REVIEW OF GOVERNMENT ENVIRONMENTAL & HEALTH POLICIES, LEGISLATION AND EMERGENCY RESPONSE MECHANISMS

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INTRODUCTION

In the Southeast Asian region, there is an old saying "api: kecil, jadi kawan; besar, jadi lawan" (fire: small, a friend; big, a foe). Thus, prevention is better than cure. Prior assessment is a prerequisite to effective management. The required assessment would call for regular monitoring of sources of fire and other haze-causing sources, air quality and visibility, meteorological and weather conditions, and building up advance predictions and an early warning system. The necessary management must be in place in terms of legislation, institutional arrangements, financial resources, and technical support (1). Such a set of strategies has to be supported by clear objectives and guided by consistent policies.

This review is largely based on various national haze action plans of member countries of the Association of Southeast Asian Nations (ASEAN) and the report of the Asian Development Bank (ADB)-(ASEAN) preparatory meeting on national haze action plans (2), held in Manila, Philippines, from 8 to 9 June 1998. It covers aspects relating to policies and strategies in terms of assessment and management, particularly those concerning emergency response mechanisms and possible legal issues. It also highlights the need not only to address the

causes and impacts of fire, as external sources of haze and pollution, but also to take into account the local pollution, particularly in those places affected by forest fires.

POLICY REVIEW

All countries of the region have introduced their respective policies, as part and parcel of their national action plans to prevent and mitigate land and forest fires.

Brunei Darussalam

The policy statements issued are as follows:

- obtain information on state of air quality as well as useful meteorological and weather information;
- determine source of haze;
- provide the public and relevant government agencies the necessary information on air quality and corresponding action;
- safeguard public health and safety;
- ensure there is adequate medical and health facilities;
- prohibit open burning during the dry period; and
- attend to local fires with the aim of achieving zero smoke emission.

The linkages of these policy statements to the objectives of Brunei Darussalam's national haze action plan are shown in Figure 1. It is clear that the policy is based on one of the Stockholm's principles on the human environment of 1972; ie. "assessment is a prerequisite to management". The other principle applied in introducing the policy is a "precautionary" one: "prevention is better than cure". The policy objective is also quite

comprehensive; it does address other sources of pollution or haze. Indeed, the combination of all types and sorts of pollution should be the main concern relating to the need to protect public health and safety from any adverse impact of total and specific form of pollution.

Indonesia

The policy statement issued is to prevent and control fire and haze by:

- setting land conversion targets at environmentally sustainable levels;
- establishing incentives to optimise use of degraded land;
- minimising haze pollution by fuel management, including the use of controlled burning techniques and zero burning when and where required; and
- protecting communities and valued ecosystems at risk from the effects of fire and haze.

The source of the Indonesian policy is based on the principle of sustainable development. The principle is applied by setting up the targets for land conversion at sustainable level, establishing incentives for the utilisation of degraded land, and protecting communities and invaluable ecosystems that are vulnerable to the likely impact of fire and haze. Implicit in the policy is the need for prior assessment of the areas at risk, before an area can be considered for land conversion purposes. The other aspect of the Indonesian policy is on the management of land conversion, in terms of its timing and priority areas, including the application of both controlled and zero burning techniques. On the question of timing, there is no specific mention on the time period nor on the recommended season. (In this case, the policy of Brunei Darussalam is very specific: no burning allowed "during the dry period"). Also worth noting is the absence of any policy statement on other sources of pollution.

Figure 2 illustrates the linkages of the Indonesian policy, from the realisation of the sustainable development concept to land conversion management.

Malaysia

For the haze control, the following policies are endorsed:

- open burning is prohibited;
- agricultural waste disposal through open burning will be strictly controlled, and to be prohibited during haze period; and
- smoke and particulate emissions from mobile sources (motor vehicles) and stationary sources (industries) will be strictly controlled and monitored.

The objectives of these policies are:

- to prevent and control identified subsectoral activities which are contributory to haze episodes;
- to enhance operational mechanism by implementing an efficient air quality monitoring and reporting programme; and
- to strengthen inter-agency cooperation and support for combating haze.

The Malaysian policy is very specific to the established sources of haze and pollution. It underlines the importance of air quality monitoring (3) and reporting (4) as well as inter-agency cooperation on the control of agricultural waste disposal or the prohibition of open burning and the control of mobile and other stationary sources of pollution.

Figure 3 illustrates the Malaysian policy linkages, from air quality monitoring, assessment and reporting to the management of all sources of haze and pollution.

Myanmar

The following policies are recommended in the national haze action plan:

- to substitute slash and burn method of cultivation with sustainable agricultural method;
- to prohibit open burning except under proper control;
- to promote vigilance measures; and
- to prevent air pollution arising from land and forest fires.

The objectives are:

- to develop policies and strategies to prevent and mitigate land and forest fires and resulting smoke haze pollution;
- to strengthen inter-agency collaboration for implementing the policies and strategies;
- to mobilize resources to strengthen the capacity of agencies responsible for implementing the national action plan; and
- to develop a more effective mechanism for monitoring land and forest fires and air quality.

