

ASEAN Plan of Action

ASEAN Plan of Action on Science and Technology

***Including:
Technology Component of
the ASEAN-UNDP
Sub-Regional Programme
for the Fifth Cycle (ASP-5)***



ASEC Resource Centre

ASEAN Plan of Action on Science and Technology



**Including:
Technology Component of
the ASEAN-UNDP
Sub-Regional Programme
for the Fifth Cycle (ASP-5)**

**ASEAN Secretariat
July 1994**



ASEC Resource Centre

FOREWORD

The mandate for the cooperation in science and technology (S&T) among the ASEAN Member Countries dates back to the founding of ASEAN as promulgated in the Bangkok Declaration of 1967. In order to provide appropriate guidelines for the identification and formulation of programmes and projects, achieve better coordination and cooperation and strengthen the capabilities in S&T within ASEAN, the first Plan of Action on Science and Technology was completed in 1981 by the ASEAN Committee on Science and Technology (COST) with the assistance of the ASEAN Secretariat. The Plan was revised and updated in 1989 to take into account the progress made in the S&T field and other developments in the region so as to ensure that the cooperative programmes remain effective and relevant.

The ASEAN Heads of Government, at their Fourth Summit Meeting in January 1992, pledged to continue to step up cooperation in science and technology and approved a Programme of Action which included several initiatives in the S&T area. In accordance with these guiding principles, the Fifth Meeting of the ASEAN Ministers for Science and Technology in September 1992 endorsed the proposal of COST to carry out a detailed review of the activities of the eight subcommittees of COST and formulate a revised ASEAN Plan of Action on S&T. The ASEAN Secretariat was again requested to assist COST in this endeavour.

With funding support from the United Nations Development Programme (UNDP), the ASEAN Secretariat prepared the draft Plan which was considered by COST at its 29th meeting in January 1994 before being submitted to

Cataloging-in-Publication Data
ASEAN.

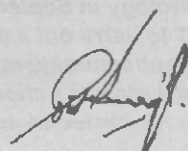
ASEAN Plan of Action on Science and Technology
Jakarta : ASEAN Secretariat, (1994)
36 p. ; 21.5 cm.
Annual
ISBN 979-8080-06-8
506.59

Design: Garisgrafis



and finally endorsed by the Sixth Meeting of the ASEAN Ministers for Science and Technology in February 1994.

The updated 1994 ASEAN Plan of Action on S&T therefore represents the strategic blueprint for the implementation of ASEAN S&T cooperative programmes that will support national and regional economic and social development initiatives into the next century. The Plan identifies six strategies and twenty supporting actions to attain the objectives that have been put forward. In order to operationalize the Plan of Action and address some of the key issues described in the Plan, the ASEAN Secretariat was again able to secure UNDP assistance to prepare a Technology Sub-Programme for consideration under the ASEAN-UNDP Sub-Regional Programme for the Fifth Cycle (ASP-5). UNDP has since approved the funding for the implementation of the ASP-5 which includes the Technology Sub-Programme component. The timely support received from UNDP at this critical juncture in the development of S&T cooperation within ASEAN is very much appreciated.



Dato' Ajit Singh
Secretary General of ASEAN

Contents

Foreword

Table of Contents

Executive Summary	1
1994 ASEAN Plan of Action on Science and Technology	9
ASP-5 Sub-Programme on Technology	35

EXECUTIVE SUMMARY

1994 ASEAN Plan of Action on Science and Technology

I. INTRODUCTION

The objectives of ASEAN cooperation on science and technology were first enunciated in 1970. Over the years, the guiding principle of regional collaboration and mutual assistance, first mandated in the ASEAN Declaration at the founding of ASEAN in 1967, has been consistently upheld and periodically refined and extended by Heads of Government and Ministers of Science and Technology.

In 1978, the ASEAN Committee on Science and Technology (COST) was established to initiate and promote ASEAN's cooperative programmes. ASEAN COST's principal functions are to promote and accelerate the development of scientific and technological expertise and human resources and to facilitate the transfer of technology from the more advanced countries to ASEAN and among ASEAN member countries.

At its inaugural meeting in 1978, ASEAN COST initiated the formulation of an ASEAN Plan of Action on Science and Technology. The first Plan of Action was completed in 1981. The Plan of Action has since been updated regularly to take account of developments and to ensure that it remains an effective guide to programming and management. Meanwhile, to ensure active participation of national institutions and scientists and technologists across the diverse areas of interest, subcommittees have been created. The subcommittees and their associated networks of resources, collectively known as ASEAN COST's subsidiary bodies, assist ASEAN COST in programme formulation, implementation and management.

Thus far, the major sources of funding support of ASEAN's science and technology (S&T) programmes have been the Dialogue Partners, namely, Australia, Canada, the EC, Japan, New Zealand, US, and UNDP. ASEAN member countries make substantial counterpart in-kind contributions to match the aid-funding provided by Dialogue Partners. Dialogue funding has been provided to support programme activities in food science & technology, geology and geophysics, marine sciences, microelectronics, non-conventional energy research, biotechnology, materials science, and S&T infrastructure and resources development. The programmes have contributed significantly to the development of ASEAN S&T capabilities.

Since the formation of ASEAN, member countries have shifted from being exporters of primary products to exporters of manufactured goods. As a result, ASEAN has experienced rapid economic growth in the last decade. Indeed, ASEAN is actively upgrading its industry and human resource capability in order to ensure greater international market access for its products.

The latest Plan of Action on Science and Technology was adopted by the Ministers for Science and Technology in January 1989. The 1989 Plan spelt out guidelines and strategies for intensifying cooperation in science and technology, human resource development, technology transfer and commercialisation, and information dissemination. In addition, the 1989 Plan called for specific changes to the ASEAN COST subsidiary bodies.

Meanwhile, the trading rules of the global marketplace are being redefined based on the outcome of discussions on the General Agreement on Tariffs and Trade (GATT). Faced with the prospects of increasing protectionism, ASEAN has affirmed its commitment to free and fair trading practices and has accelerated the implementation of the ASEAN Free Trade Area (AFTA).

The twin demands of gaining access to international markets and furthering economic development through increased direct investments in the region call for a more pragmatic and focused S&T development strategy that is both regionally integrated and sustainable in character and long-term in perspective. Furthermore, ASEAN must ensure that regional S&T programmes are capable of leveraging key expertise and resources to achieve deliverables with industry relevance and economic impact.

Therefore, in order to provide a strategic blueprint for the implementation of regional science and technology cooperation programmes that will support national and regional objectives of economic development into the next century, ASEAN COST, together with the ASEAN Secretariat, has redefined the new ASEAN Plan of Action on Science and Technology.

