



## EDITORIAL

It is now a fact in history that in a region so vast as South Asia and having varied traditions and cultures, SACEP was the first co-operative inter-governmental organisation to be established among the South Asian Nations.

Co-operation has been the basis, the foundation and the cornerstone of the South Asia Co-operative Environment Programme. As such, its future activities, progress and its success are all dependent largely on the spirit of working together in harmony and co-operation.

The emphasis of co-operation is found and agreed upon in all the primary documentation of SACEP. The Articles of Association of SACEP have not only endorsed environmental co-operation in the programme contents but also covered a commitment to work out a harmonious balance between the process of development and resources of nature. The Articles of Association goes on to state that the Member Countries shall endeavour to reach agreement by consensus after discussion in a co-operative spirit.

The environmental crisis the world is facing today, is partly due to the lack of co-operation not only amongst the neighbouring Nations but also amongst the International Organisations.

Projections of impending environmental catastrophe could only be overcome if there is a spirit of dedication, singleness of purpose and unstinted co-operation amongst all relevant authorities. The spirit of competition among International Organisations should give way to unlimited co-operation.

The message is loud and clear that unless there is true co-operation in the activities of environmental concern this world would no longer be a place where life can exist.

Nothing during the past year has underlined interdependence more forcefully than the dramatic growth in our awareness of the serious dangers to the environment posed by man's own activities. The Commonwealth has a particular part to play in facing up to such issues as these. A concern for the resources we share in common means partnership not only across the oceans but also between generations.

- Queen Elizabeth  
A Commonwealth Day Message

## EXPERTS MEETING NEWS

The Environmental Experts of the Member Countries of SACEP met in Colombo during 3-7 July, 1989, and reviewed the Projects and decided a 5 - Year Action Plan for consideration of the Governing Council which will meet in early 1990.

## GOVERNING COUNCIL MEETING

The Fifth Meeting of the Governing Council of SACEP scheduled to be held in Colombo in September, 1989, is postponed due to unavoidable circumstances and the same is expected to be held in early 1990.

The Government of Sri Lanka has kindly agreed to host this Meeting and it is also a great source of encouragement to note that H.E. R. Premadasa, President of Sri Lanka has kindly consented to inaugurate the Meeting.

This Meeting of the Governing Council is of critical importance to SACEP, as the future of the Organisation would depend to a large extent on the deliberations of this Meeting. Among the many important items coming up for discussion, the most crucial ones will be the approval of the 5-Year Plan of Action of Projects and Programmes drawn up by a Panel of Experts of the Member Countries and the determination of the financial policy of the Organisation.

INDEX	PAGE
Editorial	1
Experts' Meeting News	1
SACEP Member Countries Observe World Environment Day	2
News of Project Activities	3
News of Environmental Activities in SACEP Member Countries	4
Climate Change and Sea-level Rise in the South Asian Seas Region.	6
Nepal's green forests denuded at an alarming rate	7
The Maldives: Present Environment and Future Sea-level Rise	7
SACEP Calendar of Forthcoming Meetings / Work shops	8

# SACEP MEMBER COUNTRIES OBSERVE WORLD ENVIRONMENT DAY.

## SRI LANKA

### BANGLADESH

The World Environment Day was befittingly observed in Bangladesh by the Department of Environment Pollution Control and different other organisations as elsewhere in the world on Monday the 5th June 1989.

President Hussain Mohammad Ershad in a message called upon the World Community to mobilise all resources and preserve the environment and desist from doing things which might threaten human civilisation and imperil the very existence of living beings on this planet. In his message, he also said, "As a member of the United Nations Environment Programme, Bangladesh is fully committed to conserve both local and global environment, not only for its own benefit but also for the welfare of the entire mankind.

The concerned other organisations observed the day through holding of discussion meetings and seminars.

Forum of Environmental Journalists of Bangladesh (FEJB) held a seminar in observance of the day. Speakers at the seminar stressed the need for increasing awareness for improvement of the environment.

The United Nations Association of Bangladesh (UNAB) held a symposium at its office with eminent scientist Professor Innas Ali in the chair.

The speakers at the function stressed the need for mobilisation of adequate resources to preserve the environment.

Besides, the DEPC published a poster depicting the UNEP's slogan, "Global Warming: Global Warning."