Figures 4 illustrates the linkages of various aspects of Myanmar's policy on its haze action plan. It is noted that the policy does introduce an additional aspect for the management of forest fires in the region by substituting slash and burn method of cultivation with sustainable agricultural method. Other aspects of the policy are quite common throughout the region.

Philippines

The policy on its haze action plan is derived from a number of Presidential decrees and a special order issued by the Department of Environment and Natural Resources (DENR). These are:

- creation of the Philippines Haze Task Force, headed by the Environmental Management Bureau, with the following functions:
  - monitor the movement of haze, and serve as official source of information;
  - determine the health hazards associated with haze; and
  - coordinate with all concerned agencies/entities.
- prohibition of open burning with some exceptions;
- control of smoke and particulate emission from stationary sources through specific emission standards;
- provision of ambient air quality guidelines and standards for PM_{10} and TSP, and air quality indices for TSP, SO_2, O_3 and CO;
- control of sulphur compound emissions from stationary sources; and
- control of particulate and gaseous emissions from motor vehicles through specific emission standards for smoke, HC, and NO_x.

Thus, the policy of the Philippines is quite comprehensive; it addresses both aspects of assessment and management as well as all significant sources of haze and pollution. Figure 5 illustrates the linkages of various aspects of the policy for the Philippines. It is noted that the policy makes explicit on the need to determine or assess the health hazards associated with haze, and to introduce provisions regarding ambient air quality guidelines and standards for primary pollutants. Thus, the objectives of the haze action plan are as follows:

- to prevent and monitor haze/transboundary air pollution in the country caused by forest fires and other sources such as mobile and industrial sources;

- to enhance the delivery of services, assistance, basic needs and information to the people and communities affected by haze and air pollution; and

- to promote co-operation among Asian nations in the field of information exchanges and technology transfer for the control, prevention and monitoring of haze/air pollution.

Singapore

Notwithstanding the fact that the country is a highly urbanised with very limited agricultural land and forest, Singapore has put in place a comprehensive policy to prevent and mitigate land and forest fires. It strictly prohibits open burning of all solid wastes, including agricultural wastes from farms, wood wastes from construction sites and trimmings of trees/shrubs. It has also set up a close surveillance system to prevent and detect fires, as well as operating procedures for rapid deployment of fire-fighting resources in the event that fires are detected. However, the policy is silent on the nature and extent of control required against local sources of pollution during the haze episodes but introduces a new management element for the region by introducing an infrastructure for solid waste disposal.

Figure 6 illustrates the linkages of the above aspects of the policy. The strategies to prevent air pollution from domestic, industrial and other premises are:

- prohibition of open burning;

- infrastructure for collection and disposal of solid wastes;

- enforcement of emission standards;

- ambient air quality monitoring;
- public awareness education and feedback;
- prevention and control of land and forest fires; and
- inter-agency cooperation and support.

Thailand

The policy for its haze action plan is targeted specifically at the Indonesian forest fires. The objectives are:

- to mitigate and minimize the environmental and health impact from the Indonesian forest fires; and
- to provide considerable support to its neighbouring ASEAN countries.

The specific strategies are: legislation, enforcement and surveillance; air quality monitoring and reporting; institutional set up and strengthening; cooperation plans; public awareness, education and feedback; arrangements for intra-agency cooperation and support; operational procedures for mobilisation of resources for combating haze; and agricultural wastes management, especially utilisation.

Figure 7 illustrates the linkages of the various strategic aspects of the policy on forest fire in Thailand. It is noted that the Thai policy is similar to that of Singapore.

Vietnam

Vietnam is in the process of finalizing its national haze action plan.

National policies on haze and its control

As summarised and outlined in Table 1, it is clear that Indonesia sets itself a higher set of policy objectives by introducing the development aspects in its policy. It specifically establishes land conversion targets set at sustainable levels. Implicitly, it sets aside areas that are invaluable in biodiversity or protects those communities at risk from the impact of forest fires and haze. Its management is quite focussed. It narrows down to the need for effective fuel management through controlled burning, but it is silent on the timing of such a practice which should not be recommended especially during the dry period.

Among seven of the eight ASEAN countries, the most common policy objective is "to prevent and control fire and haze" with minor variations, in terms of emphasis. Only four countries; namely Malaysia, Myanmar, Philippines and Singapore have introduced and enforced policy on strict prohibition of open burning. In Brunei Darussalam, the prohibition is enforced only during the dry period. Such a policy is highly recommended for Indonesia and other countries in the region.

On the need to address other local sources of haze and pollution, five countries; namely, Brunei Darussalam, Malaysia, Philippines, Singapore and Thailand have established and enforced their respective emission standards for motor vehicles, industries and other domestic sectors. Controlling local sources of pollution, particularly during the haze episodes, is equally critical, in order to safeguard public health and safety, and other environmental concerns.

