

# NEWS LETTER

Malé Declaration on Control and Prevention of Air Pollution and Its Likely Transboundary Effects for South Asia

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## Continuing Capacity Building for Monitoring



Participants and resource persons of the fifth regional training programme

**The transboundary air pollution monitoring network of the Malé Declaration has been strengthened with the installation of additional monitoring stations and through training programmes.**

### Regional training programme on monitoring transboundary air pollutants

The monitoring programme is a key element of the implementation of the Malé Declaration on Control and Prevention of Air Pollution and Its Likely Transboundary Effects for South Asia. Quality Assurance and Quality Control (QA/QC) is crucial for ensuring the quality of the monitoring programme and has been identified as a priority area by the member countries. As part of the capacity building in QA/QC, four regional level training programme have been held so far.

The fifth Regional Training Programme and Refresher Course was held at UNEP

RRC.AP, Thailand, during 27-30 March 2007. Participants from the agencies supporting the monitoring programme were trained in the standardized procedures for lab analysis and QA/QC checks. The training programme also reviewed the data collected from the Malé Declaration monitoring sites, the draft protocol for the inter-laboratory comparison and the methodology for the proposed passive sampler inter-comparison study.

The participants discussed the implementation of the monitoring programme during the Phase IV (2009-2012) of the Malé Declaration and provided the following recommendations:

- Continuation of the existing monitoring stations;
- Additional monitoring stations to improve the regional representativeness of the monitoring network;

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#### Monitoring

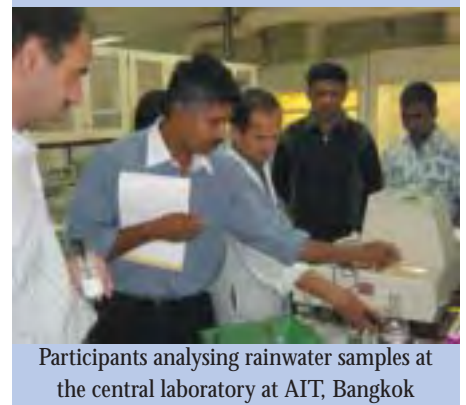
- Refresher training
- Installation of monitoring station in Pakistan

#### Impact assessment

- Training workshop on health impact assessment
- Crop studies initiated in Bangladesh
- Rapid urban assessment studies in Nepal

#### Mitigation

- Hydrogen energy for transportation in Nepal



Participants analysing rainwater samples at the central laboratory at AIT, Bangkok

- The monitoring manual needs to be updated with a standard format for reporting meteorological data;
- Inter laboratory comparisons should be implemented to improve data quality and reliability;
- Monitoring stations should be established for soil acidification monitoring and guidelines provided;
- The annual refresher training should be continued.

# Emission Inventory Preparation

The Malé Declaration promotes compilation of emission inventories across the region with harmonization through provision of guidelines and training programmes.

## Second training programme on emission inventory preparation, scenarios and atmospheric transport modeling

“Emission inventory preparation and integrated assessment modeling” was one of the priority areas identified for capacity building under Phase III implementation of the Malé Declaration. The first training workshop on emission inventory, emission scenario, and modeling was held in Bangkok during 3-8 July 2006. A follow-up training programme was organized at UNEP RRC.AP, Bangkok, Thailand during 26 February to 2 March 2007.

The participants presented the major findings of the national emission inventories they had compiled since the first workshop. The data collected from a variety of sources, were summarized in terms of absolute values/percentage of the pollutants from different sources. The participants highlighted the challenges faced by them in getting data and information, especially in the form required to be input into the emission inventory worksheet. Quality Assurance and Quality Control (QA/QC) for the emission inventories preparation was introduced. The draft Handbook on Policy Options for Air Pollution Prevention and Control in the Malé Declaration countries was also introduced to the participants. The Integrated Information and Assessment System (IIAS), which is being developed under the Malé Declaration, was reviewed by the training workshop.