### GLOBAL WARMING: GLOBAL WARNING



DEPC Poster Global Warming: Global Warning

### INDIA

The World Environment Day was celebrated in India by the Ministry of Environment & Forests in a befitting manner. Specifically, the activities undertaken were as follows:-

Two prestigious awards on environment, namely Indira Gandhi Paryavaran Puruskar and Indira Priyadarshini Vrikshamitra Awards for the year 1988 were distributed by the Prime Minister at Vigyan Bhavan on the World Environment Day. The Indira Gandhi Paryavaran Puruskar was received by Professor Sreedharan on behalf of Kerala Shartra Sahitya Parishad. The Vrikshamitra Award was received by Shri Mohan Dharja and Dr. P.R. Mishra, in the category of individuals, and a number of institutions, schools, voluntary agencies, panchayats, and government agencies for doing outstanding work in afforestation.

- The Ministry of Environment and Forests inaugurated a new exhibition gallery appropriately named as "Cell: the basic unit of life," at the National Museum of Natural History.
- At the Museum, a Bio-Science Computer Room was also commissioned to enable the school and college students to learn variety of topics relating to bio-science through computers. Dr T.N. Khosoo, an eminent scientist, delivered a thought provoking lecture on the topic "Man in Nature: Past, Present and Future."

"As experience grows and lacunae of Knowledge are filled, answers will slowly be found to the complex questions of development and environment. The search for the right answers must go relentlessly. It is a worldwide endeavour to which India pledges unstinting support."

- Rajiv Gandhi  
Prime Minister of India

The Government of Sri Lanka conducted many activities in connection with the World Environment Day. The Highlight of a week long activity was a whole day Seminar organised by the Central Environmental Authority in collaboration with the National Academy of Science and the Sri Lanka Association for the Advancement of Science. The Chief Guest on this occasion was Mr K.H.J. Wijayadasa, Secretary to the President who delivered the Key Note Address.

The theme of the Seminar was on Global Warming: Global Warning and many learned speakers spoke on various aspects on this topic.

The culmination of the World Environment Day observances was "An Evening's Entertainment of Songs on Environment" which was very well appreciated by a large and representative gathering.



Hon Minister Dr. Wimal Wickramasinghe, is inaugurating the function of Environmental Songs on the occasion of World Environment Day.



Mr K.H.J. Wijayadasa is inaugurating the Seminar on 'Global Warming: Global Warning' held in Colombo, on 3rd of June 1989.



Mr Naziur Rahman, Hon'ble Minister of LGRD and Co-operatives, delivering the inaugural speech at the seminar on environmental aspects of Groundwater Development in Bangladesh, in observance of World Environment Day, held in Dhaka on June 5th, 1989.

His Royal Majesty's Government of Nepal has recently taken many steps to protect and improve the conditions of environment. In his inaugural address at a Seminar on world Environment Day, Mr. Kamal Thapa, Minister of Communications, Nepal said.

"Environmental Protection is a matter to be constantly geared not only to hold and sustain natural balance on earth, but also to improve the quality of human life. Like many Asian countries, Nepal is also facing severe problems of deforestation, soil erosion, high population density and inadequate sanitary services. We are at the moment, as most of you may have known undergoing through a difficult period of fuel shortage in the country." the Minister pointed out.

**REGIONAL SEAS PROGRAMME**

There has been a change in the position as regards the finalisation of the Action Plan in respect of the South Asian Regional Seas Programme as all member countries have now responded to UNEP as regards their future long term commitment to the development of the Regional Seas Programme for the South Asian Seas Region. The Secretariat is happy that they have agreed to a Regional Seas Programme and the next step could be taken to finalise the approval of the Action Plan.

Meanwhile three of the Priority Projects of South Asia Regional Seas Programme formulated at the Meeting of Experts have been approved by UNEP and work is in progress.

The Coastal Environmental Management Plan for Pakistan which is ESCAP's contribution to the development of the South Asian Seas Action Plan, has been drawn up and the Government of Pakistan is at present examining the draft plan. It is expected that a final Meeting to approve this Plan would be held sometime late this year.

Work has proceeded satisfactorily in respect of the Priority Project "Development of an Operational Regional Contingency Plan for Responding to Marine Pollution Emergencies for the South Asian Region," under execution by the International Maritime Organisation (IMO).

The IMO Consultant visited the concerned Member States to ascertain the existing National Contingency Plans and the Technical Services available, and based on this information, IMO has prepared a 'Draft South Asia Marine Pollution Emergency Action Plan' which has been made available to the concerned States for necessary action.

As Phase 2 of this Project, IMO and UNEP have convened a workshop to be held in Bangkok in November-December 1989, where the concerned experts from the member countries would review the draft and agree on a final text which would serve as a basis for Regional Co-operation at the operational level in case of a Marine Pollution Emergency. The Workshop participants also will take part in a Simulated Oil Spill Response and the Implementation of the Emergency Plan.