II. UPDATED ASEAN PLAN OF ACTION ON SCIENCE AND TECHNOLOGY

In accordance with the guiding principles provided by the ASEAN Heads of Government and the ASEAN Ministers for Science and Technology, ASEAN cooperation in science and technology will aim to achieve the following objectives:

- a. a high level of intra-ASEAN cooperation in science and technology that is synergistic and self-sustaining and having the active participation of the private sector;
- b. a network of S&T infrastructure and programmes for public and private sector human resource development;
- c. an active economically-beneficial institution-industry technology transfer;
- d. an enhanced state of public awareness of the importance of science and technology to ASEAN's economic development; and
- e. an expanded S&T cooperation with the international community.

In line with the aforementioned objectives, ASEAN COST will further strengthen its cooperative programmes in the following areas:

- a. food science and technology,
- b. meteorology and geophysics,
- c. microelectronics and information technology,
- d. materials science and technology,
- e. biotechnology,
- f. non-conventional energy research,
- g. marine sciences, and
- h. S&T infrastructure and resources development.

ASEAN COST will also develop new cooperative programmes on:

- a. standards and quality assurance, and
- b. enabling technologies, such as, remote sensing and geographic information system (GIS).

Accordingly, ASEAN COST and its Subcommittees will formulate and implement projects and activities in these areas consistent with this Plan's strategies.

The following strategies and supporting actions will be implemented.

STRATEGY 1:

Supporting regional S&T programmes that are economically and socially beneficial to ASEAN

ASEAN COST should develop appropriate strategies to support national and regional efforts by leveraging on existing capabilities and providing the synergistic support critical to the expeditious accomplishment of S&T goals which result in direct economic and environmental benefits to the region as a whole. This should be accomplished by ensuring that aspects in sustainable development and economic integration under AFTA be given due consideration.

Actions:

- 1.1. *Identify private sector end-users of research results and seek active participation of the private sector in R&D.*
- 1.2. *Support improvement of standards, testing and quality assurance activities of the private sector.*
- 1.3. *Select and prioritise programme areas and projects that offer the greatest impact and the most benefits to ASEAN as a whole.*
- 1.4. *Establish a set of criteria for prioritizing programme areas and projects based on technical and economic factors.*
- 1.5. *Identify centres of excellence for S&T development.*

STRATEGY 2:

Providing close coordination and management of S&T activities

ASEAN COST must be able to make careful selection of its programmes, demonstrate viability and gain credibility for the ability to deliver results for the benefit of the region. It must therefore plan for a system of coordination and management that will ensure that regional efforts are optimized and economic benefits to ASEAN are maximized.

Actions:

- 2.1. *Set up a programme/project planning, monitoring and reporting system.*
- 2.2. *Establish a set of key targets to drive the regional S&T development effort.*
- 2.3. *Establish guidelines on the acquisition and management of programme/project funding.*
- 2.4. *Promote strategic linkages with industry.*
- 2.5. *Establish guidelines on commercialisation of results including the sharing of intellectual property rights and royalties.*

STRATEGY 3:

Developing S&T human resources

Actions:

- 3.1. Develop R&D human resources to meet sectoral needs.**
- 3.2. Establish an ASEAN S&T fellowship programme.**

STRATEGY 4:**Information networking of centres of excellence**

The need for an electronic-based technology information network is a priority for ASEAN COST. It is envisioned that the ASEAN network will not only be an effective link among ASEAN COST's subsidiary bodies and centres of excellence but also the gateway to international S&T and industrial databases.

Actions:

- 4.1. Develop an ASEAN technology information network.**
- 4.2. Establish a technology database of ASEAN business groups.**
- 4.3. Establish a database of ASEAN S&T expertise and facilities.**
- 4.4. Establish a technology scan mechanism.**

Promoting institution-industry technology transfer

Resources to be developed by ASEAN COST and its subsidiary groups should be made available to ASEAN's private sector in order to assist industry effect beneficial technology transfer from overseas. More importantly, ASEAN COST should develop mechanisms and infrastructures for intra-ASEAN institution-industry technology transfer.

Actions:

- 5.1. Establish mechanisms for technology transfer.**
- 5.2. Establish a set of incentives to encourage technology commercialisation and mobility of S&T human resource.**

STRATEGY 6:**Promoting S&T awareness**

There is little public awareness of the contributions of S&T to the economic development of ASEAN member countries. As such, every possible means should be mobilized to educate and interest the general public to the challenges and rewards of a career on science and technology, particularly in research and development.

Actions:

- 6.1. Recognize the contributions of individuals and corporations to ASEAN's scientific and technological endeavours.**
- 6.2. Publish an ASEAN S&T newsletter/magazine.**

The economies of ASEAN countries have as a whole registered favourable growth rates during the past few years. This trend is likely to continue in the foreseeable future as the countries industrialize and as the implementation of the ASEAN Free Trade Area gets underway. S&T will play a pivotal role as both a cause and effect in these processes. In order for ASEAN to maintain a competitive edge in the global economic arena, it is crucial that the development of S&T in the region be actively promoted. The foregoing strategic ASEAN Plan of Action on S&T addresses this critical issue. The objectives of the Plan could be achieved only through the commitment and support of the governments of ASEAN member countries which would entail provision of sufficient resources from both within and outside of ASEAN.

1994 ASEAN Plan of Action on Science and Technology

1. PREAMBLE

The 1989 ASEAN Plan of Action on Science and Technology was prepared by the ASEAN Committee on Science and Technology (COST) in collaboration with the then Bureau of Science and Technology of the ASEAN Secretariat. It was adopted by the 4th Meeting of the ASEAN Ministers for Science and Technology in January 1989. The 5th Meeting of the ASEAN Ministers for Science and Technology in September 1992 endorsed the proposal of ASEAN COST to undertake a detailed review of the activities of the eight Subcommittees of ASEAN COST and formulate a revised ASEAN Plan of Action on Science and Technology. The strategic plan that follows was prepared in response to this directive.

2. REVIEW OF ASEAN COOPERATION ON SCIENCE AND TECHNOLOGY

2.1. Mandate for ASEAN Science and Technology Cooperation

The Association of Southeast Asian Nations (ASEAN) was established by the ASEAN Declaration of 8 August 1967. The mandate for ASEAN cooperation in science and technology can be found in the ASEAN Declaration, which states that ASEAN shall promote active collaboration and mutual assistance on matters of common interest in the economic, social, cultural, technical, scientific and administrative fields and provide assistance to each other in the form of training and research facilities in the educational, professional, technical and administrative spheres.

ASEAN regional cooperation on science and technology was initiated when an Ad-hoc Committee on Science and Technology met in Jakarta on 27-29 April 1970. With the ASEAN Declaration as the guiding principle, the meeting established the following objectives for ASEAN cooperation in science and technology:

- a) to initiate and intensify regional cooperation in scientific and regional activities,
- b) to generate and promote development of scientific and technological expertise and manpower in the ASEAN region,
- c) to facilitate and accelerate the transfer of scientific developments and technologies among ASEAN countries and from the more advanced industrialized countries to the ASEAN region,
- d) to provide support and assistance in the application of the results of research and development, and in the more effective use of natural resources in the ASEAN region, and
- e) to provide support towards the implementation of present and future ASEAN programmes.