## MATCH model installed at the UNEP Regional Resource Center

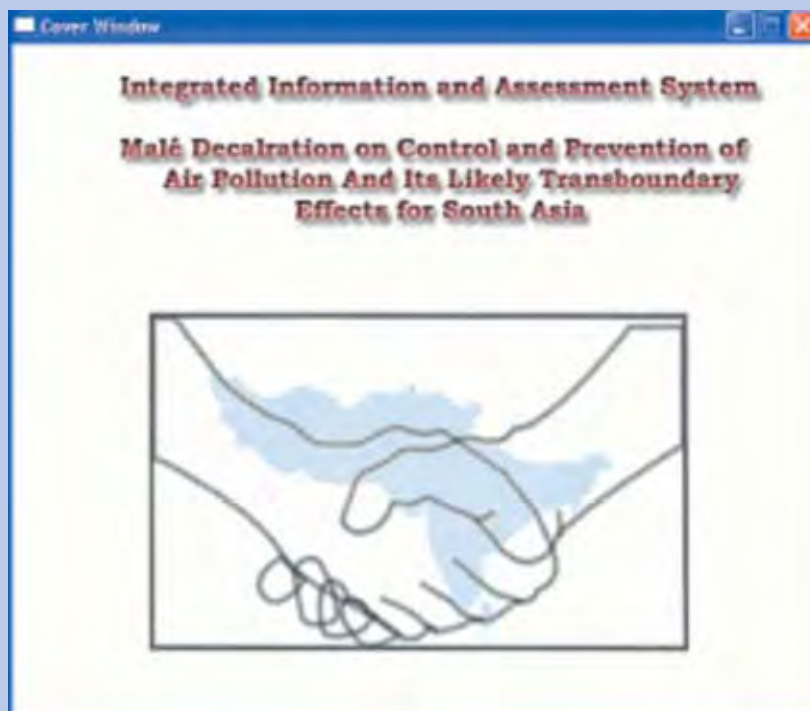
The Mesoscale Atmospheric Transport Chemistry Model (MATCH),



Participants and resource persons of the training programme

developed by the Swedish Meteorological and Hydrological Institute (SMHI), models the basic processes of atmospheric transport, governing sources, sinks and transformation of atmospheric trace constituents in a three-dimensional framework. MATCH could be used for research, emergency preparedness or environmental assessments.

The MATCH model was installed at the UNEP RRC.AP for during February 2007. The model will be used to build capacity in the region and for generating the transfer co-efficients for the Malé Declaration on IIAS.



The first version of IIAS is available for the network members

# Towards Mitigation

## Hydrogen Energy for Transportation in Nepal

Hydrogen is the simplest and lightest element known to us. As a clean energy carrier, it has raised hopes for a future hydrogen economy that could address current concerns on environment degradation and declining energy stocks.

Hydrogen has applications in transportation, industry and buildings. It can complement or replace electricity as an energy carrier, and provide storage options for intermittent renewable energy based power such as wind and solar photovoltaics. When used in fuel cells in stationary or mobile applications, it can be converted to electrical energy. It has a low energy density by volume, which makes its storage a challenge. Safety issues also have to be addressed due to its large flammability range.

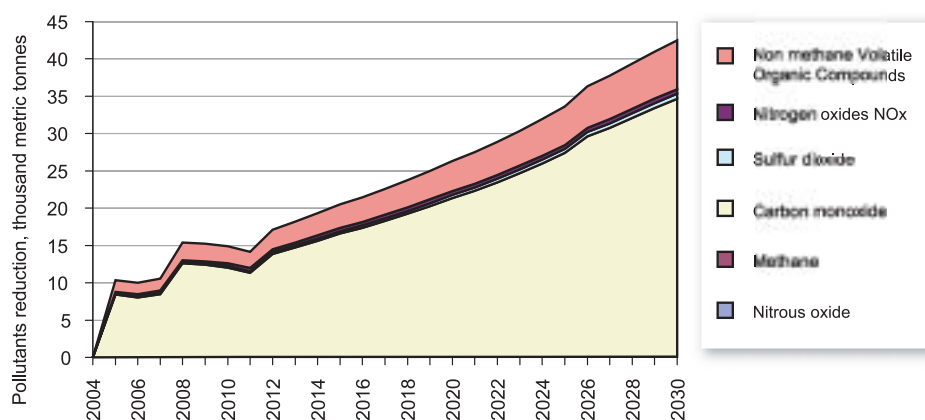
The environmental credentials of hydrogen depend on how clean the process of hydrogen extraction and use is. Though it is the most abundant element, it is found only in combination with other elements and hence needs to be extracted from hydrogen rich sources. Hydrogen can be extracted from hydrocarbons, biomass or from water. Steam reforming or partial oxidation of hydrocarbons is the most common method in use, but results in the emission of carbon dioxide and other pollutants. The other common method - electrolysis, does not produce any emissions, but the use of fossil fuel based electricity would cancel out its environmental benefits. Fortunately, many countries have the potential for cost-effective renewable energy based electricity, which could be used for electrolysis. Pilot projects in such regions could help to usher in the hydrogen economy.