There has been a delay in the implementation of the Priority Project under execution by IUCN, namely the "Development of a System of Protected Areas in the South Asian Seas Region." The first activity planned was a Workshop which will concentrate on identifying Critical Marine Habitats and Ecosystems of the South Asia Region. It was originally

scheduled for January 1989, but due to certain logistic difficulties faced by IUCN, this activity has been postponed and in all probability would take place towards the end of 1989 or early 1990.

The delay in the approval of the other 3 Priority Projects, namely: 'Assessment of Levels and Effects of Marine Pollution in the South Asian Seas Region', 'Survey of Land-Based Sources of Marine Pollution and Formulation of Guidelines and Proposals for Environmentally Sound Waste Management Technologies and Policies', 'Environmental Education and Promotion of Public Awareness for South Asian Countries in connection with the South Asian Seas Programme', is due to the fact that the Action Plan has yet to be approved.

**ENVIRONMENTAL CLEARING HOUSE SERVICES PROJECT**

The Project involves the initial setting up of an Information Dissemination Centre at the SACEP Secretariat and Mini-Centres in some of the Member States of SACEP with an Asian Development Bank grant of US\$ 100,000. The scope of the Project would initially deal with a few Subject Areas with provision for expansion. The Project would initially be for one year and if successful, efforts could be made to extend the project through contributions from Member Countries and assistance from International Organisations.

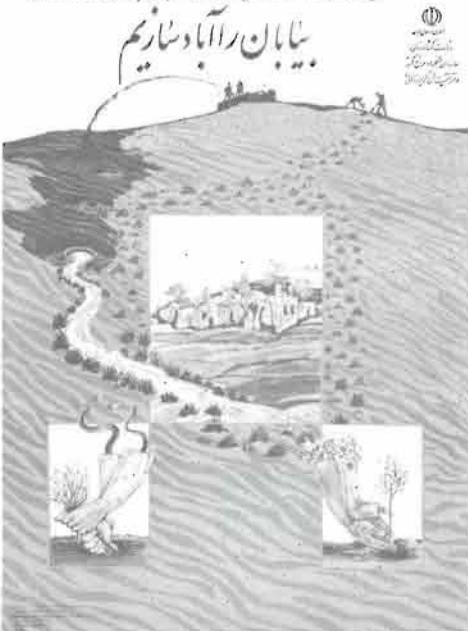
The Asian Development Bank with whom the SACEP Secretariat has been having discussions on this Project, sent a Country Mission to Sri Lanka in May 1989, who had final discussions with the SACEP Secretariat as well as the Government of Sri Lanka in respect of this Project. The Secretariat is confident that the implementation of this Project which is a long-felt need for the South Asian Region, would be possible to be started sometime in late 1989.

**MODERN TECHNOLOGIES FOR THE TREATMENT OF INDUSTRIAL EFFLUENTS IN SOUTH ASIAN COUNTRIES**

This project which was initially designed by UNIDO and subsequently modified by SACEP envisages the setting up of a Pilot Plant for the Treatment of Industrial Effluents using Modern Technologies with the provision of training facilities. The Government of Sri Lanka which has shown keen interest in this project has agreed to the setting up of this Pilot Plant in Colombo, Sri Lanka.



The Chief Guest, Hon'ble Vice Chairman of the National Planning Commission Dr. M.M. Sainju planting the sapling.



**Sand-Dune Fixation  
ISLAMIC REPUBLIC OF IRAN**

(An Artist's Perception)

One of the components of this project is the provision of training facilities to representatives from the Member Countries of SACEP and the total cost of this project is US\$ 2,918,600.

UNIDO has informed the SACEP Secretariat that their Department for Programme & Project Development and Appraisal has scrutinized the Draft Project Proposal and given their final approval. They are now proceeding with the identification of funding.

## UNDP/WORLD BANK PROJECT — STRENGTHENING NATURAL RESOURCE AREA MANAGEMENT IN ASIA

Under this project, the SACEP Secretariat has been having correspondence with the World Bank and UNDP, and in January 1989, Mr Colin Rees visited the SACEP Secretariat and informed that SACEP's assistance would be needed in respect of 3 Workshops which will be organised by ESCAP on behalf of World Bank in the Area of Strengthening of Protected Areas and Critical Ecosystem Management.

SACEP Secretariat has been in contact with ESCAP and they have decided to have one of these Workshops in Colombo in February 1990, for which they have requested the active co-operation of SACEP.