Subsequently, an ASEAN Permanent Committee on Science and Technology was established in 1971. The Committee redefined the objectives of ASEAN S&T cooperation as being to promote and intensify cooperation in the scientific and technological activities on common problems in the ASEAN region, and to raise the level of technological and scientific advancement in member countries. The Permanent Committee adopted the foregoing objectives as the terms of reference.

Following the rationalization of ASEAN operations in 1978, the Permanent Committee was designated the ASEAN Committee on Science and Technology (COST). ASEAN COST adopted the objectives and terms of reference of the Permanent Committee and met for the first time in Baguio City, Philippines, on 20-22 June 1978. Since that time, ASEAN S&T policy, management and implementation have been principally driven by ASEAN COST guided by mandates laid down by the meetings of ASEAN Heads of Government and Ministers for Science and Technology.

2.2. Guidelines from Heads of Government

The first Summit of ASEAN Heads of Government was held in Bali in 1976. Since then, Heads of Government have had four meetings.

ASEAN Heads of Governments called for collaboration in S&T at the various Summit meetings. The Manila Declaration of 1987 called for ASEAN to intensify its cooperation on science and technology, to emphasize development of an intelligent and highly productive work force consistent with rapid global scientific and technological advancements, to promote the utilization of natural resources for industrialization, and to improve the quality of life of the peoples in the region.

To achieve the objectives and to implement the policies, the Heads of Government called for a wider involvement, participation and cooperation among the peoples of member countries. They proposed that ASEAN:

- a) intensify cooperation in science and technology.
- b) support the establishment of research networks, training, exchange of experts and undertake joint R&D.
- c) strengthen R&D and promote cooperation on selected areas.
- d) support the development of "sun-rise" industries.
- e) promote cooperation in technology transfer and information exchange.

In the Singapore Declaration of 1992, the ASEAN Heads of Government pledged to continue to step up cooperation in other economic-related areas, such as science and technology and human resource development.

To implement the Singapore Declaration, the Summit's Programme of Action called upon member countries to:

- a) consider mechanisms for greater self-reliance in project funding.
- b) build R&D infrastructure including training.
- c) promote greater private sector and public sector collaboration.
- d) continue active collaboration with Dialogue Partners in S&T development and management.

2.3. Ministerial Guidelines for ASEAN Cooperation on Science & Technology

The ASEAN Ministers for Science and Technology held its first meeting in Thailand in 1980. Since then, five ministerial meetings have been held.

The ASEAN Ministers for Science and Technology, at the fifth meeting held

in Singapore in September 1992, agreed that, to promote self reliance in funding projects, the following avenues be explored:

- a) Support for projects on a cost-sharing basis among the ASEAN member countries.
- b) Build-up the ASEAN Science Fund through:
 - i. funds from private sector companies and international organizations,
 - ii. Dialogue Partner contributions,
 - iii. benefits accruing from the commercialization of collaborative projects under ASEAN COST, and
 - iv. further contributions from member countries.

To develop indigenous technological and innovative capability, the Ministers endorsed the following actions:

- a) to establish a network of specialized technological centres and centres of excellence.
- b) to establish active training networks.
- c) to foster closer linkages among technology parks and active support of science and technology exhibitions in the region, and
- d) to improve the mechanism for exchange of research scientists.

The Ministers agreed that areas of mutual interest be explored to promote private sector participation in R&D projects. In addition, the Ministers agreed that the following activities be undertaken:

- a) establish a tripartite relationship between government, industry, and the public sector.
- b) provide training to industry especially on new technologies,
- c) prepare a compendium of ASEAN commercialisable technologies from R&D institutions,
- d) hold study visits in ASEAN for targeted industrialists, and
- e) publish a newsletter for dissemination of information to industry.

The Ministers also endorsed a proposal by ASEAN COST to enhance collaboration with Dialogue Partners in new economic areas, and to explore active collaboration with non-Dialogue Partners.

2.4. Inputs from the ASEAN Standing Committee

The ASEAN Standing Committee, in December 1990, adopted two main programme themes and three criteria for ASEAN technical cooperation projects. The themes were sustainable economic reform and human development which required promotion through innovative ASEAN cooperation efforts, institutional development, human resource development, and preparation of specific technical studies.

In addition, it was agreed that all externally funded projects should meet the basic criteria of promoting integration or be common needs oriented, meeting the objectives of the two programme themes, and maximizing the comparative advantage of donors.

2.5. Evolution of the Plan of Action on Science and Technology

In consideration of the various mandates for S&T collaboration, ASEAN COST, at its first meeting in 1978, initiated the formulation of an ASEAN Plan of Action on Science and Technology (Plan). The first Plan was completed in 1981. It has since been updated on a regular basis as a result of periodic reviews by ASEAN COST of its policies and activities. This is being done to ascertain that programmes remain effective and relevant to regional development.

As a consequence of the continuing progress in ASEAN cooperation in science and technology and in response to the new initiatives from the Third Meeting of ASEAN Heads of Government in December 1987, the Plan was revised and updated in 1989.

Mindful of the objectives adopted in the Manila Declaration and recognizing the need to achieve economic development to serve the general basic needs of the peoples of ASEAN, the 1989 ASEAN Plan of Action for Science and Technology sets the following objective: to strengthen and enhance the capability of ASEAN in science and technology so that it can promote economic development and help achieve a high quality of life for the peoples of ASEAN.

To achieve this objective, the 1989 Plan of Action spelt out the following policy guidelines:

- a) cooperation among its member countries in the field of science and technology shall be promoted;

- b) technology transfer and commercialization of research results shall be encouraged;
- c) human resources development shall be emphasized; and
- d) scientific and technical information dissemination and exchange shall be intensified.

In addition, the Plan recommended the following strategies and actions:

- a) to intensify cooperation in science and technology;
- b) to widen involvement and increase participation and cooperation among the scientists and researchers of member countries;
- c) to maintain a high level of scientific and technological expertise and in the process develop an intelligent work force in a rapidly changing and highly competitive world;
- d) to promote technology transfer and the commercialization of research results;
- e) to ensure human resources development for promoting scientific, technological, and economic development; and
- f) to provide an overall awareness in ASEAN of the strategic role that science and technology plays in economic development.

The 1989 Plan of Action on Science and Technology was adopted at the Fourth Meeting of ASEAN Ministers for Science and Technology held in January 1989 in Manila.

2.6. Current Structure of ASEAN COST

The policies for ASEAN S&T cooperation are set by Meetings of ASEAN Ministers for Science and Technology, which are held approximately once every one and a half years. ASEAN COST is responsible for setting directions, coordinating activities of subsidiary groups, creating public awareness of regional S&T activities and their contribution to economic development, and reviewing overall progress of collaboration, including the progress of its relations with Dialogue Partners.