Nepal is a mountainous country with a huge potential for hydropower. Even though less than 1% of this potential

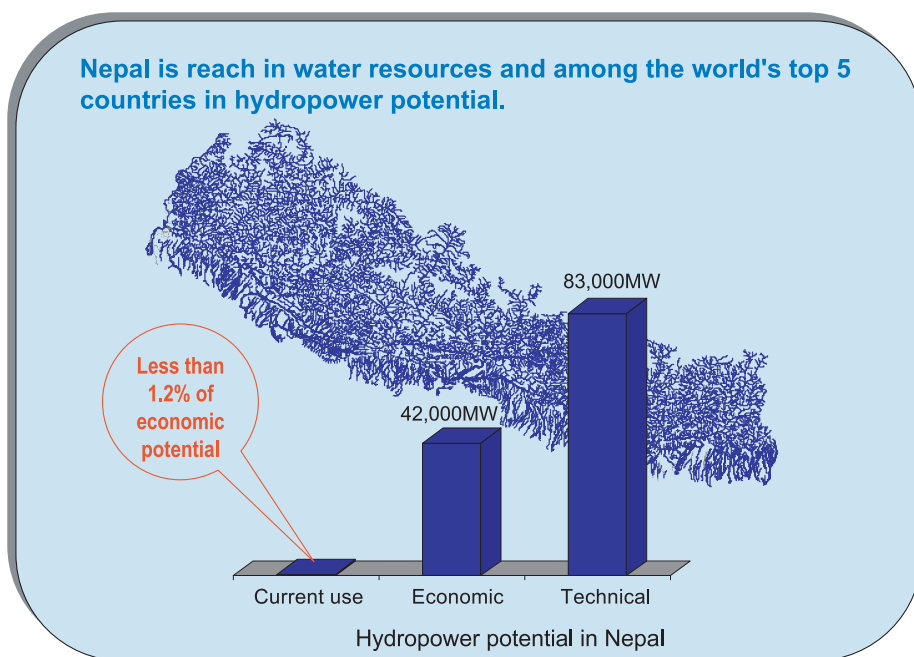
has been developed, the supply is in excess of current power demand.

UNEP commissioned a feasibility study to explore the option of using this surplus hydro-power to produce hydrogen. The study did a cost-benefit analysis of producing hydrogen from surplus hydro power during off peak hours and using it to meet the demand

for transportation in the Kathmandu valley. It considered the benefits of this technology for the nation, for the refueling station owner and for an individual hydrogen fuel vehicle owner. The study built up future scenarios for different growth rates of GDP and different percentage utilization of the surplus hydro power. (Continued on Page 4)



The avoided emissions if hydrogen is produced from surplus hydro power during off peak hours and is used to meet the demand for transportation in the Kathmandu valley.



Hydropower potential in Nepal



# Towards Mitigation...

The study concluded that hydrogen production and usage in vehicles is a feasible option in Kathmandu Valley. The surplus hydro power was found sufficient to produce enough hydrogen to meet a sizeable portion and in many cases, the entire transportation needs of the Kathmandu valley. The project was found to be economically feasible from the national perspective, the feasibility strongly depending on the electricity

tariff. Under current tariff rates, hydrogen energy based transportation is competitive with respect to that based on diesel. The study also found that investing in a refueling station is a feasible business proposition. As expected, under all scenarios there are drastic reductions in emissions, compared to the business as usual scenario. The avoided emissions are shown in the figure.

The encouraging outcome of this study needs to be followed up with verification and demonstration of the results. These small steps provide hope for all those committed to a sustainable future and the outputs could be invaluable as we debate the reality of a hydrogen economy.

## Monitoring Station in Pakistan

The Pakistan Environment Protection Agency, the National Implementing Agency for Malé Declaration in Pakistan, started the operation of the Malé Declaration monitoring site in March 2007. The site is located in Bahawalnagar in Punjab province.

The station has been established within the premises of Department of Meteorology, which will operate the monitoring station. The monitoring

station is capable of monitoring air quality as well as rainwater chemistry. Air quality measurements include: the concentrations of Respirable Suspended Particulate Matter (RSPM) or  $PM_{10}$  (particulate matter having a diameter  $<10\mu m$ ), Total Suspended Particulate Matter (TSPM), sulphur dioxide ( $SO_2$ ) and nitrogen dioxide ( $NO_2$ ). Rainwater analyses include: pH, and Electrical Conductivity (EC).