## SACEP TRAINING FELLOWSHIP SCHEME

The SACEP Secretariat is actively pursuing the possibility of starting a Training Fellowship Scheme for participants from SACEP Member Countries. The Secretariat has approached several funding and training agencies and also the Government of Netherlands and TWAS for assistance. The Secretariat is hopeful that this scheme on a modest scale would be possible to be initiated sometime early next year.

## TRAINING PROGRAMME FOR SACEP MEMBER COUNTRIES IN MANAGEMENT PLANNING OF MARINE RESOURCES

SACEP has sought funds from ESCAP for a Seminar on Management of Marine Resources and ESCAP has agreed to provide funds of US Dollars US\$ 10,000 and hence a Training Seminar is being organised by SACEP at National Institute of Oceanography, (NIO), Goa, India, probably sometime in December 1989 in which two participants from each member country shall be invited to attend for a 7-day Training Programme.

# NEWS OF ENVIRONMENTAL ACTIVITIES IN SACEP MEMBER COUNTRIES

## BANGLADESH

Some of the highlights of activities undertaken by the Government of Bangladesh in controlling environmental pollution are enumerated below:

- The establishment of 30 river water quality control monitoring stations in principal rivers and also 16 groundwater quality control stations in different parts of the country.
- 400 samples of drinking water in main cities of Bangladesh have been examined as quality control measures during the last few months of the year.
- Surveys of high sounding horns and black smoke of belching vehicles were conducted in Dhaka, Chittagong, Khulna and Bogra 3 times this year. 7% of the vehicles plying on roads were found defective and action has been initiated to prosecute about 40% of them.
- Polluting industries have been identified and preventive measures have already been taken against 10 industries. Follow-up preventive measures are being taken against 950 polluting industries. New industries are being compelled to adopt effluent treatment facilities with them. Zia Fertilizer Factory at Ashganj, Chittagong Fertilizer Factory and a shoe factory at Nayerhat have been successfully compelled to establish treatment plants to treat their effluents.
- The Government has decided to move the Tannery industries in Hazerihagh, Dhaka City to elsewhere as a safety measure for Dhaka City.
- Surveys were conducted in 40 different Upazalas to see if wood was being used in brick-burning and the forest Department is taking controlling measures on wood burning in brickfields.
- Extent of catching of frogs has been examined in 13 Upazalas and the Government has decided to issue a final order to stop the killing of frogs for exporting froglegs to foreign countries.
- DEPC has stopped the attempt of the import of toxic wastes by some vested groups in Bangladesh thus saving the nation from the horrible environmental consequences, but it is not known what has happened with the dumping of toxic waste brought by Felicia of Philadelphia, USA. It is reported that the waste was probably dumped into the Indian Ocean secretly by the ship.

- Efforts have been initiated for creating awareness among the public about environmental pollution and its dreadful consequences.
- Public awareness is being created about desertification, green house effect, depletion of ozone layer through Seminars and Symposia.
- Draft National Environmental Quality Standards have been prepared and submitted to Government for approval and publication in the Gazette.
- Control measures of use of insecticides and stopping the use of B and study on the residues of insecticides and heavy metals have been undertaken jointly by DEPC, Atomic Energy Commission and Centre for Environmental Studies and Research, Bangladesh.
- A Cell on Environment Planning has been established under the Ministry of Planning. Ministerial Division, it has been decided to establish under the Ministry of Agriculture and Forestry named "Forestry and Environment Division" to replace present Department of Environment Pollution Control.

The Government of Bangladesh has created a new Ministry entitled "Ministry of Environment and Forest".



*Environmental Pollution Control Initiative in Bangladesh: DEPC and Police are recording the numbers of very old vehicles emitting black smokes for filing case against them.*



*The Chairperson, PPP and MNA, Begum Nusrat Bhutto, inaugurating Spring Tree Plantation Campaign, 1989, by planting a sapling on behalf of Prime Minister Benazir Bhutto at the Prime Minister's House.*

## PAKISTAN

The Government of the Islamic Republic of Pakistan, in order to create environmental awareness among younger generation initiated a Project entitled "Co-ordinated Environmental Education Programme (CEEP)." It was a three-year Project which was completed in December 1988. The Environment and Urban Affairs Division and the Ministry of Education, worked in close collaboration with each other to develop a curricula for Primary, Middle and Secondary levels have been integrated in the present curricula. It is hoped that integration of environmental dimension in the curriculum would infuse on approach in the younger generation which would create awareness and consciousness and lead to a sustained programme of improving the environment of the Country.