The Chairmanship of ASEAN COST is held on a rotational basis amongst the ASEAN countries in alphabetical order, for a period of three years. ASEAN COST meets twice a year to review the progress of regional programmes, provide support for new programmes/projects, and to provide direction for implementation of programmes/projects by its subsidiary groups. At the

national level, the leading official in ASEAN COST, also known as the National COST Chairman, is generally the highest ranking administrative officer in charge of science and technology in the respective countries.

The Functional Cooperation Bureau, ASEAN Secretariat provides ASEAN COST with coordinating and support functions. ASEAN COST itself is responsible to the ASEAN Standing Committee and hence the ASEAN Foreign Ministers. The organisational structure appears as Figure 1.

2.6.1. Subcommittees

Subcommittees are formed in all the major programme areas of ASEAN COST. They are responsible for the management, coordination, evaluation and implementation of regional projects. Subcommittees are also entrusted to review ongoing projects under their purview and assess the effectiveness and impact of their projects in strengthening the regional S&T capabilities. ASEAN COST has eight Subcommittees. They are the Subcommittees on Food Science & Technology, Meteorology & Geophysics, Non-Conventional Energy Research, Materials Science & Technology, Microelectronics & Information Technology, Biotechnology, Marine Sciences, Science & Technology Infrastructure and Resource Development.

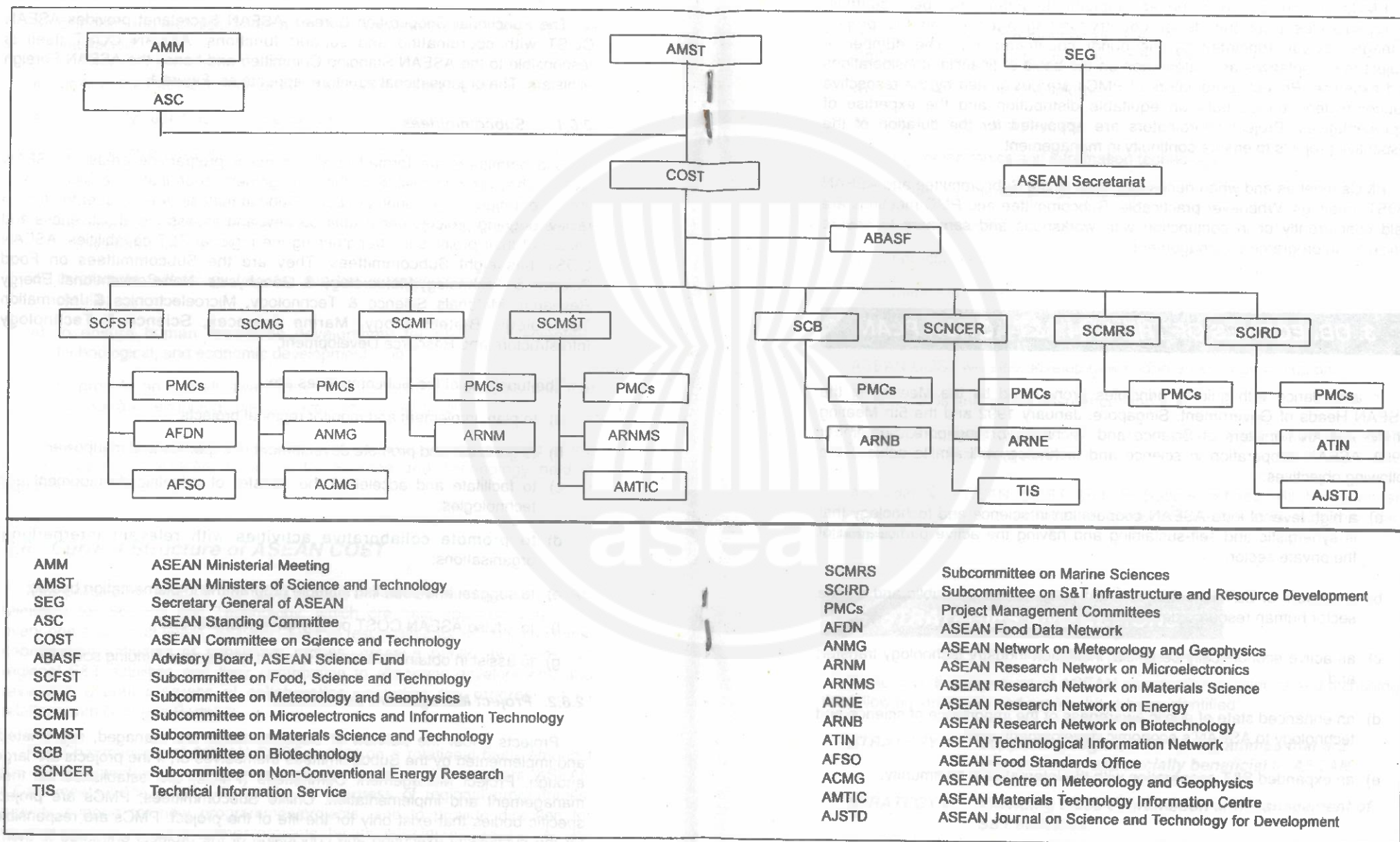
The functions of the Subcommittees are:

- a) to plan, implement and monitor regional projects;
- b) to generate and promote development of expertise and manpower;
- c) to facilitate and accelerate the transfer of scientific development and technologies;
- d) to promote collaborative activities with relevant international organisations;
- e) to suggest and establish suitable programme implementation bodies;
- f) to advise ASEAN COST on any other matters; and
- g) to assist in obtaining financial support and to seek funding sources.

2.6.2. Project Management Committees

Projects under the purview of Subcommittees are managed, coordinated, and implemented by the Subcommittees themselves or, if the projects are large enough, Project Management Committees (PMCs) are established for their management and implementation. Unlike Subcommittees, PMCs are project specific bodies that exist only for the life of the project. PMCs are responsible for the successful execution and conclusion of the projects entrusted to them.

Figure 1
Organisational Chart for ASEAN Cooperation
on Science and Technology



They are also responsible for advising the Subcommittee on future collaborative activities and follow-up actions pertaining to the projects.

PMCs are composed of project implementers from member countries, representatives from the donor country/funding agency and the project manager/advisor appointed by the donor country/agency. The number of project representatives are determined on the basis of financial considerations and expertise. Project coordinators of PMCs are designated by the respective Subcommittees based both on equitable distribution and the expertise of representatives. Project coordinators are appointed for the duration of the respective projects to ensure continuity in management.

PMCs meet as and when necessary, prior to the Subcommittee and ASEAN COST meetings. Whenever practicable, Subcommittee and PMC meetings are held concurrently or in conjunction with workshops and seminars to ensure efficiency in programme management.