On the assessment aspect of the policy framework, all the seven ASEAN countries, except Indonesia, have given importance to the need for ambient air monitoring and reporting. Monitoring and reporting are basic to assessment and management functions. In addition, Brunei Darussalam sets itself to "determine source of haze", while the Philippines, " to determine health hazards" as part and parcel of the assessment aspect of their respective policies.

On management, greater focus is on the need to introduce and strengthen legal and institutional arrangements at both national and regional levels. All the seven ASEAN countries, except Brunei

Darussalam, have given emphasis on the capability and capacity for regional cooperation, particularly in the deployment of fire fighting resources. Of course, the need to provide the public and other relevant agencies information on the episodes and responses is important and specifically emphasised by at least three countries; namely, Brunei Darussalam, Singapore and Thailand. Management specifics that have been introduced by certain countries and of significant relevance to others are:

- to establish incentives to use degraded land (Indonesia);
- to substitute slash and burn method with that of sustainable cultivation technique (Myanmar);
- to promote the utilisation of agricultural wastes (Thailand);
- to provide infrastructure for collection and disposal of solid wastes (Singapore); and last, but not least, and perhaps, the most important of all;
- "to minimise haze pollution by fuel management" through controlled burning (Indonesia).

LEGISLATION ON THE CONTROL OF LAND AND FOREST FIRES AND AIR POLLUTION

All ASEAN countries have some form of general or specific laws and regulations which are applicable for the control of forest fires and air pollution to protect public health and the environment from the impacts arising from these sources. For example, in Malaysia, the specific laws and regulations come under the Environmental Quality Act (1974, Amendments 1996) which includes:

- Environmental Quality (Clean Air) Regulations 1978 - emissions standards for stationary and mobile sources;
- Environmental Quality (Amendment) Act 1998 (Act 1030) - new provisions prohibiting open burning; and

- Environmental Quality (Prescribed Activities) (Environmental Impact Assessment) Order 1987.

There are many other laws and provisions in Malaysia which are relevant and applicable for the control and mitigation of land and forest fires and air pollution from various sources. These include acceptable practices in forest management, land development, solid waste disposal, etc.

EMERGENCY RESPONSE MECHANISM

A review of the various aspects and components of the existing emergency response mechanisms at both national and subregional levels within the Southeast Asian region provides the basis towards the formulation of an overall response mechanism for the region. Essentially, the required mechanism, as shown in Figure 8, involves the following functions, in decreasing order of priority:

(i) early fire (hot spot and smoke) detection;
- satellite monitoring
- aerial surveillance
- ground surveillance
- weather forecasting
- surface-based atmospheric modelling

(ii) fire fighting;
- coordination at national level
- coordination and assistance at subregional level
- action at local level

(iii) communication links;
- internet
- intranet
- telephone/telefax
- radio

(iv) enforcement;

(v) public education and awareness campaigns;

(vi) air quality monitoring;

(vii) studies of health and other socio-economic impacts;

(viii) fire danger rating system; and

(ix) land-use planning.

CONCLUSIONS

Generally, ASEAN countries have already in place, to a more or lesser extent, some forms of policies, legislation and emergency response measures to control and combat forest fires and air pollution, and to minimise the impacts arising from these occurrences. The attempt to develop a common set of health guidelines for the interest of all the countries involved would be most timely. In order to achieve the objectives, mechanisms to provide assistance to the respective countries to incorporate the guidelines into their existing policy, legislation and emergency response, and thereby identifying and strengthening areas of inadequacy, would be most important.

In terms of policies, the essential elements to be incorporated can be extracted and combined with approaches developed by the individual countries. With regards to policy objectives, the elements identified are:

- to prevent and control land and forest fires;
- to safeguard public health and safety in such occurrence;
- to prohibit open burning;
- to introduce and implement ambient air quality guidelines and standards; and

- to strengthen control on emissions from mobile and stationary sources.

The elements with respect to policy on development are:

- to set land use planning based on sustainable development principle; and

- to protect communities and ecosystems at risk from fire and haze effects.

The elements with respect to policy on assessment include:

- to monitor and report on air quality;

- to develop an effective mechanisms for monitoring land and forest fires;

- to develop capability for forest fires and haze detection and predictions; and

- to monitor the health and environmental impacts of haze.

The management policies focus on the following aspects:

- to provide the public and the authority information on air quality and action to be taken;

- to advise the public on actions to be taken for health protection;

- to ensure medical and health supplies and facilities to mitigate health impacts;

- to provide support to countries in need and to promote cooperation among Asian countries;

- to minimise haze pollution from fuel burning;

- to strengthen capabilities of the relevant agencies; and
- to strengthen inter-agency cooperation and support.

On the legislation aspects, all ASEAN countries have in place some form of general or specific laws and regulations for the control of forest fire and air pollution to protect public health and the environment from the impacts arising from haze episodes. The present needs lie in identifying areas of weakness and in further establishing the means to strengthen enforcement.