Besides this, the Government of the Islamic Republic of Pakistan is taking a number of steps for the protection and the preservation of the environment at the national level. These include:

- Promulgation of Pakistan Environmental Protection Ordinance;
- Establishment of comprehensive National Environmental Policy;
- Environmental Quality Control Standards;
- Introduction of Environmental Impact Assessment;
- Environmental Education Programme;
- Preparation of National Conservation Strategy;

- Contingency Plan to combat Marine Pollution;
- Integrated development of intermediate sized cities having potential for future growth;
- Devising of National Human Settlements Policy with a view to achieving geographically equitable distribution of population amongst the urban settlements;
- The shelter problem has also been given full recognition by the Government and a wide range of policies and programmes are being introduced to tackle it in a sound manner.

## SRI LANKA

### Preservation of the Knuckles (Dumbara Hills) Montane Ecosystems.

The Sri Lanka Cabinet of Ministers have declared the Dumbara Hill (Knuckles Range of Mountains) as a forest reserve thus ensuring its full protection.

These hills which dominate the Dumbara Valley, have a maximum elevation of over 6000 ft. and is an unique montane ecosystem, on account of its detachment from the central mountain mass by the picturesque Dumbara Valley.

As a result of its geographical position it exhibits a very wide range of landforms, climates and habitats, with a correspondingly varied flora & fauna. A unique pygmy forest, often less than a metre high, is found at the higher elevations.

In recent times, the forests have been encroached upon by cardamom cultivators, who underbrush and utilise the main canopy to provide the required amount of shade. The Central Environmental Authority stressed its preservation also because it is an important hydrological entity. A number of streams and rivers drain these hills and all of them are important sources of water for the Mahaweli irrigation programmes now onstream.

The proposal for protection was based on the following very important ecological parameters:

- hydrological stability of the area, feeding a number of major rivers;
- soil erosion control to prevent silting of streams and reservoirs;
- storehouse of rare and endemic flora and fauna;
- aesthetic values; and
- educational needs.

A committee chaired by the Secretary, Lands and Land Development is presently working towards the implementation of the Cabinet Decision.

### Sri Lanka Prepares a National Conservation Strategy

In November 1982, His Excellency, The President on a recommendation made by the Hon. Prime Minister appointed a Task Force for the preparation of a National Conservation Strategy of Sri Lanka.

The Government of Sri Lanka was among the first to recognise the objectives of the World Conservation Strategy prepared by IUCN and based on this, the task force began the preparation of the National Conservation Strategy.

The Sri Lanka National Conservation Strategy was presented to H.E. The President in December 1988. This is a result of a sustained effort by a Team of Specialists which included the Members of the Task Force and also an Editorial Board. The back ground material for the strategy was presented in 27 Sector papers drafted by specialists.

Some of the main recommendations of the National Conservation Strategy are:

- National Land Use Authority has been established which will decide policy on rational allocation of land and monitor its utilisation in every field.
- A draft directive has been recommended to the Honourable President for immediate halting of clearing of any forest of height above 5000 ft.
- A proposal for formation of a Central Co-ordinating Agency at National Level has been recommended to the Honourable President for Co-ordinating the activities of different agencies dealing with Water Resources, Land, Agriculture, Power and Energy.

- The Central Environmental Authority has recommended for immediate action to optimise the use of Marine resources in the Exclusive Economic Zone for the in-shore and off-shore fisheries.
- The EIA Study by qualified persons has been made compulsory for all development projects.

## Climate Change and Sea-level Rise in the South Asian Seas Region.

By G.S. Quraishie

The outstanding feature of the South Asian Seas region with respect to the impacts of climate changes and rise in sea-level is its high population of over one billion. About 10 per cent of the people of the region live on the coast. According to demographic experts, the population will probably double by the turn of the century and definitely reach two billion by the year 2025, when climatologists propose a global scenario of climatic change which foresees a temperature increase of 1.5° and a rise in sea-level of 20 centimetres. As such, any adverse effects emanating from climatic stress in the region will hit the population, creating numerous human problems. The UNEP Task Team on the implications of climatic changes in the South Asian Seas Region has taken this important aspect in consideration.

