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Regional Programme of Action for the
Protection of the Marine Environment of the
East Asian Seas from the
Effects of Land-based Activities

UNITED NATIONS ENVIRONMENT PROGRAMME

2000

EAST ASIAN SEAS REGIONAL COORDINATING UNIT
GPA COORDINATION OFFICE

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The Global Programme of Action for the Protection of the Marine Environment from Land-based Activities
GPA Co-ordination Office
P.O. Box 16227
2500 BE The Hague

Visiting address:
Vuurtorenweg 35-37,
The Hague,
The Netherlands

East Asian Seas Regional Coordinating Unit (EAS/RCU)
Rajdamnern Avenue,
Bangkok, 10200, Thailand

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East Asian Seas Regional Coordinating Unit, Bangkok

Additional copies of this and other publications of the Global Programme of Action can be obtained from:

GPA Co-ordination Office
United Nations Environment Programme
P.O. Box 16227
The Hague
The Netherlands

Telephone: (31 70) 311 4460
Fax: (31 70) 345 6648
Email: gpa@unep.nl

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1. Introduction

Human activities on land are a major threat to the health, productivity and biodiversity of the marine environment. About 80 per cent of all marine pollution is caused by human activities on land in the form of sewage disposal in rivers and coastal waters; urban storm-water run-off; sediment mobilisation; inadequately treated waters from industries; discharges of phosphorus and nitrogen used in agriculture; and finally, dumping of heavy metals and persistent organic pollutants. Ship-based sources contribute relatively small amounts, but may have severe impacts when large volumes are released such as during major oil spills.

The Global Programme of Action for the Protection of the Marine Environment from Land-based Activities (GPA/LBA) was adopted on 3 November 1995 by 109 Governments and the European Commission at the Intergovernmental Conference in Washington D.C., 23 October - 3 November 1995 (UNEP(OCA)/LBA/IG.2/7). The Global Programme of Action (GPA) aims to prevent the degradation of the marine environment from land-based activities by making States aware of their duty to preserve and protect the marine environment. It is designed to assist States in taking actions that will lead to the prevention, reduction, control and/or elimination of the degradation of the marine environment, as well as to its recovery from the impacts of land-based activities. The GPA is designed to be a source of conceptual and practical guidance for national and/or regional authorities to draw upon in devising and implementing sustained action to prevent, reduce, control and/or eliminate marine degradation from land-based activities.

2. Development of the Regional Programme of Action

At the Regional Workshop on Implementation of the GPA for the Protection of the Marine Environment from Land-based Activities in the East Asian Seas (Cairns, Australia 30 April - 3 May 1997) each country presented a draft national overview detailing problems, solutions, barriers, assistance needed and regional co-operation required for the preparation of national/regional programmes of action on land-based activities. The problems identified appear as Annex I. The meeting recognised the similar problems faced by each country in the region, and proposed that a regional overview on the sources and activities affecting the marine, coastal and associated freshwater environment in the East Asian Seas be completed on the basis of information provided during the meeting.

A further outcome of the Cairns meeting was the "Draft Regional Programme of Action for the Protection of the Marine Environment of the East Asian Seas from the Effects of Land-based Activities".

At the Thirteenth Meeting of the Coordinating Body on the Seas of East Asia (COBSEA) in Bangkok, Thailand, 18-19 November 1998 two documents were presented for endorsement; "Land-based Sources and Activities Affecting the Marine Environment in the East Asian Seas: An Overview" *UNEP (WATER) / EAS IG. 9/4 Annex 1* and "The Draft Regional Programme of Action for the Protection of the Marine Environment of the East Asian Seas from the Effects of Land-based Activities".

The meeting provided comments and suggestions on the two draft documents, and instructed the EAS/RCU to reconcile the documents; and add additional information forthcoming from the meeting of the Commission for Sustainable Development (April 1999). In addition, it was recommended that the documents make reference to the Transboundary Diagnostic

Analysis (TDA) and Strategic Action Plan (SAP) for the South China Sea; documents prepared as preliminary work for the proposed GEF project "Reversing Degradation trends in the South China Sea".

Land-based Sources and Activities affecting the Marine Environment in the East Asian Seas – An Overview is a complementary document to this Regional Programme of Action.

3. Rationale for Developing a Regional Programme of Action for the East Asian Seas Region

The Global Programme of Action specifies objectives and actions at National, Sub-regional, Regional and International levels. Specifically, regional and sub-regional co-operation and arrangements are considered "crucial for successful actions to protect marine environments from land-based activities". The objectives of the GPA on the regional level are to "strengthen and, where necessary, create new regional co-operative arrangements and joint actions to support effective action, strategies and programmes for:

- (a) Identification and assessment of problems;
- (b) Establishment of targets and priorities for action;
- (c) Development and implementation of pragmatic and comprehensive management approaches and processes; and
- (d) Development and implementation of strategies to mitigate and remediate land-based sources of harm to the coastal and marine environment".

Further rationale for adopting a Regional Programme of Action comes from information on marine pollution from the East Asian Seas Region. Pollutants from

land-based activities greatly affect the marine environment in the region, in particular in coastal areas. In the Transboundary Diagnostic Analysis (TDA) of the South China Sea, (*UNEP SCS/TDA Ver. 4*), wastes from domestic, agricultural, and industrial sources, along with sediments and solid wastes were identified as the major sources of pollutants that impinge on both freshwater and coastal systems in the seven countries).