A framework for the formulation of emergency response mechanisms can be derived from the cooperative experience among the three countries most affected during the 1997 haze episode; namely, Indonesia, Malaysia and Singapore. The framework encompasses coordination bodies, monitoring and detection of fires, fire fighting, communication channels, enforcement, monitoring or air quality and health impacts, public education and awareness campaigns, and land-use planning and fire danger rating.

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Table 1
Summary of national policies relating to haze in the Southeast Asian region: objectives, development, assessment and management

Objectives

- To prevent and mitigate land and forest fires (Brunei);
  To prevent and control fire and haze (Indonesia);
  To prevent and control activities contributing to haze episodes (Malaysia);
  To develop policies and strategies to prevent and mitigate land and forest fires resulting in smoke haze pollution (Myanmar);
  To prevent air pollution arising from land and forest fires (Myanmar);
  To prevent and monitor haze/transboundary air pollution (Philippines);
  To prevent and control land and forest fires (Singapore);
  To mitigate, minimise the environmental and health impact from the Indonesian forest fires (Thailand).

- To safeguard public health safety (Brunei);

- To prohibit open burning (Malaysia, Philippines, Singapore);

  To prohibit open burning, except under proper control (Myanmar);

- To control emission from mobile and stationary sources (Brunei);
  To control smoke and particulate emissions from mobile and stationary sources (Malaysia);
  To control various sources of air pollution: mobile and stationary (Philippines);
  To enforce emission standards (Singapore);
  To carry out enforcement (Thailand).

- To introduce provisions of ambient air quality guidelines and standards (Philippines).

Development

- To set land conversion targets at sustainable levels (Indonesia);

- To protect communities and valued ecosystems at risk from effects of fire and haze (Indonesia).

Assessment

- To obtain information on the state of air quality (Brunei);
  To monitor and report on air quality (Malaysia);
  To develop a more effective mechanism for monitoring lands and forest fires and air quality (Myanmar);
  To monitor haze/transboundary air pollution (Philippines);
  To monitor haze movement and report (Singapore);
  To carry out air quality monitoring and reporting (Thailand).

- To determine source of haze (Brunei);

- To monitor smoke and particulate emissions from mobile and stationary sources (Malaysia);

- To determine health hazards (Philippines);

- To promote vigilance measures (Myanmar);
  To carry out close surveillance system to prevent and detect fires (Singapore);
  To carry out surveillance (Thailand).

Management

- To provide the public and the authority information on air quality and action taken (Brunei);
  To promote public awareness, education, and feedback (Singapore, Thailand);
  To enhance the delivery of services, assistance, basic needs and information to the public and communities affected (Philippines).

- To ensure adequate medical and health facilities (Brunei);

- To provide considerable support to neighbouring ASEAN countries (Thailand);
  To promote cooperation among Asian countries (Philippines).

- To minimise haze pollution by fuel management (Indonesia);

- To strengthen inter-agency cooperation and support (Malaysia);
  To strengthen inter-agency collaboration and to mobilize resources to strengthen the capacity of agencies responsible for the plan (Myanmar);
  To coordinate with all concerned agencies (Philippines);
  To establish arrangements for inter-agency cooperation and support (Singapore);
  To establish institutional set-up and to strengthen cooperative procedures for mobilization of resources for combating haze (Thailand);
  To establish operating procedures for rapid development of fire fighting (Singapore).

Figure 1
Policy linkages from objective to assessment and management of forest fires and other sources of haze, Brunei Darussalam