3. OBJECTIVES OF THE 1994 S&T ACTION PLAN

In accordance with guiding principles pronounced by the Meeting of the ASEAN Heads of Government, Singapore, January 1992 and the 5th Meeting of the ASEAN Ministers of Science and Technology, Singapore, September 1992, ASEAN cooperation in science and technology will aim to achieve the following objectives:

- a) a high level of intra-ASEAN cooperation in science and technology that is synergistic and self-sustaining and having the active participation of the private sector;
- b) a network of S&T infrastructure and programmes for public and private sector human resource development;
- c) an active economically-beneficial institution-industry technology transfer; and
- d) an enhanced state of public awareness of the importance of science and technology to ASEAN's economic development; and
- e) an expanded S&T cooperation with the international community.

4. PROGRAMME AREAS

In line with the aforementioned objectives, ASEAN COST will further strengthen its cooperative programmes in the following areas:

- a) food science and technology,
- b) meteorology and physics,
- c) microelectronics and information technology,
- d) materials science and technology,
- e) biotechnology,
- f) non-conventional energy research,
- g) marine sciences, and
- h) S&T infrastructure and resources development.

ASEAN COST will also develop new cooperative programmes on:

- a) standards and quality assurance, and
- b) enabling technologies, such as, remote sensing and geographic information system (GIS).

Accordingly, ASEAN COST and its Subcommittees will formulate and implement projects and activities in these areas consistent with this Plan's strategies.

5. STRATEGIES AND ACTIONS

To achieve the objectives of ASEAN cooperation in science and technology, the following strategies and actions have been identified:

STRATEGY 1: *Supporting regional S&T programmes that are economically and socially beneficial to ASEAN.*

STRATEGY 2: *Providing close coordination and management of S&T activities.*

STRATEGY 3: Developing S&T human resources.

STRATEGY 4: Information networking of centres of excellence.

STRATEGY 5: Promoting institution-industry technology transfer.

STRATEGY 6: Promoting S&T awareness.

STRATEGY 1:

Supporting regional S&T programmes that are economically and socially beneficial to ASEAN

ASEAN's more recent national S&T plans show a common desire of member countries to develop core competencies by active involvement of the private sector thereby ensuring that results from such joint activities will have direct economic benefits. From the standpoint of ASEAN COST, it is imperative that regional S&T development programmes under its purview are in consonance with such national initiatives being pursued by member countries. It is thus timely for ASEAN COST to develop appropriate strategies to support national and regional efforts by leveraging on existing capabilities and providing the synergistic support critical to the expeditious accomplishment of the above-stated S&T goals. This should be accomplished by ensuring that relevant aspects in sustainable development and economic integration under AFTA be given due consideration.

Actions:

1.1. Identify private sector end-users of research results and seek active participation of the private sector in R&D.

This will involve active solicitation of feedback from industry on their technology needs. Special task forces will be formed to undertake detailed discussions with core business groups and to ascertain industry's willingness to co-finance R&D or technology development projects that will realize readily commercialisable results. To this end, ASEAN COST's subsidiary groups must meet with industry partners through seminars, fora, workshops, and the triennial ASEAN Science and Technology Week which is a platform for discussions between ASEAN and Dialogue Partner business groups. Reports of such meetings and feedback must be made at regular ASEAN COST

meetings in order that ASEAN COST can give its support in a timely manner and coordinate the mobilization of relevant groups and agencies to pursue further development.

1.2. Support improvement of standards, testing and quality assurance activities of the private sector.

In the light of the development of the ASEAN Free Trade Area (AFTA) and the need of the private sector to become more competitive on both intra-ASEAN and global bases, ASEAN COST should actively promote the upgrading of standards and technology of the private sector, in support of the ASEAN Consultative Committee for Standards and Quality (ACCSQ). To this end, ASEAN COST should support improvement of standards, testing and quality assurance activities of the private sector. This can be done through establishment of training and consultancy programmes, and programmes on technical services related to standards, testing and quality assurance. Special attention should be given to key areas of production affected by AFTA in particular, and technological improvement in general.

1.3. Select and prioritise programme areas and projects that offer the greatest impact and the most benefits to ASEAN as a whole.

The objective of this activity is to come up with worthwhile regional projects having the greatest technological impact and economic significance to ASEAN. In order to qualify projects as truly regional, ASEAN COST must adopt an up-to-date definition that reflects ASEAN's effort in promoting the ASEAN Free Trade Area (AFTA) and the current climate under which Dialogue Partners regard ASEAN regional programme funding.

Given the present scenario with regard to Dialogue Partner funding and the increasingly imminent prospects of diminishing direct contributions to regional S&T programmes, ASEAN COST must devise a workable procedure for qualifying regional programmes/projects for support and prioritization.

In addition, the procedure is meant to facilitate subsequent implementation, including all aspects of commercial exploitation of results. To this end, the interest of the private sector must be taken into account. Preferably, industry involvement should begin at the earliest stage of proposal formulation and project design procedure. In order to ensure effective implementation of the above procedure, ASEAN COST will set up a Project Review Committee (PRC).

1.4. Establish a set of criteria for prioritizing programme areas and projects based on technical and economic factors.

It is imperative that a set of criteria for selecting and prioritizing programme areas and projects be established. In addition, the criteria will provide ASEAN COST, through its PRC, with a means of prioritizing projects that will require institutional and funding support of ASEAN member governments, Dialogue Partners, and other external sources.

The criteria on regionality should be based on technical and economic considerations. Attention should be focused on the following:

- a) regional industry application and economic relevance,
- b) ability to leverage on strengths of existing centres of excellence,
- c) increased cross-flow of technology and human resources, and
- d) good track record of participating subsidiary groups and institutions.

Thus, regional programmes/projects should satisfy some if not most of the following criteria:

- a) multi-country technology diffusion, industry application and commercialization, but not necessarily multi-country project implementation;
- b) funding from industry, with potential for tripartite funding support from ASEAN, Dialogue Partners and the private sector;
- c) multi-country technology and human resource contributions and regional public and private sector human resource development;
- d) inter-disciplinary activities involving two or more subsidiary groups;
- e) no duplication of nationally supported programmes having the major commitment of national resources; and
- f) accord with AFTA and sustainable development.

Other factors such as institutional capabilities and capacity, deliverables, time frame of project, application or commercialization plan, risks, and benefits accruing to ASEAN COST should also form part of the overall assessment and qualification.

1.5. Identify centres of excellence for S&T development.

In attempting to stimulate regional S&T programmes, ASEAN COST will adopt a focused approach by leveraging on existing capabilities of and linkages established by its subsidiary groups. ASEAN COST will make a careful assessment of the public institutions such as universities and research centres within the subsidiary groups to ascertain their core competencies. The assessment will consider factors such as staff strength, track record of project accomplishment, impact and sustainability of their current activities, and their linkages with the private sector.