The main sources of pollution and their perceived contribution to the state of marine environments of the participating countries in the South China Sea as well as the quality of the database available in each country is summarised in ANNEX II.

The TDA for the South China Sea also indicates that pollution generated from land-based activities has a transboundary effect in the region as pollutants are transported from one place to another; mainly through international rivers, atmospheric deposition and by sea circulation such as along the shared Sunda shelf. Annex III summarises the transboundary pollution issues among the TDA-participating countries. Economic activities such as coastal tourism and the trade of waste are anthropogenic agents of pollution transport across national boundaries.

Currently a very poor database exists for atmospheric inputs in the East Asian Seas region. For this reason and because their impacts are harder to establish given the nature of atmospheric chemistry and the larger scales needed to carry out appropriate studies of air sheds they may seem innocuous. It must be pointed out however, that atmospheric pollutants are most potent in being transported across national boundaries.

No projects or activities proposed in the documents will be implemented in the disputed areas. All activities should not directly or indirectly affect and/or prejudice the state sovereignty and the land and waters integrity of the member states of the COBSEA.

When any project or action is to be implemented, the project implementation plan in detail will be circu-

lated to all the participating states for consideration. Any project or action should be carried out only based upon consensus by all the participating states through consultation.

Further development of the projects and activities included in the document should take into account the priorities within this region: those easy to implement proceeding prior to the difficult ones acting in line with all the participating states' abilities and highlighting the key points.

4. Objectives of the Regional Programme of Action for Land-based Sources of Marine Pollution

The East Asian Seas Regional Programme Of Action (RPA) will focus on the regional objectives of the GPA, with special emphasis on problems in the East Asian Seas Region. The objectives of the RPA are:

- Identification of the regional problems of pollution from land-based activities, with reference to the relevant sections of the Transboundary Diagnostic Analysis for the South China Sea and the National Overviews of the Effects of Land Based Activities on the Marine Environment;
- Establishment of regional priorities. To achieve this objective, it is important to provide scientific information based on existing knowledge, and, where necessary, obtain more information by carrying out monitoring and research activities;
- Development and implementation of management approaches and processes

- Implementation of the activities identified in this RPA to mitigate and remediate land-based sources of harm to the coastal and marine environment in the region.
- Development of pilot projects to demonstrate implementation of the RPA and to provide experience and knowledge for the entire region.

5. Priority Sources of Marine Pollution in the Region

The land-based sources of marine pollution of main concern in the region were assessed by participants at the Cairns workshop and by the Transboundary Diagnostic Analysis (TDA) for the South China Sea. This assessment at the workshop included a consideration of the relative importance of impacts upon food security, public health, coastal and marine resources, ecosystem health and socio-economic benefits. The land-based sources of marine pollution were ranked in priority order, as follows:

- (i) Sewage;
- (ii) Agriculture;
- (iii) Industry;
- (iv) Urban runoff; and
- (v) Habitat modification.

5.1 SEWAGE

About 6 million tons of Biological Oxygen Demand (BOD) are generated by the coastal population of the 7 participating countries of the South China Sea alone (Table 5.1). Of this, only 11% is removed by sewage treatment in four countries. Assuming the same population growth rates prevail up to 2005, the generated BOD will increase to 6.6 million tons. If the amount removed by sewage treatment is not significantly increased from the current insignificant

level of 11%, the coastal waters of the Sunda Shelf from the Indo-China Peninsula to Malaysia and Indonesia, across to the western Philippines may become eutrophic and anaerobic.

Discharges of untreated or partially treated domestic sewage, runoff from unsewered urban areas and discharges from tourist and recreational facilities were identified as the main sources of sewage in the region. Sewage increases the levels of nutrients, suspended particulate matter and human pathogens in coastal waters. The environmental effects of discharges of untreated or partially treated sewage to the marine environment are common issues facing the COBSEA member governments and the growth of mega-cities in the region poses a significant additional threat to the marine environment.

Recognising variation in local conditions, domestic sewage improperly discharged to freshwater and coastal environments may present a variety of concerns. These are associated with:

- (i) pathogens that may result in human health problems through exposure via bathing waters or through contaminated shellfish;
- (ii) suspended solids;
- (iii) significant nutrient inputs;
- (iv) biochemical oxygen demand; and
- (v) persistent pollutants such as POPS, plastics, and heavy metals which contribute to cumulative and transboundary marine degradation. All have serious deleterious ecological consequences.

One area of particular concern is the apparent increase in the frequency of toxic algal blooms which may be related to changes in nutrient inputs from anthropogenic activities and a sign that points to the environment having its assimilative capacity exceeded. While science still has to determine the mechanisms behind the dynamics of blooms, which occur both in polluted and pristine areas, the role of nutrients in enhancing primary production has been known since the 1890's.

Table 5.1. Generation of Biological Demand (BOD) by Participating Countries

Country ¹	South China Sea Population ² (x 10 ³ persons) (% National)	Population in cities (x 10 ³ persons) (% South China Sea population)	Pop growth rate (%) ³	BOD generated (10 ³ ton/yr) ⁴	BOD removed by sewage treatment ⁵ (10 ³ ton/yr)
China	59,694 (5%)	21,031 (35%)	1.6	1,089.4	<10%
Indonesia	105,217 (50%)	>50,161 (48%)	2.9	1,920.2	364
Malaysia	10,336 (51%)	1,527 (15%)	3.3	188.6	53
Philippines	23,633 (31%)	6,342 (27%)	2.1	431.3	149
Thailand	37,142 (62%)	0	1.4	677.8	89
Vietnam	75,124 (100%)	2,144 (3%)	1.6	1,371.0	No treatment
Total	313,131 (19%)	>82,980 (>27%)	1.4	5,714.5	655
2005	360,000			6,500.0	722 (1995 level of treatment)
Data for other member states of COBSEA is not available at present stage.					

