASEAN level, a Regional Haze Action Plan (RHAP) was formulated and endorsed by ASEAN Environment Ministers in Singapore on 23 December 1997. The adoption of this instrument has proved to be a turning point in the region's approach to preventing and mitigating the damage from recurrent fires and haze. The RHAP document is a reflection of ASEAN's determination to actively tackle the problem.

The Asian Development Bank (ADB) has been playing its part, supporting and catalyzing action to prevent and mitigate the impact of forest fires and haze. It has provided technical assistance at the regional level through the ASEAN Secretariat and advisory technical assistance at the national level to Indonesia.

Intended as a reference source and general guide for fire and haze management in the ASEAN region, this volume primarily targets policymakers and professionals at the regional level and in the ASEAN member countries, as well as in other donor countries and agencies. As such, it reviews the fire and haze situation in the region, but putting it into an overall global context. It draws on the findings of ADB's two related technical assistance projects, including lessons learned and proposals for follow-up in the short and medium term.

The volume is organized into two main parts.

THE PREMISE presents in the first three chapters background information relating to forest fires and associated haze, comparing global responses and initiatives to address the situation. In particular, the situation in ASEAN is dealt with in some detail.

Chapter 1 focuses on the increasing incidence and intensity of forest fires and haze in recent years, analyzing the major causes and developments in fire science and technology to address these problems. There is also a brief account of international action to address forest fires and haze.

Chapter 2 goes into some detail on the fires and haze that have affected the ASEAN region, providing analysis on the causes, and the constraints that have exacerbated these causes. Forestland conversion

involving uncontrolled use of fire in land preparation is identified as a major source of fires, the environmental, economic, and social aspects of which are examined.

Chapter 3 discusses the responses at several levels to the recent forest fires and haze in the ASEAN region, particularly the occurrences of 1997-1998. It also provides an analysis of recent trends in donor assistance.

***THE PROGRAM**, containing Chapters 4 to 6, discusses the programs being implemented in the ASEAN region, including regional, subregional, and national components of the Operationalized Regional Haze Action Plan (ORHAP), to enhance regional preparedness to meet any future occurrences of forest fires and haze.*

Chapter 4 details ADB's two-pronged approach to address transboundary atmospheric pollution in the region through its advisory technical assistance grant to Indonesia and regional technical assistance grant to ASEAN. It describes the catalytic role intended, objectives and details of activities, as well as the results achieved and lessons learned.

Chapter 5 explains the ORHAP and how it is closely linked to, and supportive of, actions at subregional, national, and local levels in ASEAN. The three main program components of prevention, mitigation, and monitoring and the institutional arrangements for implementation are discussed in detail with references to the activities and actions falling under each.

Chapter 6 looks at the important actions required to consolidate the initiatives undertaken so far and to promote and implement appropriate forest fire management in the region, to support rational land use and development. A lesson learned is that cooperation, openness, and dissemination of results among projects and relevant government departments is of paramount importance, as is a participatory approach. Millions of people living in rural areas depend on forests for their livelihood. Often, their aspirations for a more decent, secure, and equitable way of life are tied up with forestry development. Organized and informed participation of these people can help all parties involved to find solutions to their problems. The likelihood (in terms of number and intensity) of forest fires can be reduced through rational and balanced management interventions with the full participation of local communities.

A bibliography and six Appendixes follow, providing a glossary of local and technical terms, ongoing assistance programs and activities of the RHAP, procedures for formulating and implementing a Fire Suppression Mobilization Plan, fire danger rating systems, funding agencies' collaboration to combat forest fires and haze, and an outline of the ASEAN Haze Action Online.

ADB stands ready to provide the necessary assistance at the regional as well as at the national level in support of the efforts aimed at addressing the underlying causes of forest fires and associated haze as documented in this publication. But it is important to recognize that the initiative and responsibility for successful implementation rest with the countries concerned. Regional organizations such as ASEAN can act as a facilitator and coordinator of bilateral or multilateral support, using its influence and capacity to mobilize intraregional cooperation and collaboration in dealing with the challenge. In this context, as the publication points out, the emphasis has to be on prevention, because as the old axiom goes, "prevention is better than cure."

*ROLF SELROD ZELIUS
Chief, Office of Environment and Social Development
Asian Development Bank*