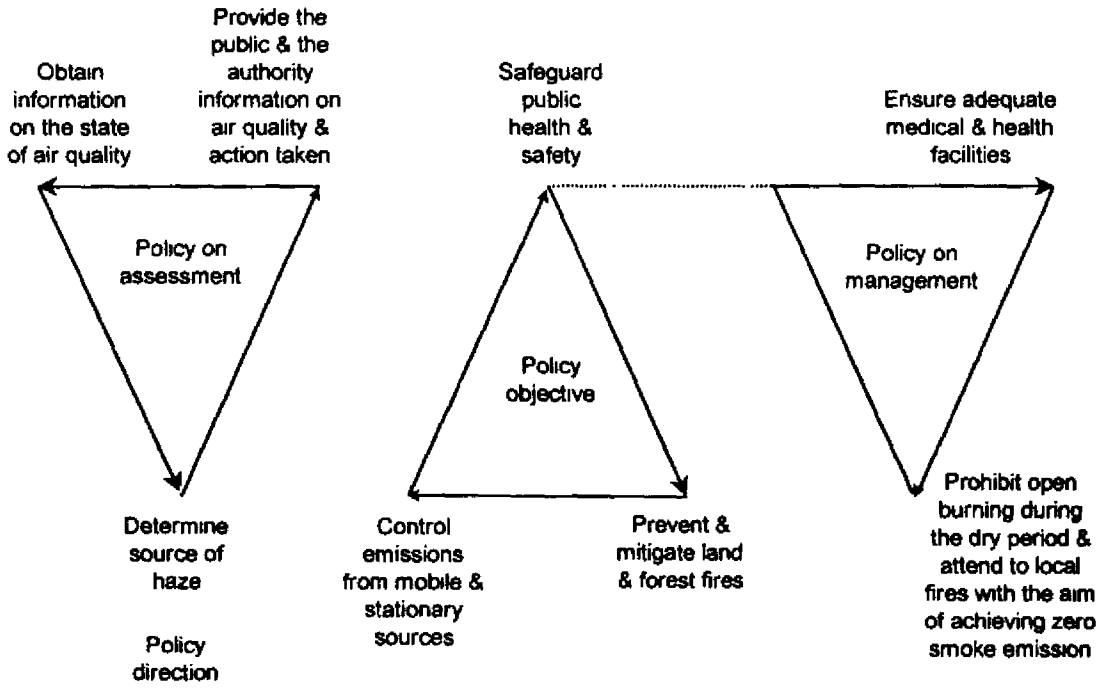

Figure 2
Policy on prevention and control of fire and haze, Indonesia

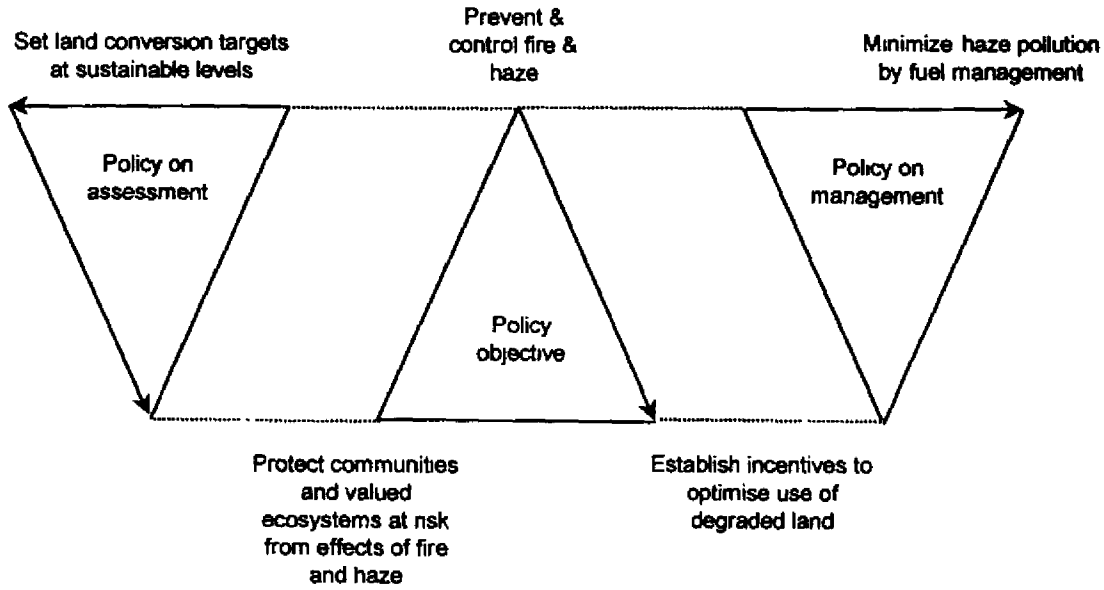

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Figure 3
Policy on haze and control of its sources, Malaysia