¹Only populations of subdivisions interacting with the South China Sea were included, and were recalculated to 1996 using growth rates in third column.

²Total population for all South China Sea subdivisions in a country was obtained.

³Average population growth rate for all South China Sea subdivisions in a country was obtained using a weighted mean method.

⁴Estimated BOD production using 0.05 kg/per/day (Economopoulos, 1993)

⁵Reference Koe and Aziz, 1995.

5.2 AGRICULTURAL RUN-OFF

Waste generated by agriculture and aquaculture and which enters water bodies in a diffuse mode, makes up the second most important group of pollutants in the seven countries bordering the South China Sea (TDA for the South China Sea) and in the East Asian Seas region (Koe and Aziz 1995). Run-off is a source of sediment mobilisation through soil erosion from deforestation (Table 5.2) and land clearing; nutrients from fertilisers, animal and aquaculture wastes, and POPs from pesticides. The countries of the region generally have high rainfalls that generate significant land run-off and large river systems.

Suspended solids are perceived to be a major pollutant of coastal waters and have immediate observable impacts on aquatic systems, such as the smothering of coral reefs, and burial of macrophytes like seagrasses and seaweeds. Very little quantitative data is available in terms of the actual sediment load that has entered aquatic systems in the region, and little information was obtained from the national reports at the Cairns workshop. Rates of shoaling can be used as indicators of sediment deposition, but again, these represent net accumulation of both human-induced and naturally-caused particle movements.

About 10 million tonnes of fertiliser are used in countries of the South China Sea annually (TDA for the South China Sea). Nutrients in agricultural run-off include all the bio-available forms of nitrogen and phosphorus. Though the major nutrients are relatively

simple variables to quantify, it is difficult to distinguish between natural and anthropogenic sources and to identify and quantify non-point sources of these substances. The major effect of excessive nutrient inputs is the promotion of primary productivity that can lead to eutrophication

Pesticides (fungicides, herbicides and insecticides) are applied to enhance plant growth and the production of cultured organisms, by eliminating their competitors, predators and parasites. Pesticide use in the East Asian Seas region is extensive; with about 120,000 tonnes of pesticides used by countries of the South China Sea annually. China reports using about 89,423 tons in its South China Sea areas in 1995 while Indonesia used about 29,000 tons annually during the period from 1992-1996. Detecting the presence of the pesticides in aquatic environments requires expensive analytical equipment which most government laboratories in the region cannot afford. However, it is critical to establish pesticide concentrations in waters adjoining intensive farming areas before levels rise to critical concentrations that can decimate biodiversity and productivity in aquatic systems.

The continued use of pesticides may lead to the build up of persistent organic pollutants (POP's), and resistance among target species, making population growth less controllable. Furthermore, non-target species that are critical to ecosystem function may be affected by pesticide use. Pesticides also have a host of adverse effects on humans including carcinogenic effects.

Table 5.2. Land clearance in selected countries in the East Asian Seas region

Country ¹	Land area (10 ³ km ²)	Forest area (% of land)			Clearance rate with reforesta- tion (km ² /y)	Annual round- wood production (10 ³ m ³)	Annual average reforestation (km ²)
		1981	1986	1989			
<i>Year</i>	<i>1989</i>	<i>1981</i>	<i>1986</i>	<i>1989</i>		<i>1985-87</i>	<i>1980's</i>
Australia	7,618	13.9	13.9	13.5	3,189	19,907	620
Malaysia	329	66.0	60.0	57.8	3,122	32,000	250
Indonesia	1,812	75.0	72.5	60.0	32,335	158,075	1,640
Philippines	298	31.0	24.5	21.5	2,516	35,822	630
Thailand	511	47.0	35.0	28.0	11,826	36,900	310
Data for other member states is not available at present stage							

Source: Agenda 21-Indonesia 1997

In the past, the use of pesticides was promoted by chemical manufacturers and the International Monetary Fund through a programme called the "Green Revolution" in the 1960's (Agenda 21-Indonesia 1997). Consequently, governments provided farmers with subsidies to buy pesticides, which in some cases were banned in the countries where they were manufactured, e.g. DDT and chlordane. Integrated pest control programmes have been implemented in a number of countries, and the use of pesticides should be reduced to minimal levels.

5.3 INDUSTRIAL WASTE

Industry and mining activities produce by-products and wastes including significant amounts of POPs, oils, heavy metals, nutrients (nitrogen and phosphorous), suspended solids and hazardous wastes.

Industry wastes include those from industrial incinerators, power plants, dredging and discharges of oil and contaminants from factories, and river transportation facilities. Hazardous and toxic pollutants include paint and colour agents, organic solvents and other by-products of industrial manufacturing or processing. Hazardous wastes are products having one or more of the following features: explosive, inflammable, reactive, disease-causing, corrosive, and/or toxic (based on toxicological tests).

The assimilative capacity of an ecosystem to human-made toxins, e.g. PCB's or POP's, is zero. This means that none of these substances should be dumped in the sea.

5.4 URBAN RUN-OFF

Urban run-off contains significant amounts of sediment, solid waste, hydrocarbons (oils), heavy metals, POPs and nutrients.