The South Asian Seas region is very large and can be divided into several sub-regions such as the Arabian Sea, Bay of Bengal, Central Indian Ocean, Regime of Maldivé Islands and so on. Each sub-region has a typical oceanic area characterised by different water masses, circulation patterns, mixing processes, etc. Therefore, climatic changes will have different effects in each sub-region. The Arabian Sea is more saline than the Bay of Bengal and an increase in temperature and subsequent evaporation will have different effects. Cyclones (tropical revolving storms) have a frequency of about three per year in the Bay of Bengal and about one in the Arabian Sea. The gentle sloping shelf and shallow seas off Bangladesh are prone to high storm surges which are generated by the cyclones. Storm surges now constitute the greatest hazard of geophysical origin to human populations, having surpassed earthquakes. This is partly due to the rapid increase of the coastal zone population in the relevant areas of the world.

In the North Indian Ocean the number of cyclones per year is relatively small, but the number of effects is very large due to the topographic and demographic characteristics of the region. The projected

increases in global temperature and sea-level are expected to have considerable influence on the cyclones and storm surges respectively, with a very probable significant increase in the associated hazards for human populations and related developments. If the projected climate changes occur, flooding due to storm surges will become much worse than at present; salt water incursions will increase; coastal erosion will increase; and a considerable greater proportion of the human population will become subject to the hazards of storm surges. Thus the Task Team has recommended that evidence for climatic change induced cyclone formation, intensity, frequency and fate must be carefully analysed from historical records.

Global circulation model results together with extrapolated information for the South Asian Seas region, suggest that there will be an increase in rainfall and an enhancement in the melting of glaciers. Large rivers like the Indus, Ganges and Brahmaputra emerge from melting of glaciers in the Himalayas, and their flow is supplemented in the plains from run-off from torrential rains. As a result, increase in intensity and frequency of floods in the rivers can obviously be expected. Semblance of such floods appeared in the summer of 1988 in India, Pakistan and Bangladesh where many lives were lost, not to mention damage to property. Future floods could be even worse.

Climatic change is expected to increase the intensity of the monsoon circulation. The atmospheric low pressure (generally known as heat low) that develops over the sub-continent during summer is likely to intensify, and would support the monsoon winds to blow favourably from the sea into the system. At the same time, a warm ocean can supply more moisture to these winds. The present interannual variability being experienced in the monsoon system will probably smooth out, giving place to almost steady wet monsoons each year. The periodic occurrence of droughts can be expected to fade away gradually.

The variation in the wind system due to the increase in temperature is likely to affect oceanic circulation. The wind stress pattern is likely to change resulting in shifting of gyres, rings and eddies; mixing of waters from rivers will increase; flow through adjoining seas like the Persian Gulf and Red Sea and the through flow of Pacific waters into the Indian Ocean via the Indonesian Archipelago will be disturbed; nutrients in the sea will be redistributed and so will primary production and fish stocks. The new thermal field of the sea is liable to trigger off large fish migration. Undoubtedly, the temperature increases would also have an influence on evaporation and precipitation patterns, run-off, nutrient supplies, wind patterns, species composi-

tions, occurrences of plankton blooms (sometimes called red tides), and the spread of diseases in fish and coral reefs. Last but not least, temperature increases would considerably influence human health.

Experts have been indentified by the Task Team to evaluate the possible effects of the agreed scenario of changes on the coral reef system. In Sri Lanka several factors of human origin are influencing the coral reefs including mining, industry, tourism development, pressure on fisheries and fishing boat anchorage. Consequently, shore erosion has considerably increased on the Sri Lankan coast. These other man-induced factors must be isolated from the effects of sea-level rise and temperature change in order to evaluate the impacts of climate change.

The Task Team has noted that impact assessment requires a multi-disciplinary approach covering the whole spectrum of changes. A system analysis approach has been recommended starting from a set of scenario variables such as sea-level rise and temperature change; the effects on physical systems like coasts, deltas, rivers, morphology, etc.; the effects on socio-economic systems like safety, damage to agriculture, coastal protection works, recreation, etc. These are to be evaluated to assess the range of damage and benefits

As Maldives is seen by the experts as a special case in these scenarios, UNEP has sent a mission to assess the situation and recommend feasible response options to the Maldives Government. A summary of the mission's findings appears on page 23.

At the same time, different counter measures like dykes, various engineering works, flushing, and beach nourishment should be studied. This will provide various alternatives to be adopted which will form alternate policy options to be presented to decision makers.

Courtesy: The SIREN/OCA-PAC NO. 39

If the world has become an international market place, it has also become a bungled experiment that threatens to destroy the laboratory. We choke ourselves in pollution, cook ourselves in carbon dioxide, incinerate our genetic resources while burying ourselves in wastes. Our descendents may not live long enough to try, from ultraviolet radiation. Science can help to answer these problems, but the answer is well beyond the knowledge and resources of one or even a handful of countries.