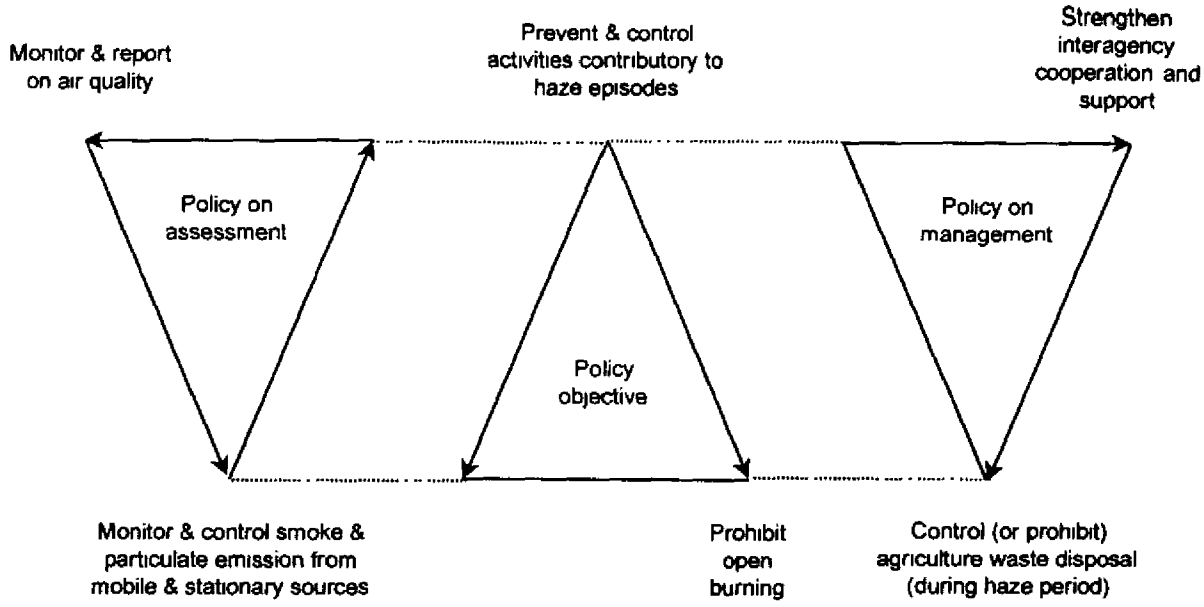


Figure 4
Policy on national haze action plan, Myanmar

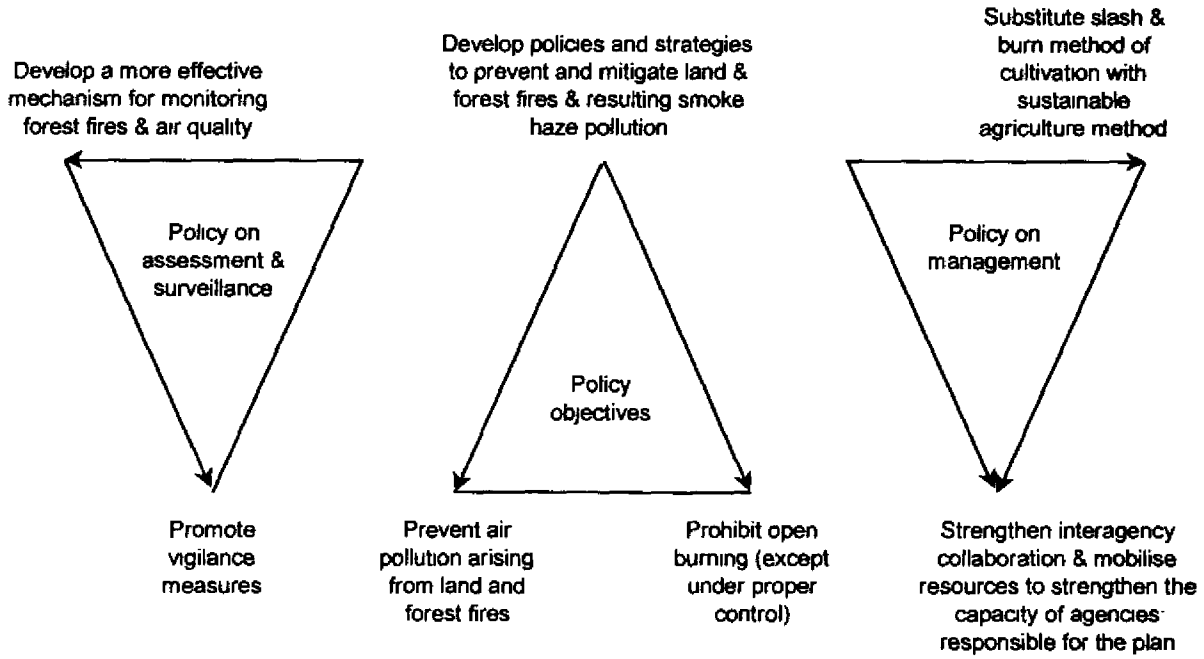


Figure 5
Policy on haze and its control, Philippines