Table 5.3. Solid waste from domestic sources

Country ¹	Population of South China Sea subregions x 10 ⁵ (% of national)	Estimated solid waste (10 ³ t/y) (at 0.6 kg/person/day)	Reported values of solid waste from domestic source (10 ³ t/y)	Percent disposal at authorized disposal sites (1989) ¹
Cambodia	1,985 (18%)	435	560	No data
China	59,694 (5%)	13,073	No data	No data
Indonesia	105,217 (50%)	23,042	22,899	60%
Malaysia	10,336 (51%)	2,264	1,924	65%
Philippines	23,633 (31%)	5,176	1,330	70%
Thailand	37,142 (62%)	6,134	482	40%
Vietnam	75,124 (100%)	16,452	No data	No data
Total	313,131 (19%)	66,576		
2005	360,000	78,804		
Data for other member states is not available at present stage				

¹Source: Koe and Aziz 1995.

Solid wastes are generated by domestic and industrial activities. Although the composition of solid waste from domestic sources is mostly organic (putrescible) and paper, its decomposition rates are slow. In addition some solid waste is not biodegradable, e.g. plastics, metals and glass. When solid wastes such as plastic bags reach aquatic systems, they are sometimes mistaken as a food source by some marine animals causing on often slow and painful death. Solid wastes also reduce the aesthetic value of beach and underwater scenery for coastal tourism.

5.5 HABITAT MODIFICATION

Habitat modification results from land clearance and deforestation for aquaculture, port, urban, industrial, and resort development; logging, mining, and the damming of rivers. In the South China Sea Region, 69% of mangrove forests have been lost while in the South East Asian region, 82% of Coral Reefs are considered degraded. The area of seagrass beds lost in the region is unknown due to a lack of information on seagrass coverage (Taluae-McManus 1999).

6. Protection of the Marine Environment From Land-based Sources of Pollution - Guiding Principles

During the Cairns RPA workshop the following were identified as principles that should be followed to address the impacts of land-based activities on the marine environment in the region.

- (i) the need to address the priority sources of pollution in the region;
- (ii) the importance of regional co-operation, national co-ordination and stakeholder involvement in creating and implementing solutions; and
- (iii) the need to develop supporting systems to facilitate regional, sub-regional and national implementation of agreed pollution mitigation strategies and actions.

The need to address priority Land-based sources of Marine pollution

To address priority sources of marine pollution there is a need for:

- (a) information on monitoring activities and results, both for discharges and quality of receiving waters, to trigger priorities;
- (b) an understanding of the impacts of pollutants on marine and coastal habitats, including waters and sediments.
- (c) adoption of management principles which are compatible across the region taking into account (a) and (b) above and the varying levels of development and environmental variation among COBSEA member countries;
- (d) development of national legislative support to implement the Regional Programme of Action, taking into account the varying levels of development and environmental variation among COBSEA member countries;
- (e) integrated catchment and coastal planning;
- (f) integrated planning for siting and operation of infrastructure, particularly in pollution sensitive areas;
- (g) promotion of the economic and environmental benefits of cleaner production to industry and consumers;
- (h) wide cross-sectoral participation in the implementation of the Regional Programme of Action;
- (i) the participation of experts and convening of technical workshops in the implementation of the Regional Programme of Action.

The importance of Regional Co-operation/National Co-ordination and Stakeholder Involvement

The Regional Programme of Action recognises the need to work at the regional, sub-regional and national levels, simultaneously, to most effectively address the priorities of land-based sources of marine pollution. At the national level, there is a need for each government in the region to improve co-operation among the different tiers of government that exist within their respective systems.

In addition to working at a multi-lateral government level, co-operation and consultation with private enterprise involved in pollution reduction and substantial involvement of the community can improve the strategies developed to address land-based activities and the actions taken to implement pollution reduction.

Developing appropriate support systems to facilitate regional, sub-regional and national implementation of agreed pollution mitigation strategies and actions

In developing strategies and actions to address land-based sources of marine pollution, it was agreed at the Cairns workshop that a series of common tools or support systems be used in addressing the priority problems in the region. These support systems, which apply to actions at the regional, sub-regional and national levels are:

- (i) relevant, high-quality data and information;
- (ii) ongoing monitoring and review;
- (iii) public education and awareness raising;
- (iv) legislative support and enforcement;
- (v) integrated planning;
- (vi) economic incentives;
- (vii) compatible regional standards;
- (viii) innovation, research and development for meeting regional needs;
- (ix) technology transfer.

7. Proposed Actions

This section will describe the proposed actions, management objectives, ancillary actions necessary to address each of the priority land-based sources of marine pollution in the East Asian Seas region and identifies the party(s) responsible for undertaking each action. A summary of the proposed actions appears as Table 7.1

7.1 GENERAL PRIORITIES

1. Assess information on the results of monitoring activities in the region, for both discharges and receiving waters, to trigger priorities. Relevant information from other organisations should be collected, such as the Strategic Plan for the Assessment and Prediction of the Health of the Ocean: A Module of the Global Ocean Observing System. Initiate a regional pilot project to demonstrate the priority actions.
2. Review research conducted on the impacts of pollutants on marine and coastal habitats, including waters and sediments. In order to implement the other proposed actions, information on the fate of pollutants once they arrive in the marine and coastal habitats is required. In addition information is required on the physical, chemical and biological impacts of these pollutants on marine and coastal habitats.