- Editorial.  
New Scientist.  
March, 25, 1989.  
British Science Magazine.

## NEPAL'S GREEN FORESTS DENUDED AT AN ALARMING RATE

Nepal's once lush green forests are being denuded at an alarming rate, raising fears of ecological disasters not only in the Himalayan kingdom but also "downstream" countries like India and Bangladesh.

The rapid deforestation has put into question Nepal's ability to implement a 22-year master plan for forestry Development.

The plan has received vital funding and technical assistance from the UN Development Program and other international agencies. One of the programs getting UNDP support is community forestry.

The program is particularly important for Nepal's fuelwood needs. "An acute shortage of kerosene has to excessive depletion of forest resources," says a Nepal official.

We estimate that trees in about 240 hectares are being destroyed daily. That rate of present destruction, he adds, is more than five times compared with the past.

Bangladesh is also afraid that rapid deforestation would worsen the flood problem.

The official says that only 22,000 hectares of forests are cleared annually to meet the country's energy needs. But with the dispute, it has worsened.

The dispute also adversely affects the targeted planting of trees in 32,000 hectares this year in a determined attempt to minimise deforestation, according to the official.

Environmentalists have warned that the situation would be particularly devastating as deforestation will worsen landslides, flooding and drought that take a heavy toll in life and property in Nepal, India and Bangladesh.

A report by the Asian Development Bank in Manila said, Nepal would lose 63 per cent of its forest cover between 1980 and 2000. The loss could be much more as a result of recent felling of trees for fuelwood.

Threat to forests also comes from what the Nepalis call *dadhelo* or forest fires. In one recent case, fire destroyed 1,200 hectares of forest in the central district of Sarlahi.

Most Nepali families rely on fuelwood for cooking, and in the high mountains also for heating homes. Kathmandu's one million inhabitants take a lion's share with their demands having gone up from 120 tons to 1,200 tons due to the petroleum shortage.

(Depthnews Asia)

## The Maldives: Present Environment and Future Sea-Level Rise

By John C Pernetta

Much has recently appeared in the international press concerning the threat posed by rising sea-level and global climate change to atoll island states such as the Maldives. Sensationalist stories of the Maldives disappearing within thirty years might sell newspapers, but they represent a distorted view of what is likely to happen, and can adversely affect the confidence of investors in the tourist industry on which the economy of the Maldives is based.

At the request of the Maldives President, OCA/PAC recently sent two consultants from the South Pacific and Mediterranean Task Teams on climate change to assess the situation, and advise UNEP on how they might collaborate with the Republic in tackling the policy and planning aspects of future climate change and sea-level rise impacts in the Maldives. The consultants found that in addition to future problems, current environmental management is weak, resulting in a large number of critical situations.

In part, the current environmental problems result from the high population density (650 people per square kilometre) which is aggregated onto around 200 of the 1,200 islands which make up this archipelago. The problems of the capital, Male, have reached a critical level, with the freshwater aquifer - on which the population depends - projected to disappear in 10 years if present trends continue; reef reclamation has removed the buffer zone so that storm swell overtop the seawalls and flood the town; poor sewage and garbage disposal is affecting reef growth; and the entire coastline is now being fixed by seawalls and breakwaters.

Modification of the coastline has occurred on many islands with the construction of seawalls, groynes, jetties, piers and wharves as well as the dredging of harbours - which are all undertaken without prior investigation of local current patterns and sand movements.

The current environmental problems are exacerbated by high population growth and urban drift (3.2 per cent a year for the country; 7.0 per cent a year for Male); a lack of Government mechanisms for taking environmental problems into consideration in the planning process; a lack of guidelines and procedures for the evaluation of environmental issues; lack of in-country data on many physical and biological parameters; and a shortage of trained manpower at all levels.

In all areas and atolls, environmental problems are locally severe, and environmentally unsound developments have been recently highlighted by the impacts of storm-generated

long distance swells, which have caused widespread flooding of reclaimed areas and have weakened and/or damaged coastal structures.

Current environmentally unsound development practices will increase the country's susceptibility to changes predicted to occur as a consequence of global warming and the "greenhouse effect". Assuming a sea-level rise of around 18 centimetres by the year 2030, the islands in the archipelago which have been structurally modified can expect increased rates of erosion and coastal alteration. The impacts of "high" waves will be greater, with increased sea-level and continued land reclamation reducing the capacity of the reef to absorb wave energy. Changes to aquifer volume may be expected, whilst increased temperatures may lead to an increased demand for air conditioning, thus indirectly affecting the balance of payments by causing increased importation of fuel for power generation.