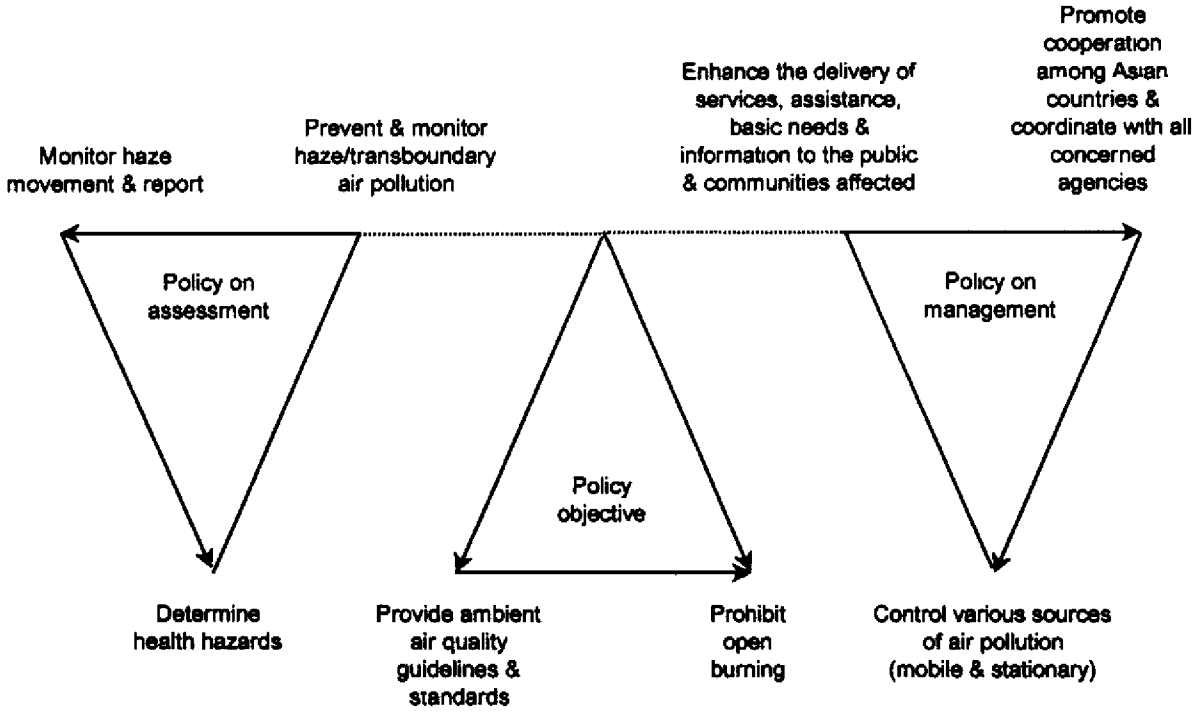


Figure 6
Policy on prevention & control of land & forest fires and control of other emissions, Singapore

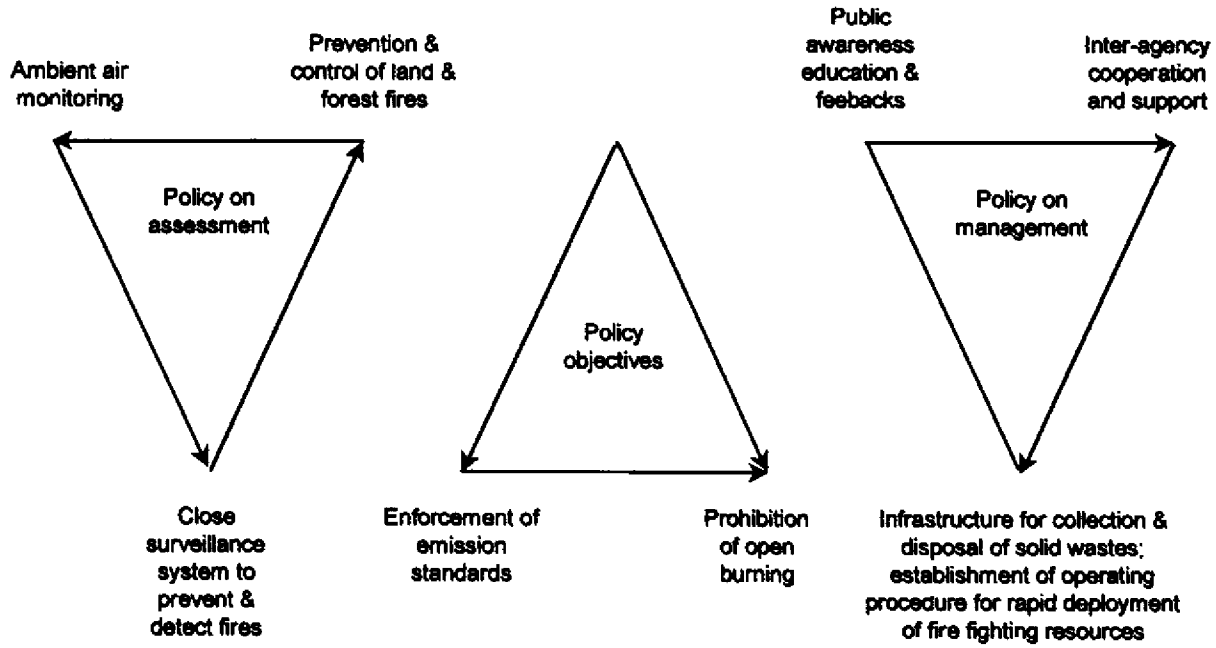
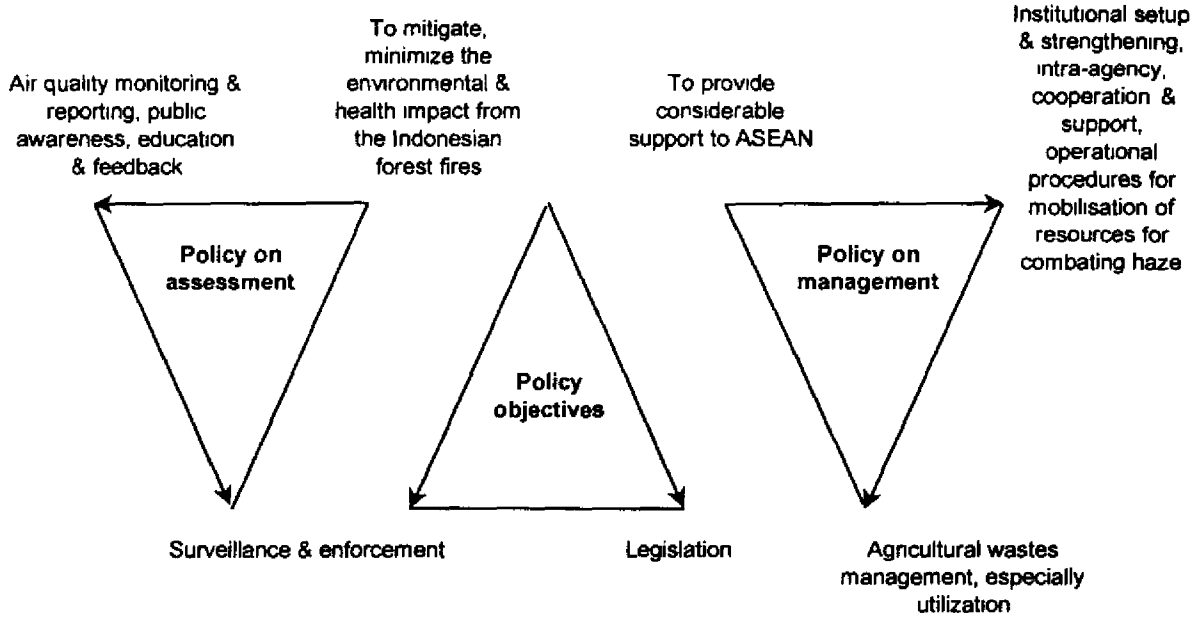