Establishment of monitoring station in Bahawalnagar in Punjab province, Pakistan

## Upcoming Events

### Site audits

Members of the monitoring committee will conduct site audits in Bangladesh and Nepal during May 2007.

### Exchange programme

An exchange programme will be held between the national level project managers and the Secretariat at UNEP RRC.AP, to initiate the planning for Phase IV and to collate the learning from Phase III activities. This is scheduled during 22-31 May 2007, at UNEP RRC.AP, Thailand.

### National stakeholders consultation

A national stakeholders consultation is scheduled to be held in June 2007 in Colombo, Sri Lanka.

### Crop impact assessment

The first workshop on crop impact assessment will be held in Bangladesh during August 2007.

### Health impact assessment

The second health impact assessment workshop will be held during October 2007 in Bangkok.

# Impact Assessment

The Malé Declaration aims to enhance the impact assessment capabilities of member countries through training programmes and field studies

## Regional training programme on the assessment of health impacts of air pollution

Health impacts assessment was one of the priority areas identified for capacity building under Phase III implementation of the Malé Declaration. The first training workshop on health impacts was held in Bangkok during 19 to 22 February 2007. The training helped the participants in understanding the concepts and the technical and policy measures that could be taken. The relevance of such measures in the South Asian context was also discussed. The presence of participants from both environmental and medical institutions backgrounds enriched the proceedings.

## National training programme on Rapid Urban Assessment

As part of the Malé Declaration impact assessment programme, a Rapid Urban Assessment (RUA) study is being conducted in Nepal. The study aims to provide an integrated view to decision makers of the health impacts of air pollution in the Kathmandu valley and to build capacity. The study was initiated with a week long training programme on Rapid Integrated Urban Assessment, held in Kathmandu, during 20-24 November 2006. Resource persons from the International Center for Integrated Mountain Development (ICIMOD) and the Swedish Environmental Research Institute (IVL) conducted the training programme. The training help the participants to

understand the RUA methodology and its application to Kathmandu valley.

## Crop impacts assessment was one of the priority areas identified for capacity building under Phase III implementation of the Malé Declaration.

The Bangladesh Agricultural University (BAU) has started field experiments since March 2007 using ozone sensitive and non-sensitive clones of clover to establish, as part of the crop impact assessment study in Bangladesh. Crop impact assessments have also been initiated in Pakistan, Nepal, and Sri Lanka.



Participants attending the health impact assessment workshop



School children and teachers are participating in the health impact study, Dhaka, Bangladesh

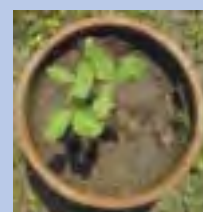


Participants attending the rapid urban assessment training programme, Kathmandu.



Clover plant planted at the BAU campus to detect the impacts of air pollutants on crops

Performance of NC-S clover cutting after 7days



Performance of NC-S clover cutting after 21days

# National Focal Points (NFP) and National Implementing Agencies (NIA)

## Bangladesh

NFP: Ministry of Environment & Forest

NIA: Department of Environment  
Dhaka

## Bhutan

NFP & NIA: National Environment Commission  
Thimpu

## India

NFP: Ministry of Environment and Forests

NIA: Central Pollution Control Board  
New Delhi

## Iran

NFP & NIA: Department of Environment  
Tehran

## Maldives

NFP & NIA: Ministry of Environment, Energy & water  
Malé

## Nepal

NFP: Ministry of Environment Science and Technology

NIA: International Center for Integrated Mountain Development (ICIMOD)  
Kathmandu

## Pakistan

NFP: Ministry of Environment, Local Govt. & Rural Development

NIA: Pakistan Environment Protection Agency,  
Islamabad

## Sri Lanka

NFP: Ministry of Environment & Natural Resources

NIA: Central Environment Authority, Colombo

## Coordinating Agencies

UNEP Regional Resource Center for Asia and the Pacific (UNEP RRC.AP)  
Bangkok, Thailand



South Asia Co-operative Environment Programme (SACEP)  
Colombo, Sri Lanka



Stockholm Environment Institute (SEI)  
Stockholm, Sweden



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## Malé Declaration Newsletter

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