Coral growth may be adversely affected by increased temperature, and indeed the anomalous rise in Indian Ocean water temperature to 1.5°C above normal during 1987 caused widespread coral bleaching and death. Coral reefs are already being heavily impacted by live coral mining and sand dredging to produce construction materials.

Social impacts arising from inter-island migration as a consequence of changes to island stability and habitability are likely to be profound given the nature of Maldivian society, which is characterised by generally low mobility and a strong attachment to individual atolls and islands.

Economic impacts will be most intensely felt if the tourist industry is adversely affected. The present resort islands represent a considerable investment of infrastructure on the land and coastlines of very small islands, which are at risk from increased sea-level and episodic events such as storm-generated wave surges.

Given such problems, can anything be done to assist? The answer is clearly yes. During their visit, the UNEP consultants were struck by the widespread concern for environmental impacts and the Maldivians' strong desire to rectify past mistakes as expressed by many officers in Government departments as diverse as public works and tourism.

By strengthening the environmental monitoring and planning capability of Government, past mistakes need not be repeated. In some cases, such as Male, where coastal modifications have already been undertaken the possibilities are more limited. In these places, coastal defences remain the

## SACEP CALENDAR OF FORTHCOMING MEETINGS/WORKSHOPS

only possible means of reducing wave impacts, and the tetrapod breakwater currently being constructed in the South coast of Male represents one "high tech" and expensive solution. Prior planning and consideration of environmental impacts will hopefully reduce the need for such expensive defensive solutions in the future.

Courtesy: The SIREN/OCA-PAC NO. 39

### MALDIVES

The Maldives, whose very physical existence is being increasingly threatened by unpredictable tidal waves, has taken the initiative in summoning a ministerial meeting of low-lying states in Asia, the Pacific and the Caribbean to develop a common strategy to fight sea-level rises.

Titled the Small States' Conference on Sea-Level Rises, the proposed meeting is scheduled to be held in Male from November 14 - 18.

Backed by the Commonwealth Secretariat in London, the conference is to be attended by endangered nations such as Guyana, Kiribati, Tonga, Tuvalu, Trinidad and Tobago.

The United Nations, which is actively supporting the move, will be represented by the UN Environment Programme (UNEP), the UN Development Programme (UNDP), and the Food and Agriculture Organisation (FAO).

A brainchild of Maldivian President Maumoon Abdul Gayoom, the conference is expected to work out a basis of co-operation among the small states of the world and a programme of action to mobilize world attention on the catastrophic effects of sea-level rises.

The conference will also seek international co-operation in setting up protective measures against this environmental hazard.

President Gayoom, who has been personally involved in both national and international efforts to address this critical problem, warned the United Nations in 1987 that his country faces the threat of being wiped off the face of the earth.

In an emotional address to the 159-Nation General Assembly, he said: "A mean sea-level rise of two meters would suffice virtually to submerge the entire country of 1,190 small islands, most of which barely rise over two meters above mean sea-level, and precipitate the death of an entire nation state."

Gayoom said it was necessary for his country, with international assistance, to take preventive measures such as the establishment of an early warning system, strengthening coastal protection mechanisms, raising the land surface and moving present development activities inward.

In 1987 the Maldives was hit by three tidal waves shaking the 200,000 strong nation to its very foundations.

TITLE	TIME FRAME	VENUE
1. ESCAP/World Bank Regional Meeting and First Workshop on Strengthening of Protected Areas and Critical Ecosystem Management.	November 1989	Bangkok
2. IMO/UNEP Workshop on South Asian Marine Pollution Emergency Action Plan.	27th November to 1st December 1989	Bangkok
3. Meeting of Legal Experts to review the draft convention and protocols for the protection and management of the South Asian Seas Region.	December 1989	To be determined.
4. SACEP/ESCAP Workshop on Coas-Resources Management Planning.	10 days in December 1989	Goa, India (Venue to be confirmed)
5. 2nd Workshop on Strengthening of Protected Areas and Critical Ecosystem Management. ESCAP/World Bank.	February 1990	Colombo, Sri Lanka
6. First Workshop in connection with SAS - 3 Project 'Development of Systems of Protected Areas for South Asian Seas.'	Early 1990	Colombo
7. SACEP GC V Meeting	To be determined.	Colombo



*Baghi Bala Watershed Afforestation in Kabul, Afghanistan*



*Rehabilitation of salty marsh soil in Yazd by planting Tamarix.*