Figure 7
Policy on Indonesian forest fires, Thailand



ROLE OF THE FOREST FIRE EMERGENCY STANDARDS

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HOW TO USE AND APPLY THESE STANDARDS

Every country has some type of organisation to face natural emergency situations (floods, earthquakes, slides, etc) or those caused by human beings (railway and airplane accidents, multiple highway accidents, chemical spill, etc), which often occur.

Sensitisation of the authorities

The first recommendation is that great effort should be made so that national institutions include forest fire emergencies in their planning and work. Although it is a subject which has had enormous environmental, economic and social impact in recently affected countries, it is considered a remote topic, something almost anecdotal that occurs in other latitudes, but not in our region. Hence, necessary incentive has not been received to consider them within the lines of action of emergency systems.

An important aspect of the "WHO Health Guidelines for Episodic Vegetation Fire Events" must then include motivations of the authorities so that they may integrate this subject with its diverse dimensions and complexities.

A strategy aiming at sensitising decision-makers regarding the real magnitude and difficulties that the problem can become in each of our countries, according to previous years' experiences , must be prepared. It is therefore, important to primarily identify and work with the "Authority

Sector"; ie. the authority that has an effective legal power which could integrate other public services and institutions under its coordination.

Emphasis on the prevention of forest fire emergencies

To avoid forest fires, an adequate prevention and control strategy must be put in place. It is very important to include the various representatives of the community in order to educate the population to collaborate in the prevention of these emergencies.

Adaptation of plans to local situation

If the methodology can be adapted and incorporated into each country's strategy, the national authorities could be oriented regarding the steps to follow to achieve an adequate coordination, planning, and action in the implementation of these standards.

Sensitisation of the competent technical agencies

Besides sensitisation of the authorities, it is necessary to motivate the services and technical groups, defined as those with effective technical aptitudes, responsibility, knowledge and resources. This process can be achieved through adequate and permanent technical assistance that international organisations can provide, promoting local efforts, registering progresses, collecting and providing feedback data, and disseminating to other countries the successful initiative.

There is a special interest in establishing technical assistance and training procedures in complex subjects, such as the assessment of impact on health or the transportation of forest fire pollutants, which might require specific regional technical meetings.

PREPARATION OF A NATIONAL POLICY AND STRATEGY THAT RESPOND TO FOREST FIRE EMERGENCIES

Structuring the authority

Once motivation of the national authorities (authority sector) has been achieved, incorporation of the forest fire emergency plan should follow. New areas to consider should include the impact on health in the national emergency programmes. The latter will be integrated into the national civil defence system (coordination group) or another national organisation with the same objective. The competent technical agencies (technical group) will be summoned to provide the expertise.

The forest fire emergency standards can then be inserted and applied in accordance to the institutional and legal system of each country. This will ensure the commitment and coordinated participation of the various institutions with clearly identified responsibilities. An adequate organisation and preparation of the forest fire emergency plan will then be obtained.

Preparation of a strategic plan by the technical agencies

Under the instructions of the authority, the agencies in charge of the national emergency programmes will first identify the main technical bodies related to:

- forest fire prevention and control (agriculture, natural resources);
- health services, with its diverse complex levels (health centres and hospitals), epidemiological and environmental surveillance networks;
- air quality surveillance systems; and
- meteorological services.