7.2 PRIORITY SOURCE: SEWAGE AND URBAN RUN-OFF (WATER RECYCLE MANAGEMENT)

It is anticipated that a Regional Agreement be established to deal with (i) Water Recycle management, and (ii) Criteria and Standards for release of sewage and urban run off into waterways, and a Regional Action plan developed accordingly. To implement such an agreement a Regional Action Plan is required.

The establishment of a Regional Agreement will ensure the co-operative basis necessary for achieving the objective of reduction in the impact of sewage on the seas of East Asia to within ecological acceptable limits.

Action S1 Establish a data and information network to link with the GPA Clearing House, based on the existing monitoring network in the region.

Objectives

To determine:

- (i) the discharge quality and quantity of sewage in the region based on information collected by each participating country;
- (ii) the assimilative capacity of the ocean to absorb waste in key areas; and
- (iii) scientific information on further actions to be taken to address the problem.

Ancillary action

- (i) Establish a regional database network by accessing existing information and relevant monitoring and co-ordinating the databases in the Region. The expected outputs are:
 - Information on the environmental condition of regional seas;
 - Information of the status of waste water recycle management in each country;
 - Possible solutions to address environmental problems of the Region.
- (ii) Conduct a survey and report on sewage disposal and treatment in each country (population, service, loads, discharge standards, projections, national sewage policies, socio-economic effects); Prepare a survey format/questionnaire for distribution to the participating countries in the region; Analyze the responses obtained from the survey form/questionnaires; and Provide a report.

Responsibility

Participating countries; EAS/RCU in consultation and co-operation with existing environment databases.

EAS/RCU, participating countries, and consultant if necessary.

(iii) Prepare a Regional report on the status of sewage management and treatment in each COBSEA country. This could be conducted by a questionnaire survey (achievable within 1 year).

EAS/RCU; Participating countries

(iv) Undertake a documentary study of data on the quantity and quality of urban run-off in the Region (achievable within 2 years) and put this in the database network.

Participating countries; EAS/RCU, consultant if necessary

Action S2 Establish the necessary infrastructure for enhancing the exchange of scientific information on sewage discharge and its impacts on the marine environment, marine habitats and human health.

Objectives

- (i) Enhancement of the level of existing scientific and technical knowledge on the discharge of sewage, including; sources of sewage, quantity of discharge, its route to the marine environment, monitoring methods and its impact on human health;
- (ii) Establishment of a regional network for exchanging scientific information and knowledge with regard to monitoring, research and control of sewage discharge.

Ancillary Action

- (i) Establish a regional scientific task force to model the sensitivity of each region;
- (ii) Identify the requirements for a monitoring network in the region, based on the existing network to monitor the discharge of sewage to the rivers, and finally to the marine environment;
- (iii) Provide regular reports on the status of sewage discharge and its impact on the marine environment and habitats;
- (iv) Develop a programme to identify major pollution sources;
- (v) Convene a conference to identify innovative solutions and options for urban *waste water recycle management*.

Responsibility

National institutions, EAS/RCU, and co-operating agencies and programmes, e.g. HOTO Panel.

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Action S3 Reduce the discharge of sewage using treatment systems for the key sources, with potential technical transfer to other sewage sources.

Objectives

- (i) Introduction of waste treatment systems or recycling to all sources where sewage is discharged;
- (ii) Provision of the necessary technology for re-cycling water for other uses; and
- (iii) Reduction of damage to the environment by sewage discharge.

Ancillary action

Responsibility

- | | |
|--|--|
| (i) Promote primary and secondary treatment of municipal sewage discharged to rivers, estuaries and the sea; | Participating countries, private sectors, NGOs and EAS/RCU |
| (ii) Promote and control the efficient operation and proper maintenance of existing treatment facilities; | Participating countries, private sectors, NGOs and EAS/RCU |
| (iii) Promote the reuse of treated effluents for the conservation of water and nutrient resources. | Participating countries, private sectors, NGOs and EAS/RCU |

Action S4 Assistance in establishing national regulation on sewage discharge in order to protect marine environments in the region.

Objectives:

- (i) Development and implementation of national regulations on sewage discharge into rivers and seas;
- (ii) Establishment of a regional network for the exchange of legal instruments and, where appropriate, co-operation in the preparation, updating and adoption of necessary regulations;
- (iii) Provision of assistance in achieving necessary action for enforcing the regulations in the countries of the region.

Ancillary actions

Responsibility

- | | |
|---|--|
| (i) Update and adopt national regulations concerning sewage discharges into the sea and rivers, and develop national plans and programmes for the environmentally sound management of sewage; | National institutions, EAS/RCU, and consultants if necessary |
|---|--|

- | | |
|--|--|
| (ii) Assist in upgrading the capability of preparing and enforcing relevant regulations; | National institutions, EAS/RCU, and consultants if necessary |
| (iii) Facilitate consultation, if necessary, on sewage discharge where transboundary problems exist; | National institutions, EAS/RCU, and consultants if necessary |

7.3 PRIORITY SOURCE: AGRICULTURAL RUN-OFF

The general targets for this priority source are to reduce the outputs of nutrients and suspended solids from agriculture and aquaculture practices and to introduce the sustainable use of seeds, fertiliser and pesticides.

