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PARTICIPATION OF NEWLY INDEPENDENT STATES (NIS) AND SOME OTHER COUNTRIES IN TRANSITION IN INTERNATIONAL AIR POLLUTION MONITORING AND ASSESSMENT NETWORKS[1]

Note by the Meteorological Synthesizing Centre – East (MSC-E)[2]

1. MSC-E is engaged in research and assessment of long-range transport of heavy metals (HM) and persistent organic pollutants (POPs). The experience gained in the course of cooperation within the framework of the Convention on Long-range Transboundary Air Pollution, Helsinki Commission (HELCOM) and the Arctic Monitoring Assessment Programme (AMAP) is at the basis of this note.

2. The main focus is on:

(a) The availability of data at national level;

[1]The designations employed in this document do not imply the expression of any opinion whatsoever on the part of the Secretariat of the United Naitons concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. In particular, the boundaries shown on the maps do not imply official endorsement or acceptance by the United Nations.

[2]MSC-E is one of three centres of the Cooperative Programme for Monitoring and Evaluation of the Long-range Transmission of Air Pollutants in Europe (EMEP) under the UNECE Convention on Long-range Transboundary Air Pollution. The document has been prepared by Messrs. S Dutchak and M .Fedunin.

(b) The advantages of NIS participation in international air pollution monitoring and assessment networks for individual NIS themselves and for the international community;

(c) Broadening NIS participation in the networks and improving its effectiveness.

I. AVAILABILITY OF DATA AT THE NATIONAL LEVEL

A. Emissions

3. All Parties to the Convention on Long-range Transboundary Air Pollution report data on national emissions. The three Baltic States and seven NIS report data on the traditional air pollutants (SO_x, NO_x, NMVOC, CH4, CO, CO_2). Since signing the protocols on HMs and POPs (Aarhus, 1998), the three Baltic States and six NIS have also provided emission data on Pb, Cd, Hg, As, Cr, Cu, Ni, Zn on a regular basis. The three Baltic States and four NIS have provided emission data on some POPs.

4. Data reported under the Convention give an opportunity to see trends in emission levels. Figure 1 illustrates emission variations of lead in the Republic of Moldova. Emissions of lead in this country declined 23-fold during 1990-99. Over the same time period, emissions of lead reduced as much as 21-fold in Belarus, 5-fold in Estonia, 1.7-fold in Latvia and 1.5-fold in the Russian Federation.

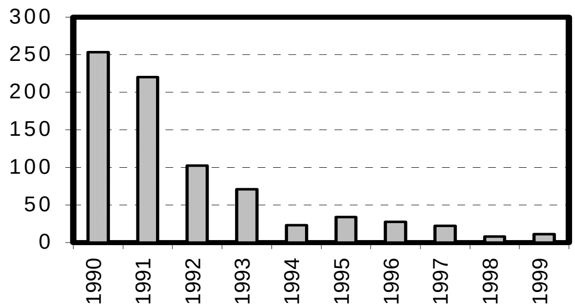


Figure 1. Trend in lead emissions for the Republic of Moldova, ton/year

5. It should be pointed out that some NIS submit limited information or do not provide any at all. Emission inventories often do not cover all pollution sources. For example, Armenia does not estimate lead emissions from road transport although for the majority of countries it is the main source of lead emissions. In some countries (e.g. in Belarus and Ukraine), only ammonia emissions from industrial sources are assessed, while the main input of ammonia is from agriculture.

6. The application of an agreed methodology for emission inventories is the key element in the improvement of emission data quality. CORINAIR (CORe INventory of AIR emissions) and EMEP work jointly on the Atmospheric Emission Inventories Guidebook. To facilitate its use MSC-E has translated it into Russian and convened two training courses for NIS and the three Baltic States (in 1998 and 1999) and the workshop on the further development of the EMEP/CORINAIR Guidebook (Moscow, 2001). MSC-E, in collaboration with external experts,

estimates emissions of selected POPs for a number of European NIS and for the Russian Federation. It has also started compiling expert emission estimates for NIS in Central Asia. In particular, its database contains emissions of sulphur compounds, mercury, lead and selected POPs. NIS emission data are used for assessing the long-range transport and pollution loads in Europe, the regional seas (the Baltic, North, Mediterranean and the Black Seas), and the Arctic and Asian regions.