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Abbreviations and Acronyms

| | |
|-------------|---|
| ADB | Asian Development Bank |
| ADPC | Asian Disaster Preparedness Center |
| ADTA | advisory technical assistance |
| AMC | ASEAN member country |
| AMMH | ASEAN Ministerial Meeting on Haze |
| API | Air Pollution Index |
| ASEAN | Association of Southeast Asian Nations |
| ASMC | ASEAN Specialized Meteorological Centre |
| ASOEN | ASEAN Senior Officials on Environment |
| ATM | atmospheric transport models |
| AusAID | Australian Agency for International Development |
| AVHRR | Advanced Very High Resolution Radiometer |
| BAKORNAS PB | Badan Koordinasi Nasional Penanggulangan Bencana (National Coordination Agency for Disaster Management) |
| BAPEDAL | Badan Pengendalian Dampak Lingkungan (National Environmental Impact Management Agency) |
| BAPPENAS | Badan Perencanaan Pembangunan Nasional (National Development Planning Agency) |
| BMG | Badan Meteorologi dan Geofisika (Meteorological and Geophysics Agency) |
| CDC | Centre for Disease Control (Malaysia) |
| CIDA | Canadian International Development Agency |
| CIFOR | Centre for International Forestry Research |
| COST | ASEAN Committee on Science and Technology |
| CRISP | Center for Remote Imaging, Sensing and Processing |
| CSIRO | Commonwealth Scientific and Industrial Research Organisation |
| CSU | Coordination and Support Unit |
| DIP | Detailed Implementation Plan |
| ENSO | <i>El Niño</i> Southern Oscillation |
| ENSOI | <i>El Niño</i> Southern Oscillation Index |
| EPA | US Environmental Protection Agency |
| ESCAP | Economic and Social Commission for Asia and the Pacific |
| EU | European Union |
| FAO | Food and Agriculture Organization |
| FDRS | fire danger rating system |
| FFPCP | Forest Fire Prevention and Control Project (of the EU) |
| FFPMP | Forest Fire Prevention and Management Project (of JICA) |
| FIRE | Fire in Global Resource and Environmental Monitoring (CEC-JRC) |
| FSMP | Fire Suppression Mobilization Plan |

| | |
|-----------------|---|
| GAW | Global Atmospheric Watch |
| GDP | gross domestic product |
| GIS | geographic information system |
| GMS | Geostationary Meteorological Satellite |
| GTZ | Deutsche Gesellschaft für Technische Zusammenarbeit (German Agency for Technical Cooperation) |
| ha | hectare |
| HTTF | Haze Technical Task Force |
| ICRAF | International Centre for Research in Agroforestry |
| IDNDR | International Decade for Natural Disaster Reduction |
| IFFM | Integrated Forest Fire Management Project (of GTZ) |
| IFFN | <i>International Forest Fire News</i> |
| IGAC | International Global Atmospheric Chemistry |
| IMS | information management systems |
| JICA | Japan International Cooperation Agency |
| KBDI | Keetch-Byram Drought Index |
| km | kilometer |
| LAPAN | Lembaga Antariksa dan Penerbangan Nasional [Indonesian National Institute of Aeronautics and Space] |
| m ³ | cubic meter |
| MACRES | Malaysian Centre for Remote Sensing |
| mm | millimeter |
| MOFEC | Ministry of Forestry and Estate Crops (Indonesia) |
| mt | metric ton |
| NDVI | Normalized Difference Vegetation Index |
| NWFP | nonwood forest product |
| NWP | Numerical Weather Prediction |
| NGO | nongovernment organization |
| NHAP | National Haze Action Plan |
| NMS | National Meteorological Services |
| NMSs | nonmeteorological satellites |
| NOAA | National Oceanic and Atmospheric Administration |
| ORHAP | Operationalized Regional Haze Action Plan |
| PARTS | Programme to Address Regional Transboundary Smoke |
| PM | particulate matter |
| PRC | People's Republic of China |
| PSI | Air Pollutant Standard Index |
| PMU | Project Management Unit |
| PUSDALKARHUTNAS | Pusat Pengendalian Kebakaran Hutan Nasional (National Center for Forest Fire Control) |
| RETA | regional technical assistance |
| RHAP | Regional Haze Action Plan |

| | |
|---------|--|
| RFA | Regional Firefighting Arrangement |
| SEA-EI | Southeast Asian Environment Initiative |
| SEAFIRE | Southeast Asian Fire Experiment |
| SOP | standard operating procedure |
| SPOT | Satellite Positioning and Tracking |
| SRFA | Subregional Firefighting Arrangement |
| STARE | Southern Tropical Atlantic Regional Experiment (IGAC) |
| TEWT | Tactical Exercise without Troops |
| TKNPKHL | Tim Koordinasi Nasional Pengelolaan Kebakaran Hutan dan Lahan (National Coordinating Team for Land and Forest Fire Control Management) |
| UN | United Nations |
| UNCED | United Nations Conference on Environment and Development |
| UNDAC | United Nations Disaster Assessment and Coordination |
| UNDP | United Nations Development Programme |
| UNEP | United Nations Environment Programme |
| UNESCO | United Nations Educational, Scientific and Cultural Organization |
| UNICEF | United Nations Children's Fund |
| US | United States |
| USAID | United States Agency for International Development |
| WHO | World Health Organization |
| WMO | World Meteorological Organization |
| WRI | World Resources Institute |
| WWF | World Wide Fund for Nature |

Note: "\$" refers to US dollars unless otherwise specified.