Action A1 Establish a data and information network to assess the quantities and types of fertilisers used and the quantity of solid and liquid manure produced by farm animals and aquaculture

Objectives

To determine:

- (i) the quality and quantity of agricultural run-off in the region based on information collected by each participating country;
- (ii) the assimilative capacity of the ocean to absorb discharge from the rivers in key areas;
- (iii) scientific information on further actions to be taken to address the problem

Ancillary action

- (i) Quantify the nutrient load lost from agriculture, either from the use of large quantities of fertilisers, or the production of high amounts of solid and liquid manure by farm animals and aquaculture, based on the existing data and information;
- (ii) Identify the gaps in knowledge of discharges of nutrients and suspended solids from agriculture and aquaculture sources in the region;

Responsibility

National institutions, EAS/RCU, and consultants if necessary.

National institutions, EAS/RCU, and consultants if necessary.

- (iii) Exchange data and information on a regional level between the participating countries particularly focussing on transfer of techniques for monitoring agriculture and aquaculture pollutant loads in the marine environment.

National institutions, EAS/RCU.

Action A2	Promote the rational use of fertilisers and reduce the losses of nutrients by the misuse of inorganic fertilisers and manure
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Objectives

- (i) Upgrading of knowledge on the rational use of fertilisers in order to reduce the discharge of nutrients to rivers and the marine environment;

Ancillary action

Responsibility

- (i) Establish regional and national guidelines on the use of fertilisers and environmentally sound agriculture practices.

National institutions, EAS/RCU

Action A3	Establish sediment load targets with regard to the sensitivity of the receiving environment; develop integrated catchment plans to achieve the targets and implement these plans followed by a timely review of their impacts
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Objectives

- (i) Reduction in the sediment load in rivers and the marine environment;

Ancillary action

Responsibility

- (i) Develop and Implement National and Regional catchment plans incorporating guidelines for the activities of agricultural, forestry and engineering practices.

National institutions, EAS/RCU.

- (ii) Review the impact of plans on the sediment load in rivers and marine environment.

National institutions, EAS/RCU, and consultants if necessary.

Action A4 Assist Participating countries in Developing, promoting and implementing their integrated pesticide management plans

Objectives

- (i) Reduction in organic pollutants from agricultural sources, including POPs;
- (ii) Facilitation of environmentally sound technology transfer for the rational use of pesticides, and the minimisation of their discharge to the water system.

Ancillary action

- (i) Adopt regulations on residue levels in products;
- (ii) Develop stricter environmental controls and enforcement on transportation, storage and handling of pesticides;
- (iii) Ensure regulations developed are harmonised across the region.

Responsibility

Participating countries, EAS/RCU, international organisation, e.g. FAO, UNDP, etc.

Participating countries, EAS/RCU, international organisation.

Participating countries, EAS/RCU,.

7.4 PRIORITY SOURCE: INDUSTRIAL WASTE

The general target is to reduce inputs of industrial wastes and determine the assimilative capacity of the receiving waters. Specific actions proposed are:

Action In1 Establish a data and information network on the sensitivity of waters in the region to outfall pollutants and technologies available to control the levels of pollutants to acceptable levels

Objectives

Obtain information on:

- (i) the discharge quality and quantity of industry wastes in the region based on information collected by each participating country;
- (ii) the assimilative capacity of the ocean to absorb industry waste in key areas; and
- (iii) scientific information on further actions to be taken to address the problems.

Ancillary action

- (i) Collate information available on the sensitivity of receiving waters to outfall pollutant concentrations from industry;

Responsibility

National institutions, EAS/RCU, and consultants if necessary

- (ii) Collate information on appropriate technologies to achieve concentrations at a level consistent with the sensitivity of receiving waters.

National institutions, EAS/RCU, and consultants if necessary

Action In2 Undertake a feasibility study for the introduction of cleaner production in the region

Objectives

- (i) Provision of scientific information and the availability and feasibility of the cleaner production in the region; and
- (ii) Protection of marine and coastal environments from the discharge of industry wastes.

Ancillary action

- (i) Identify economic and policy incentives for cleaner production;
- (ii) Initiate implementation of cleaner technologies in industries;

Responsibility

National institutions, EAS/RCU, and consultants if necessary

National institutions, EAS/RCU, and consultants if necessary

Action In3 Upgrade the capability of participating countries to control industrial wastes

Objectives

- (i) increase public awareness of participating countries to control industrial wastes discharge to marine and coastal environments in the region; and
- (ii) upgrading the capability of the participating country.

Ancillary action

- (i) Create and disseminate information on best management practices for industries in reducing and minimising pollutant discharges;
- (ii) Identify means to overcome impediments to technology transfer of innovative appropriate technology to industry (to be done by consultancy);
- (iii) Provide training and education (technical and managerial) for cleaner production;

Responsibility

National institutions, EAS/RCU, media and consultants if necessary

National institutions, EAS/RCU

National institutions, EAS/RCU

- (iv) Locate new industries away from the environmentally sensitive areas identified in the regional study.

National institutions, EAS/RCU

7.5 PRIORITY SOURCE: HABITAT MODIFICATION

The general target for this issue is to reduce Marine pollution resulting from the modification of habitats in the region.

Action H1	Develop guidelines for port development, land reclamation, forestry, logging and aquaculture to limit habitat destruction and marine pollution effects
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Objectives

- (i) introduction of the concept of integrated coastal area management for the coastal and marine environments and resources;
- (ii) development of necessary guideline and maps which will provide scientific information to various users in the region.