B. Measurements

7. Estonia, Latvia and Lithuania measure nitrogen and sulphur compounds and heavy metals within EMEP and HELCOM monitoring programmes. The Russian Federation provides measurement data on nitrogen and sulphur compounds to EMEP. Figure 2 demonstrates that there are few monitoring stations, located mainly in the Baltic States and the northwest of the Russian Federation.

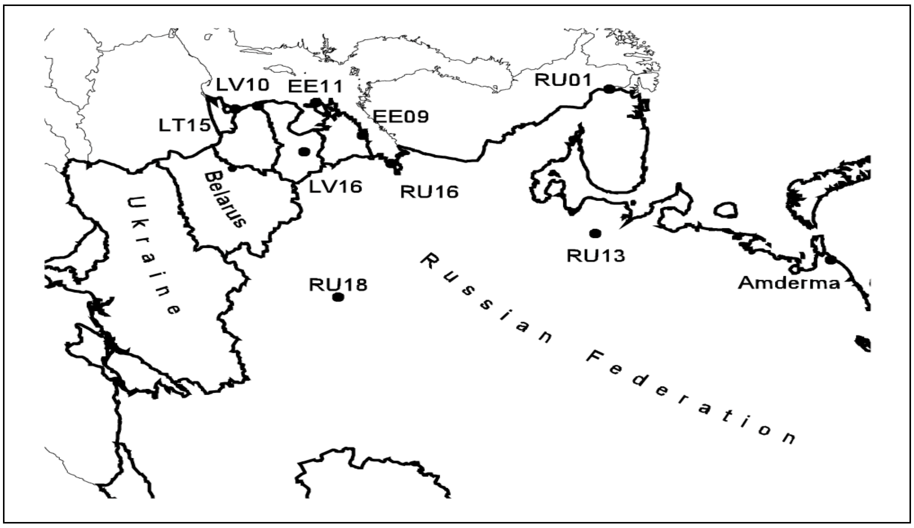


Figure 2. Map of NIS monitoring stations involved in EMEP, HELCOM and AMAP

8. The primary network of long-range atmospheric transport monitoring stations, particularly for POPs and associated methodologies, was developed during earlier AMAP activities. Recently this network has been expanded to fill gaps in geographical coverage. A POPs monitoring station was established in 2000 in Amderma, in the Russian Arctic, within the framework of the joint AMAP/Russian /Canadian project.

9. Limited measurement data make it impossible to see an overall pattern of pollution in NIS. The need to develop the monitoring network in NIS is quite evident. Given the high cost of the monitoring network it is reasonable to use an integrated approach based on monitoring and modelling data for the evaluation of pollution levels in a country. EMEP, HELCOM and AMAP widely use the monitoring/modelling approach for the evaluation of air pollution transport and contamination loads.

C. Modelling

10. Along with monitoring data, mathematical modelling provides information about pollution levels from national and external sources, long-term trends, seasonal variations, contributions of different source categories, and exceedance over critical loads. MSC-E performs calculations of HM and POP transport and deposition in Europe and provisional model runs for the northern hemisphere, providing estimates for NIS located in Asia. Model estimates for sulphur, nitrogen and ground-level ozone are performed by EMEP/MSC-West. Some examples of model results for NIS are presented below.

II. CONVENTION ON LONG-RANGE TRANSBOUNDARY AIR POLLUTION

11. The status of ratification (as of 7 December 2001) of the Convention and its protocols by NIS and the Baltic States is illustrated in table 1.