Simultaneously, ASEAN COST will seek feedback, through its subsidiary groups, on industry's technology and human resource needs. Based on the expressed needs of industry, ASEAN COST will provide support for the seeding of select centres of excellence. The role of such centres of excellence is to form networks to provide assistance to industry's technological upgrading, engage in strategic targeted R&D having industry relevance and economic value, train public and private sector research personnel, and act as key nodes for networking and technology transfer.

STRATEGY 2:

Providing close coordination and management of S&T activities.

ASEAN COST will be playing an increasingly active role in fostering cohesive and purposeful S&T activities in consonance with the increased pace in the regionalization of trade practices under AFTA. To ensure relevance of its own programmes, ASEAN COST must develop a system of management and close coordination based on sound knowledge of country needs and their intrinsic S&T strengths and weaknesses. It must also foster strong intra-ASEAN linkages with both the public and private sectors and have a keen sense of the market for technology products and services. In effect, ASEAN COST is responsible to prepare and update an ASEAN Science and Technology Map.

To ensure a high success rate in securing funding and its effective use, ASEAN COST must be able to make careful selection of its programmes, demonstrate viability, and gain credibility for its ability to deliver results for the benefit of the region. Thus, not only does ASEAN COST have to react to increased demand for "openness" in the flow of goods and services within ASEAN, it must also plan for a system of coordination and management that

will ensure that regional efforts are optimized and economic benefits to ASEAN are maximized.

ASEAN COST must endeavour to create opportunities for countries to learn from the experiences of one another. This will allow countries to overcome technological barriers by leveraging on regional capabilities and resources.

To this end, COST's subsidiary groups involved in the management and performance of R&D should be guided by the overriding principle of delivering research results that will benefit industry and contribute to ASEAN's economic development. Therefore, the key to sustaining the regional effort, which should be in line with national efforts, is the ability to manage the performance of subsidiary groups involved in planning, promotion, sourcing of funds, implementation of R&D, and exploitation of results.

A performance management mechanism must be quickly established. The mechanism should incorporate a project monitoring and reporting system, a set of key targets, a system to identify and allocate appropriate ASEAN resources to regional programmes/projects, and a system for determining the sharing of rewards such as intellectual property rights and royalties.

Actions:

2.1. Set up a programme/project planning, monitoring and reporting system.

While S&T policy governing the regional development effort is agreed upon and mandated, such policy must allow subsidiary bodies to design programmes that will best meet the needs of the respective industry sectors. Subsidiary groups within ASEAN COST must be given flexibility to define their specific objectives and achievable targets for project implementation. They should also be responsible for programme/project monitoring and evaluation and be part of the reporting chain between ground activities and ASEAN COST.

2.2. Establish a set of key targets to drive the regional S&T development effort.

Targets will help to drive the development efforts at two levels. They serve as checks of overall achievements and provide indicators for forward planning of funding and required resources needed to achieve stated objectives. Should targets not be met, ASEAN COST could take immediate action to correct the situation and bring the development on course.

2.3. Establish guidelines on the acquisition and management of programme/project funding.

Concurrent with developments to mobilize and expand the ASEAN Fund and the ASEAN Science Fund, ASEAN COST must take steps to establish guidelines on the types of programmes/projects that can qualify for funding support from the ASEAN Fund/Science Fund. In addition, ASEAN COST should also set out conditions for returns of funds to its own operating account should there be income generated out of the use of such funds.

2.4. Promote strategic linkages with industry.

The industrial environment in ASEAN is becoming increasingly technology intensive and competitive. Simultaneously, the implementation of AFTA will place special demands on ASEAN COST to play a lead role in mobilizing the regional scientific and technological capabilities for the advancement of ASEAN into the next century. Thus, in support of ASEAN's initiatives towards becoming a world contender in industrial production and innovation, and in line with strategies propounded above, it is imperative that ASEAN COST initiate a series of activities aimed at promoting strategic linkages with industry.

Besides seeking R&D collaboration with industry and participation of the private sector in regional S&T developments, an ongoing programme to put industry in constant touch with regional S&T development programmes and resource availability is urgently needed. The programme should be based on mutually-beneficial interactions and should offer industry opportunities to tap the resources of centres of excellence, effect technology exchange, and secure technical expertise to support industry's technology upgrading programmes.

2.5. Establish guidelines on commercialization of results including the sharing of intellectual property rights and royalties.

In order to plan ahead for resource allocation and enhance programme management, ASEAN COST should establish guidelines on modes of collaboration with industry with clear statements on commercialization of results. The specific relationship chosen to support a particular industry-oriented project is often tailored to meet the specific needs of the company. However, it is possible to break down the various collaborative activities into

broad categories having clear statements on project implementation and exploitation of results.

ASEAN COST and its subsidiary groups will need to be responsive and decisive in dealing with the private sector. In order to be proactive and effective in dealing with industry on matters concerning R&D collaboration and technology licensing, ASEAN COST should promote technology transfer with the support of relevant agencies in ASEAN.

In addition, internal guidelines should be drawn up to facilitate discussions with industry on issues concerning commitment of resources on the ASEAN side, industry funding, and the ownership of intellectual property rights and sharing of royalties. Furthermore, experience has shown that no single mode or mechanism will apply to all situations. Hence, the guidelines are meant to facilitate negotiations and to allow subsidiary groups to conclude collaborative arrangements with industry.

STRATEGY 3:

Developing S&T human resources.

It has been shown that developing nations generally lack the needed technical human resource to effect the type of technology assimilation and development required for industry upgrading. In addition, it is even harder to find, within this highly skilled technical resource pool, the select group of professionals qualified in S&T policy formulation and management and R&D. These professionals are needed to participate in designing and managing S&T programmes, innovative technology development, industrial research, and pre-competitive R&D in both the public and private sectors.

Thus, ASEAN COST must continually instill in its subsidiary groups positive programming steps to identify sectoral S&T and R&D human resource needs and to include as extensively as possible development programmes to meet those needs. This includes nurturing of promising research scientists, technologists and engineers.

Actions:

3.1. Develop R&D human resources to meet sectoral needs.

The economic buoyancy experienced by ASEAN in the last five years has

not been able to cause industry to invest in substantive R&D activities. There is strong reason to believe that the major cause of the limited industry R&D activities in ASEAN is due to the lack of suitably qualified human resource. The situation cannot be corrected solely by government R&D incentives, grant support and loans. Specially tailored R&D human resource development programmes leveraging on core competencies of centres of excellence are needed to supplement R&D support and investment programmes. In ASEAN, a substantial portion of the public expenditure on S&T development and R&D may have to be committed to physical infrastructure and equipment. Thus, to ensure success in human resource development programmes, well thought-out strategies and careful planning are required.