Ancillary action

- (i) Assemble available information on these developments, habitats and risks and prepare maps.
- (ii) Commission a review of ESCAP/WB/UN Guidelines on environmental impact assessment of these developments for relevance in the COBSEA Region.
- (iii) Convene a COBSEA Workshop to adopt ESCAP/WB/UN Guidelines for the COBSEA Region

Responsibility

National institutions, EAS/RCU and co-operating organisations

National institutions, EAS/RCU and co-operating organisations

National institutions, EAS/RCU and co-operating organisations

Table 7.1 Summary of the Proposed Programme of Action

Source of pollution	Target	Action and Ancillary action	Action by whom	Time frame (years)
Sewage	A regional agreement on waste water recycle management. Criteria and standards for sewage and urban run off release into waterways. A regional action plan	<p>Action S1: Establish a data and information network to link with GPA Clearing House, based on the existing monitoring network in the region;</p> <p>Action S2: Establish the infrastructure for enhancing the exchange of scientific information on sewage discharge and its impacts to the marine environment, marine habitats and human health;</p> <p>Action S3: Reduce the discharge of sewage using a treatment systems for the key sources, with potential technical transfer to other sewage sources;</p> <p>Action S4: Negotiate and establish a regional agreement on sewage discharge to protect marine environments in the region.</p>	EAS/RCU, participating countries, and consultant if necessary	2
				3
				5
				3
Agriculture Run-off	To reduce the nutrient inputs from agriculture and aquaculture practices and to introduce sustainable use of seeds, fertiliser and pesticides. To reduce the suspended solids released from agricultural lands.	<p>Action A1: Establish a data and information network to assess the quantities and types of fertilisers used and the quantity of solid and liquid manure produced by farm animals and aquaculture;</p> <p>Action A2: Promote rational use of fertilisers and reduce the losses of nutrients by misuse of inorganic fertilisers and manure;</p> <p>Action A3: establish sediment load targets with regard to the sensitivity of the receiving environment; develop integrated catchment plans to achieve the targets and implement these plans followed by a timely review of their impact;</p> <p>Action A4: Develop, promote and implement integrated pesticide management plans.</p>	Participating countries, EAS/RCU, international organisations	2
				4
				5
				5
	To reduce inputs of industrial waste. To determine the capacity of marine habitats to absorb industrial waste.	<p>Action In1: Establish a data and information network on the:</p> <p>(i) sensitivity waters to outfall pollutants; and</p> <p>(ii) technologies available to control the levels of pollutants to acceptable levels;</p> <p>Action In2: Undertake a feasibility study for the introduction of cleaner production in the region;</p> <p>Action In3: Upgrade the capability of participating countries in controlling industrial wastes</p>	Participating countries, EAS/RCU, international organisations, and consultant if necessary	2
				2
				3
Habitat Modification	To reduce environment impacts from modification of habitats in the region.	To provide guidelines for port development, land reclamation, forestry, logging and aquaculture to limit habitat destruction and marine pollution effects	Participating countries, EAS/RCU, international organisations and consultant if necessary.	1 2 3

Source of pollution	Target	Action and Ancillary action	Action by whom	Time frame (years)
PILOT PROJECTS Pilot Project 1: To be identified – Urban discharge	i) To formulate and adopt regional guidelines for sewage treatment and disposal and environmental quality criteria and standards; ii) To establish an environmentally suitable and economically feasible system of collection and disposal of urban solid waste; iii) To assist the development of national plans and programmes for reduction of the pollution discharge from main cities in the demonstration sites.	i) To set up a criteria for selection of a city in the region to be the site of pilot project. It is suggested that this city should be: <ul style="list-style-type: none"> • A coastal city near marine habitats that can be used to indicate effects of urban activities; • Population over 1,000,000; • With certain level of industry development during last 3 decades; • Some environment monitoring data available for the project; and • Reasonable infrastructure on environmental protection. ii) To identify sources of pollution and decide on the monitoring scheme; These pollutants are mainly: <ul style="list-style-type: none"> • Municipal sewage • Solid wastes • Heavy metals • POPs iii) To monitor the pollutants from identified sources, and to study the impacts to the marine and coastal environments; (iv) To establish a management plan to reduce the pollution discharge.	Participating countries, EAS/RCU, international organisations, and consultant if necessary	5
PILOT PROJECTS Pilot Project 2: Agriculture Discharge and Sediment Runoff	(i) To formulate and adopt regional guidelines for assessment of agriculture input of pollutants, and the relevant environmental quality criteria and standards; (ii) To establish an environmentally suitable and economically feasible methods for the sustainable use of fertiliser and pesticides in the demonstration site; and (iii) To assist the development of national plans and programmes for reduction of the agriculture discharge to the marine environment in the demonstration sites.	<i>Project Activities:</i> (1) Confirm that fertiliser and/or pesticides are affecting the marine environment. To formulate and adopt regional guidelines for assessment of agriculture input of pollutants, and the relevant environmental quality criteria and standards; (2) Work towards obtaining fertiliser/pesticide scenarios which combine high agricultural outputs and low pollution levels. To assist the development of national plans and programmes for reduction of agriculture discharge to the marine environment at demonstration sites. (3) Determine the effects of decreased level of discharge of a river on salinity intrusion, sediment load and coastal erosion or accretion. (4) Assess impacts of mining activities to the coastal marine environment. (5) Communicate, educate and train all members of the community in being more environmentally aware and caring for marine ecosystems.	Participating countries, EAS/RCU, international organisations, and consultant if necessary	5

8. Pilot Projects

8.1 PILOT PROJECT 1: SEWAGE DISCHARGE

To select a suitable city in the region to implement a pilot project to demonstrate the reduction and management of sewage discharge of pollutants into marine environments.