Table 1. Status of the Convention and its protocols (as of 7 December 2001) for NIS and the Baltic States

	1979 Convention	**1984** EMEP Protocol	**1985** Sulphur Protocol	**1988** NOx Protocol	**1991** VOC Protocol	**1994** Sulphur Protocol	**1998 Protocol on** Heavy Metals	**1998** Protocol on POPs	**1999** Gothenburg Protocol
Armenia	1997 (Ac)						1998 signature	1998 signature	1999 signature
Azerbaijan									
Belarus	1980 (R)	1985 (At)	1986 (At)	1989 (At)					
Estonia	2000 (Ac)	2001 (Ac)	2000 (Ac)	2000 (Ac)	2000 (Ac)				
Georgia	1999 (Ac)								
Kazakhstan	2001 (Ac)								
Kyrgyzstan	2000 (Ac)								
Latvia	1994 (Ac)	1997 (Ac)					1998 signature	1998 signature	1999 signature
Lithuania	1994 (Ac)						1998 signature	1998 signature	
Republic of Moldova	1995 (Ac)						1998 signature	1998 signature	2000 signature
Russian Federation	1980 (R)	1985 (At)	1986 (At)	1989 (At)		1994 signature			
Ukraine	1980 (R)	1985 (At)	1986 (At)	1989 (At)	1991 signature	1994 signature	1998 signature	1998 signature	
Uzbekistan									
Tajikistan									
Turkmenistan									

R = Ratification Ac = Accession At = Acceptance

12. With the example of Ukraine we would like to illustrate the availability of environmental information for this country. At present Ukraine submits only emission totals for the pollutants required under EMEP. Spatial distribution of emissions for the evaluation of transboundary transport has been prepared by MSC-E (fig. 3). Ukraine does not provide any monitoring data for its territory. To have an idea of environmental pollution in Ukraine, model calculations are used. Figures 3-6 give spatial emission distribution, emission trends and modelling results for lead dispersion.

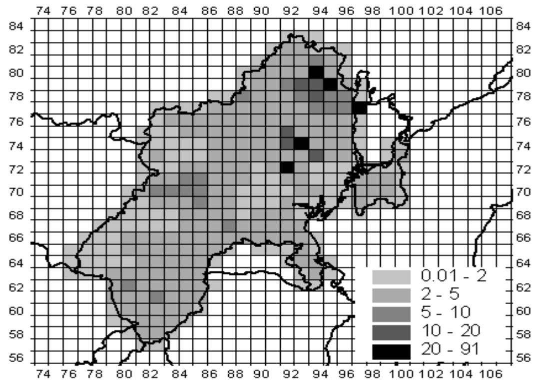


Figure 3. Spatial distribution of lead emissions for Ukraine for 1999, 50x50 km^2, kg/km^2/year

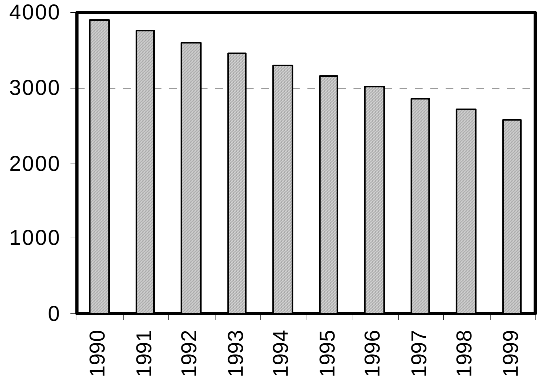


Figure 4. Trend in lead emissions for Ukraine to the other counters (expert estimates), tons/year