3.2. Establish an ASEAN S&T fellowship programme.

Utilizing existing facilities in universities and centres of excellence in ASEAN, the fellowship programme is intended to provide ASEAN nationals with the opportunity to learn S&T and appreciate the culture of the host country. Industry commitments to these programmes can be facilitated by adopting appropriate measures of company sponsorship of candidates.

STRATEGY 4:

Information networking of centres of excellence

A major weakness of developing economies is the lack of an adequate S&T infrastructure. A component of such an infrastructure may be described as an environment that supports and enhances interactions among research scientists and engineers, business groups, sponsors, and public sector policy makers. The infrastructure is a networking of nodes such as databases of core business groups and technology needs, databases of technology suppliers, secondary networks (e.g. networks of subsidiary groups and centres of excellence) for information dissemination, libraries and resource centres, technology transfer and patenting assistance centres, and international development agencies. The need for an electronic-based technology information network is a priority in a competitive environment that ASEAN is entering. It is envisaged that the ASEAN network will not only be an effective link among ASEAN COST's subsidiary groups and centres of excellence but also a gateway to international S&T and industrial databases.

Actions:**4.1. Develop an ASEAN technology information network.**

An ASEAN technology information network will allow centres of excellence, universities, R&D organizations and existing networks to be linked together to receive and share information relating to R&D, business developments, research funding, technology transfer, and R&D manpower availability. Moreover, in order to meet the demands of today's fast-moving R&D and technology-intensive business environments, access to international networks and databases is a necessity. Thus links to BITNET, INTERNET and other regional and international S&T and industry networks should be established.

4.2. Establish a technology database of ASEAN business groups.

This activity can be a joint effort between ASEAN COST and the various national associations of manufacturers, small and medium enterprises/industries, and chambers of commerce. In fact, much of the industry data concerning business type, address and contact, and technology focus and product, are already published and in some cases updated annually. These sources of information form the starting point for the database.

The database should be updated frequently by subsidiary groups and centres of excellence. Secondary level information, preferably accessible only to ASEAN COST and its subsidiary groups and programme participants, concerning procurement, technology and materials suppliers, technology needs, R&D activities, manpower profile and training needs, and participation in aid-funded projects should progressively be included.

4.3. Establish a database of ASEAN S&T expertise and facilities.

In support of a more proactive approach in managing ASEAN's S&T programmes and resources and also in line with the need to promote strategic linkages with industry, ASEAN COST should establish an on-line database of ASEAN technology expertise and facilities. The database should cover capabilities and facilities of centres of excellence, universities, key research organizations in ASEAN and in Dialogue Countries. In addition, information on international aid and UN agencies, development banks, venture funds, and foundations should be included.

The level of information required will progressively be determined as the database becomes operational. Again, the updating process must rely heavily on inputs from subsidiary groups and centres of excellence. The database is meant to be largely accessible to industry and outside users.

4.4. Establish a technology scan mechanism.

Compilation of information on Dialogue Partners as well as other relevant countries relating to their S&T capabilities, core businesses of their industry, their market access and major trading partners, existing linkages with ASEAN counterparts, previous experiences, potential for providing training to ASEAN nationals, prospects and modes for joint technology exploitation, and modalities for project financing and management must be carried out. In essence, a continuing Dialogue Partner watch focusing on technology and industry needs to be organized.

At periodic intervals, ASEAN COST should mount country visits to appreciate the situation first hand and to establish contacts with key persons and agencies. ASEAN COST and its subsidiary groups in conjunction with the Functional Cooperation Bureau of the ASEAN Secretariat should look into how the responsibility of information gathering and the scan mechanism could be implemented. The technology watch programme once initiated should be extended to cover the global technology market.

STRATEGY 5:**Promoting institution-industry technology transfer**

Resources to be developed by ASEAN COST and its subsidiary groups should be made available to ASEAN's private sector in order to assist industry effect beneficial technology transfer from overseas. More importantly, under this strategy, ASEAN COST should develop mechanisms and infrastructure for intra-ASEAN institution-industry technology transfer.

Actions:**5.1. Establish mechanisms for technology transfer.**

One of the major impediments to industry technological upgrading is the

failure to effect technology transfer between the R&D "performer" and the potential technology user. This activity is aimed at developing capabilities as well as creating an effective channel for technology transfer between ASEAN's subsidiary groups and centres of excellence and industry taking into account that technology transfer is often country to country and industry to industry.

This activity should become part of a network of centres in various member countries. It is envisaged that such technology transfer centres will eventually be found in all member countries. ASEAN COST should provide support for such centres within its network of subsidiary groups and centres of excellence to assist ASEAN COST in negotiating R&D collaborative activities with industry, sourcing technology and human resource, drawing up Memoranda of Understanding and agreements, and licensing of technology.

5.2. Establish a set of incentives to encourage technology commercialization and mobility of S&T human resource.

It is proposed that ASEAN COST institute a set of incentives that subsidiary groups and centres of excellence can avail of to promote institution-industry technology transfer and commercialization. The incentives can include, among others, matching funding support for R&D collaborative activities receiving industry funding; and sharing of royalties arising from licensing and sale of intellectual property and know-how among subsidiary groups and S&T human resource.

STRATEGY 6:

Promoting S&T awareness

Because ASEAN is made up of developing economies, there is inadequate public awareness of the contributions of S&T to the economic development of member countries and ASEAN.

Undoubtedly, ASEAN's industrial competitiveness as well as S&T development into the next century is contingent on its ability to attract bright young men and women to take an active interest in its S&T enterprise and to augment the R&D manpower pool. As such, every possible means should be mobilized to educate and interest the general public to the challenges and rewards of a career in science and technology, particularly, in research and development. At the same time it is also important to accord recognition to scientists, technologists and engineers who have made outstanding achievements or contributions to the progress and development of S&T.

Actions:

6.1. Recognize the contributions of individuals and corporations to ASEAN's scientific and technological endeavours.

In order to instill public awareness and commitment and further encourage participation, ASEAN COST must take steps to accord appropriate recognition to those who make significant contributions to regional economic development through science and technology. The major focus should be on people; those who manage S&T development and R&D, the implementors of R&D, and the sponsors. Public recognition of the people behind ASEAN's drive up the technological ladder must be made to create prestige in the profession and a sense of dedication to the regional cause, especially now when national governments are in accord on the establishment of ASEAN as a global trading force.

Besides recognizing public sector contributors through the ASEAN S&T Medal, recognition should be extended to private sector individuals whose contributions have benefitted the regional economy or are about to give ASEAN a technological advantage. Corporations can similarly be honoured for their sponsorship and participation in S&T developments and R&D leading to product development, process improvement, the creation of technology-intensive businesses, and international market penetration. In addition, companies and individuals that contribute to the breaking down of technological barriers to intra-ASEAN trade should similarly be honoured.