Objectives

- (i) To formulate and adopt regional guidelines for sewage treatment and disposal and environmental quality criteria and standards;
- (ii) To establish an environmentally suitable and economically feasible system of removal of pollutants from sewage discharge;
- (iii) To assist the development of national plans and programmes for reduction of the sewage discharge from main cities in the demonstration sites.

Plan of Action

- (i) Develop criteria for selection of the pilot study site. It is suggested that this city should have the following characteristics:
 - Located nearby near marine habitats that can be used to indicate effects of urban activities;
 - A population over 1,000,000;
 - An increase in industrial development during the last 3 decades;
 - Some environmental monitoring data available for the project; and
 - Reasonable infrastructure on environmental protection.
- (ii) Monitor pollutants from identified sources, and study their impacts on the marine and coastal environments;
- (iii) Establish a management plan to reduce pollution discharge.

8.2 PILOT PROJECT 2: AGRICULTURE DISCHARGE AND SEDIMENT RUNOFF

To select a suitable river in the region to implement a pilot project to demonstrate the reduction and management of discharge of pollutants into the marine environment from sources of agriculture activities.

Objectives

- (ii) To formulate and adopt regional guidelines for assessment of agriculture input of pollutants, and the relevant environmental quality criteria and standards;
- (iv) To establish environmentally suitable and economically feasible methods for the sustainable use of fertiliser and pesticides in the demonstration site; and
- (v) To assist the development of national plans and programmes for reduction of agriculture discharge to the marine environment at demonstration sites.

Project Activities

- (i) Confirm that fertiliser and/or pesticides are affecting the marine environment;
- (ii) Work towards obtaining fertiliser/pesticide models which combine high agricultural outputs and low pollution levels;
- (iii) Determine the effects of decreased level of discharge of the river on salinity intrusion, sediment load and coastal erosion or accretion;
- (iv) Assess impacts of mining activities to the coastal marine environment; and
- (v) Communicate, educate and train all members of the community in being more environmentally aware and caring for marine ecosystems.

9. Programme Support

Financial and technical assistance is required to implement the proposed actions. Similarly, implementation of programmes, following feasibility studies will require coordinated financial assistance from a variety of sources. Agencies and organisations with appropriate technical and financial capacity for possible contribution are identified in the 4th column of Annex 2.

LIST OF ACRONYMS USED

COBSEA	Coordinating Body on the Seas of East Asia
ESCAP	United Nations Economic and Social Commission for Asia and Pacific
FAO	Food and Agriculture Organisation of the United Nations
GPA	Global Programme of Action for the Protection of the Marine Environment from Land-based Activities
HOTO	Health of the Oceans
IAEA	International Atomic Energy Agency
IFCS	Intergovernmental Forum on Chemical Safety
IPCC	Intergovernmental Panel on Climate Change
POPs	Persistent organic pollutants
UN	United Nations
UNEP	United Nations Environment Programme
WB	World Bank
WHO	World Health Organisation

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ANNEXES

Annex I: National Overview Presentations: Summary of Problems Identified

Problem	Sewage	Urban Run-off	Agriculture	Industry	Habitat Mod.	Litter	H/M	Sediment	Oil	POPS
Country										
Cambodia	√	√	√ inc. aqua	√	√			√	√	√
China	√		√	√				√	√	√
Indonesia	√		√	√ inc. mining				√		
Korea	√	√	√ inc. aqua		√					
Malaysia	√		√	√ inc earth-works				√		
Philippines	√	√	√	√	√	√	√	√		√
Singapore	√			√ inc solid waste						
Thailand	√	√	√	√	√	√		√		
Vietnam	√	√	√	√	√			√	√	√
Australia	√	√	√	√	√	√	√	√	√	√

Annex II: Ranked sources of pollution among participating countries

Source	Rank (1-7) (1-Most important) and Description of available database	Contribution to pollution of national aquatic environments (L=Low, M= Moderate, H= High)						
		Ca	Ch	Indo	Mal	Phil	Tha	Viet
• Domestic waste	1-Fair	H	H	H	M	H	H	H
• Agricultural waste	2-Poor	M	H	H	M	H	H	H
• Industrial waste	2-Poor	M	H	H	H	H	H	H
• Sediments	3-Poor	M	H	H	M	H	H	H
• Solid waste	4-Fair	H	H	H	M	H	H	H
• Hydrocarbons	5-Poor	L	M	H	M	M	M	M
• Ship-based sources	6-Poor	M	M	M	M	M	M	M
• Atmospheric	7-Poor	M	M	M	M	M	M	M
Data for other member states is not available at present stage								

Source: UNEP (Water)/EAS/SCS/NCM. 2/3; 1998

Annex III: Transboundary issues associated with pollution

Transboundary Issue – Quality of Information	Ca	Ch	In	Ma	Ph	Th	Vi
1. Pollution of transboundary rivers							
• Mekong River – Poor to Fair	✓	✓				✓	✓
• Red River – Fair (Viet Nam)		✓					✓
• Sai Gon-Dong Nai – Fair (Viet Nam)	✓						✓
2. Transport of polluted coastal waters along the Sunda Shelf – Poor	✓	✓		✓		✓	✓
3. Haze from forest fires – Poor			✓	✓	✓		
4. Acid precipitation – Poor		✓				✓	✓
5. Transport of waste for trade and recycling – Poor	No data	✓	✓	✓	✓	✓	No data
6. Coastal tourism – Fair	✓	✓	✓	✓	✓	✓	✓
Data for other member states is not available at present stage							