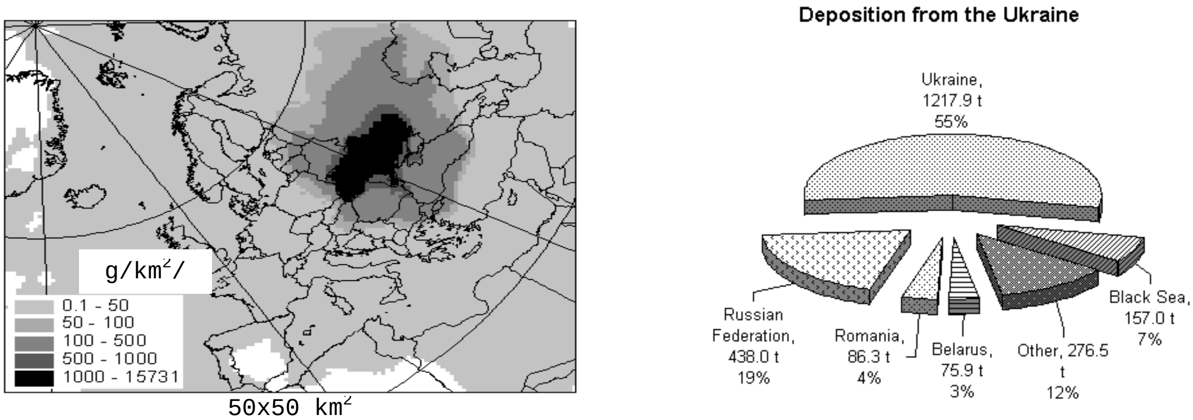


Figure 5. Lead depositions from national sources in Ukraine in 1999

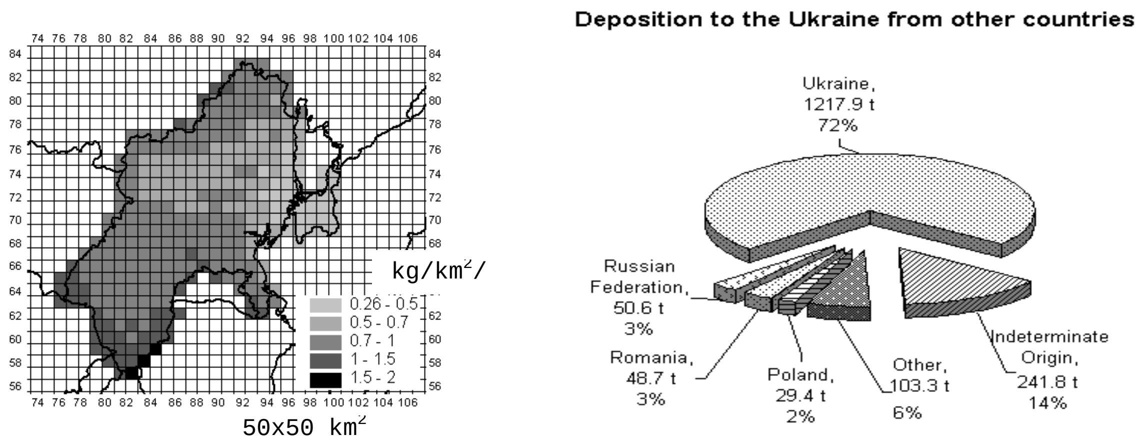


Figure 6. Lead depositions to Ukraine from external sources in 1999

13. The bulk of the pollution emitted in Ukraine (55%) is deposited within its borders. Figure 5 shows that the main countries-receptors of lead deposition from Ukrainian sources are the Russian Federation (19%), Romania (4%) and Belarus (3%). Some 7% of lead is deposited

in the Black Sea. In its turn, Ukraine is polluted by the Russian Federation, Romania, Poland and other countries (fig. 6).

14. Figure 7 demonstrates calculated trends in lead depositions from European countries to Ukraine in the 1990-98 period.

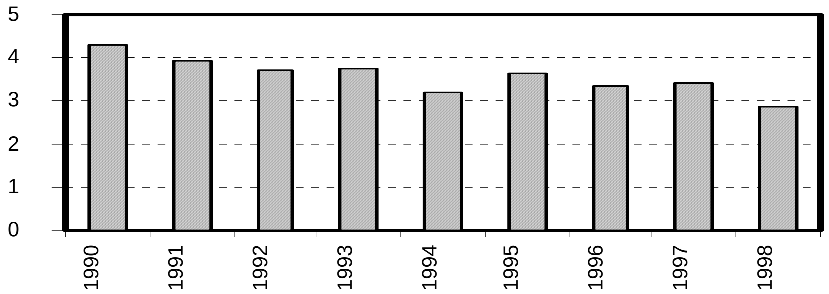


Figure 7. Trend of total (wet and dry) deposition densities of lead to Ukraine, kg/km^2/year

15. A similar situation exists in most NIS as far as the availability of emission and measurement data is concerned. Modelling could, therefore, be considered as an important source of information about the state of the environment in NIS.