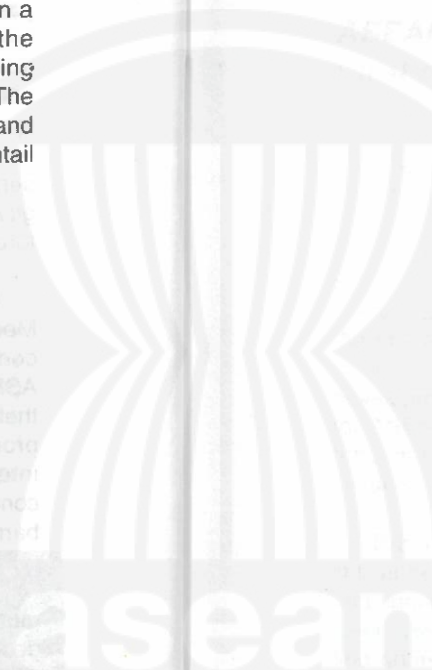
The ASEAN Science and Technology Week will provide an excellent platform for honouring the contributions of individuals and corporations described above and for enhancing public awareness of the benefits of the ASEAN science and technology enterprise.

6.2. Publish an ASEAN S&T newsletter/magazine.

ASEAN COST should continue to publish the ASEAN Journal on S&T for Development. It should also publish an ASEAN S&T newsletter for information dissemination rather than as an amalgamation of publications of its subsidiary groups. This will allow subsidiary groups to continue to focus on respective technology areas and derive innovative ways of increasing subscribers.

6. CONCLUSION

The economies of ASEAN countries have as a whole registered favourable growth rates during the past few years. This trend is likely to continue in the foreseeable future as the countries industrialize and as the implementation of the ASEAN Free Trade Area gets underway. S&T will play a pivotal role as both a cause and effect in these processes. In order for ASEAN to maintain a competitive edge in the global economic arena, it is crucial that the development of S&T in the region be actively promoted. The foregoing strategic ASEAN Plan of Action on S&T addresses this critical issue. The objectives of the Plan could be achieved only through the commitment and support of the governments of ASEAN member countries which would entail provision of sufficient resources from both within and outside of ASEAN.



ASP-5 SUB-PROGRAMME ON TECHNOLOGY

SUB-PROGRAMME ON TECHNOLOGY

ASEAN - UNDP Sub-Regional Programme for the Fifth Cycle (ASP-5)

Cooperation in science and technology (S&T) among ASEAN Member Countries has been a continuing and significant theme throughout ASEAN's history. Ever since its formation in 1967, the Heads of Governments of ASEAN have emphasised this important aspect at its various Summit Meetings. Economic growth rates in the ASEAN region have been fairly high in recent years and is predicted to continue at this level in the foreseeable future due to the process of industrialisation and the increase in trade liberalisation brought about by establishment of the ASEAN Free Trade Area (AFTA). The development and application of S&T then becomes even more crucial in order for ASEAN to stay competitive in the global economic arena and at the same time maintain an economically, socially and environmentally sound and sustainable development in the region.

The 1994 ASEAN Plan of Action on Science and Technology stresses the critical need to further enhance and intensify S&T cooperation within the region and identified six strategies and twenty supporting actions to achieve the objectives that have been stated. In order to operationalise the Plan of Action and address some of the other key issues described in the Plan, ASEAN has received UNDP assistance under the ASEAN-UNDP Sub-Regional Programme for the Fifth Cycle (ASP-5). The Technology Sub-Programme of ASP-5 is to be implemented through four interlinked sub-programme elements, namely:

- | | |
|-------------|---|
| Element I | Operationalisation of the 1994 ASEAN Plan of Action on Science and Technology |
| Element II | ASEAN Science and Technology Management Information System |
| Element III | Public-Private Collaboration in Regional Science and Technology Development |
| Element IV | Technology and Environment |

The first Sub-Programme element is intended to develop the operational plan and work programme for the Plan of Action as mandated by the ASEAN Ministers for Science and Technology at their Sixth Meeting held in Manila in February 1994. This would also include the formulation of alternative financing schemes for implementing the proposed ASEAN S&T activities particularly through self-reliant/cost-sharing mechanism which has been adopted by the Ministers as the primary funding modality.

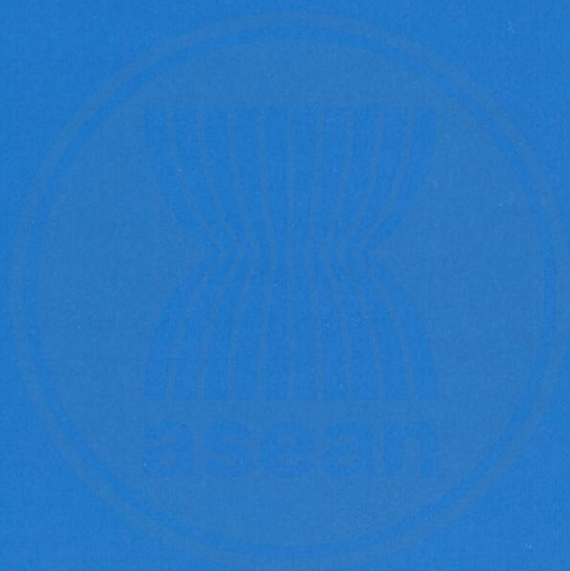
The second Sub-Programme element addresses the need for the ASEAN Member Countries to enhance their capacity to collect and analyse existing and new S&T indicators through the development of a computer-based management information system. This would also entail the adoption of a common methodology from which a synthesised and standardised system of S&T indicators for the ASEAN region can be compiled. These indicators would then be published periodically as a series. Training associated with both the hardware and software aspects of the installed system would also be conducted.

The third Sub-Programme element aims to lay the groundwork for strengthening public-private cooperation in S&T development within the ASEAN region. A study would be undertaken to identify the barriers and opportunities for public-private collaboration in regional S&T activities together with a set of recommendations to address the situation. Associated with this analysis would be a package of proposals to specifically motivate and stimulate increased public-private interaction in S&T development among ASEAN Member Countries.

The fourth Sub-Programme element attempts to promote ASEAN regional cooperation in enhancing scientific understanding of the dynamics of natural resources and environmental systems as well as the processes and technologies available to overcome problems associated with pollution and waste management. Similar to the approach taken in the third Sub-Programme, an assessment would be conducted to identify the constraints and opportunities that the public and private sectors in ASEAN face in using environmentally sound technologies. A set of proposals would then be developed to intensify regional collaboration on research and development, transfer, adaptation and generation of pollution and other waste mitigative processes and other environmentally sound technologies.

The Technology Sub-Programme under ASP-5 is expected to be implemented over a period of 30 months with inputs from UNDP in the order of approximately US\$ 500,000. Inputs from ASEAN would mostly be in-kind contributions such as staff time, office space and other logistical support.





*Published by the ASEAN Secretariat
70 A Jalan Sisingamangaraja
Jakarta 12110, Indonesia*

ASEC Resource Centre