III. HELCOM

16, Estonia, Latvia, Lithuania and the Russian Federation are Contracting Parties to the Convention on the Protection of the Marine Environment of the Baltic Sea Area. Participation in HELCOM gives these countries a possibility to receive information about the pollution of the Baltic Sea (table 2) and its catchment areas adjacent to these countries, to assess their contribution and that of external sources to the Baltic Sea pollution and to investigate pollution trend fit against emission trends and measurements. This information is a significant component for the development of a national environmental protection strategy.

Table 2. Contributions from countries to the depositions of heavy metals to the Baltic Sea in 1998, kg/year

	Lead	Cadmium	Mercury
Estonia	13701	74	4
Lithuania	2287	1891	98
Latvia	13844	577	94
Russian Federation	149141	2785	349

17. The four above-mentioned countries participating in HELCOM have few monitoring stations on their territory (fig. 2). For the assessment of the pollution level in these countries and the contamination load on the Baltic Sea model calculations are applied for the time being. The emission data submitted to EMEP are used for these calculations. With the example of Latvia we illustrate the pattern of depositions from this country to the Baltic Sea and adjacent countries (fig. 8).

18. Figure 9 shows that the transboundary transport of cadmium is the main contributor to the

contamination of the Gulf of Riga. The main input to this sub-basin of the Baltic Sea comes from: Poland (283.7 kg/year), Germany (59.8 kg/year) and Lithuania (50.7 kg/year) while Latvia contributes 25.2 kg/year that is, less than 4%.

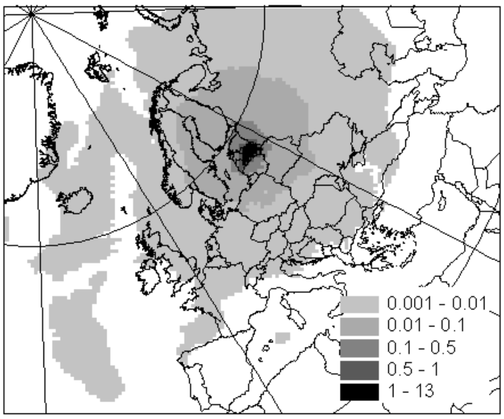


Figure 8. Cadmium depositions from Latvian national sources to the Baltic Sea and its catchment area, g/km^2/year

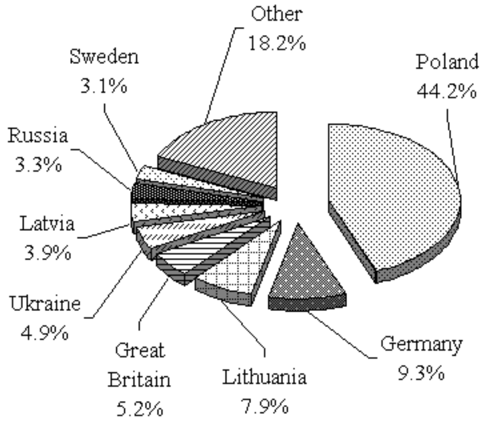


Figure 9. Contributions from countries to depositions of cadmium to the Gulf of Riga

IV. AMAP

19. AMAP was established in 1991 to implement certain components of the Arctic Environmental Protection Strategy (AEPS). The Russian Federation is the only NIS participating in this programme.

20. The Russian Federation has stations measuring sulphur and nitrogen compounds (fig.2) and, together with Canada and AMAP, is establishing a station for POPs monitoring. Official emission data are available mainly for the European part of the Russian Federation. For the Asian part emission estimates are used. At present, Arctic pollution by different countries and regions is assessed on the basis of model calculations. Research into Arctic pollution is being carried out under various international projects assisted by AMAP, the United Nations Environment Programme (UNEP), EMEP, the World Meteorological Organization (WMO), the European Union and others.

21. Assessing POP and HM long-range airborne transport and deposition to the Russian Arctic is one of the major activities under the RAIPON/AMAP/GEF Project “Persistent Toxic Substances, Food Security and Indigenous Peoples of the Russian North”. This work is being implemented by MSC-E, with the Norwegian Institute for Air Research (NILU) and the AMAP secretariat. Under the project MSC-E has estimated Arctic pollution by lead from regions of the northern hemisphere. Information on depositions to the Arctic region is shown in figures 10 and 11. It should be noted that the Asian part of the Russian Federation contributes about 37% to lead deposition to the Arctic, while emissions from this region are less than 5% of the total emissions from the northern hemisphere. The contribution of the Russian Federation’s European part is included in the overall pollution from Europe.

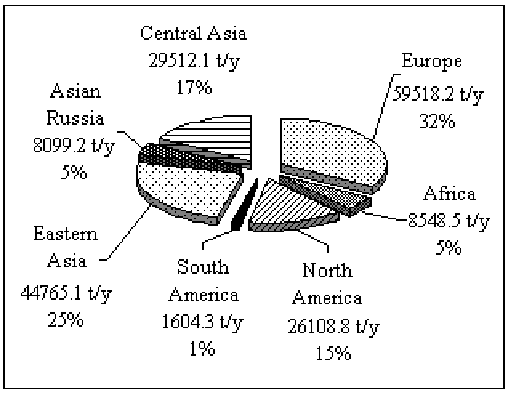


Figure 10. Lead emission from different regions in 1990, tons/year

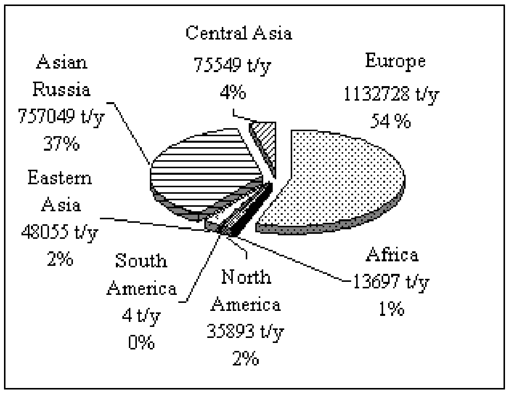
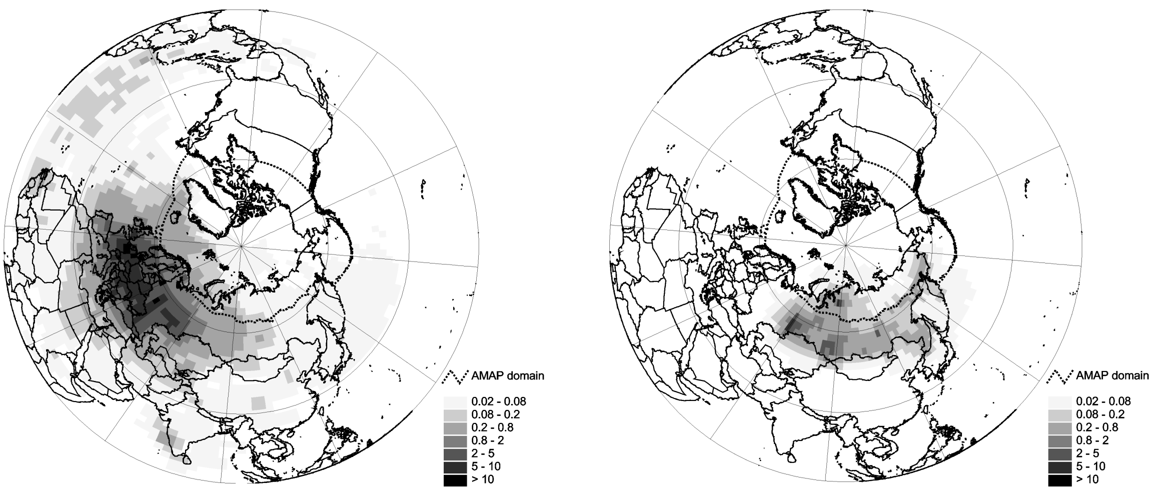


Figure 11. Lead depositions to the Arctic region from various regions in 1990, tons/year

22. Maps of lead deposition to the northern hemisphere, including the Arctic region, from Europe and the Asian part of the Russian Federation are presented in figure 12. These maps show the principal pathways of lead transport to the Arctic region.



Europe *The Asian part of the Russian Federation*

Figure 12. Spatial distribution of lead deposition fluxes from Europe and Asian Russia in 1990, mg/m^2/year

V. ADVANTAGES OF NIS PARTICIPATION IN INTERNATIONAL AIR POLLUTION MONITORING WORK

23. The active participation of NIS in international conventions for the abatement of air pollution is very important both for NIS themselves as well as for the whole region and even globally. Conventions, such as the Convention on Long-range Transboundary Air Pollution, establish a framework for the development of strategies to abate the harmful effects of air pollution on human health and ecosystems. Joint international abatement strategies achieve environmental targets in a more effective and less costly way than isolated national strategies. Below is a summary of advantages to be expected from increased participation by NIS in the international cooperative efforts that are under way.

A. Advantages for individual NIS

24. These advantages include:

- Opportunities for establishing a basis for cost-effective strategies to reduce the harmful effects of air pollution on human health, ecosystems and materials, jointly with all other countries of the region;
- Possibilities for using the unified methodology (manuals and guidebooks) for air pollution measurements, emission inventories and assessment of critical loads. Participation in workshops and training courses on monitoring and emissions. Intercalibration of analytical methods used by national laboratories;
- Acquisition of modelling information about pollution levels and trends in a country with spatial resolution 50x50 km^2. Data on pollution exceedance versus internationally agreed critical loads. Acquisition of information about the contribution of own sources and sources from neighbouring countries to the pollution of its own territory, adjacent sea basins and highly sensitive regions (e.g. the Arctic);
- Development of a programme for emission reduction on the basis of the best available technologies and standards;
- Familiarization with the experience of other countries in the field of monitoring and abatement strategy;
- Financial support for participation in international workshops, meetings of task forces and working groups and in research programmes;
- Application of multilateral environmental agreements to national environmental legislation.

B. Advantages for the international community

25. These include:

- Acquisition of reliable information about emissions, air pollution levels and transboundary transport from NIS to neighbouring countries, marginal seas and the Arctic, etc.;
- Establishing the basis for cost-effective international strategies to reduce the harmful effects of air pollution on human health, ecosystems and materials;
- Joint activity for the environmental protection on a regional and global scale taking into account NIS geographical position, size and pollution input;
- Acquisition of information about national emission reduction and environmental protection strategy and policy;
- Involvement of NIS experts in research carried out within international projects and programmes;

- NIS involvement in the procedures of compliance and enforcement regimes under multilateral environmental agreements which these countries are Parties to.

C. Broadening NIS participation in the networks and improving its effectiveness

26. A significant element in improving air pollution monitoring in NIS is their accession to international agreements, conventions and protocols. International cooperation under these instruments can strengthen national capacities in the area. In this regard, MSC-E can render assistance in:

- The development of monitoring/modelling approach;
- The assessment of pollution levels, trends and transboundary transport for NIS;
- The organization of training courses and workshops;
- The preparation of emission expert estimates;
- The translation of technical and methodological materials into Russian.

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27. Additional information about official emission data, emission expert estimates, monitoring data, depositions and transboundary fluxes, etc. can be found on the EMEP web site www.emep.int and on the MSC-E web site www.msceast.org.