

1. BACKGROUND

1.1 Objective of the Project

Dust and sandstorm (DSS) is the generic term for a serious environmental phenomenon in Northeast Asia. It causes considerable hardship and loss of income, disrupts communications, affects peoples' health, and, in extreme cases, leads to death of people and destruction of livestock and crops over large areas in the affected countries.

At the request of the governments of the People's Republic of China (PRC) and Mongolia, the Asian Development Bank (ADB), the United Nations Convention to Combat Desertification Secretariat (UNCCD), the United Nations Economic and Social Commission for Asia and Pacific (UNESCAP), and the United Nations Environment Programme (UNEP), initiated their own projects for the prevention and control of DSS in Northeast Asia. The ADB prepared the project concept for a regional technical assistance (RETA or TA) in early May 2002 and the three agencies of the United Nations made a project proposal to seek support from the Global Environment Facility (GEF) to address the same environmental problem in the region.

During a meeting among the environment ministries of the PRC, Japan, the Republic of Korea, and Mongolia in June 2002, it was proposed by the governments of the four countries that the ADB, the UNCCD, the UNESCAP, and the UNEP jointly develop an expanded TA to integrate the support from the international community, maximize the effects of the undertaking, and promote regional cooperation on DSS to be co-financed by the ADB and the GEF. A joint fact-finding and consultation mission comprising representatives from the four international organizations led by the ADB visited the PRC and Mongolia from 26 August to 2 September 2002. The mission reached an understanding with the governments of the PRC and Mongolia on all aspects of the Terms of Reference for the TA. The joint project on "Prevention and Control of Dust and Sandstorms in Northeast Asia (RETA 6068)" was then approved by the ADB and the GEF in December 2002 and its implementation commenced in March 2003. Appendix 1 presents the Terms of Reference of RETA 6068 Project while Appendix 2 lists the participating parties involved in undertaking the project.

The TA project was implemented together by the ADB, the UNESCAP, the UNCCD, and the UNEP in collaboration with the governments of the PRC, Japan, the Republic of Korea, and Mongolia. A Steering Committee and three Technical Committees were organized for the implementation of the project with the ADB as the executing agency responsible for the overall management and administration of the TA.

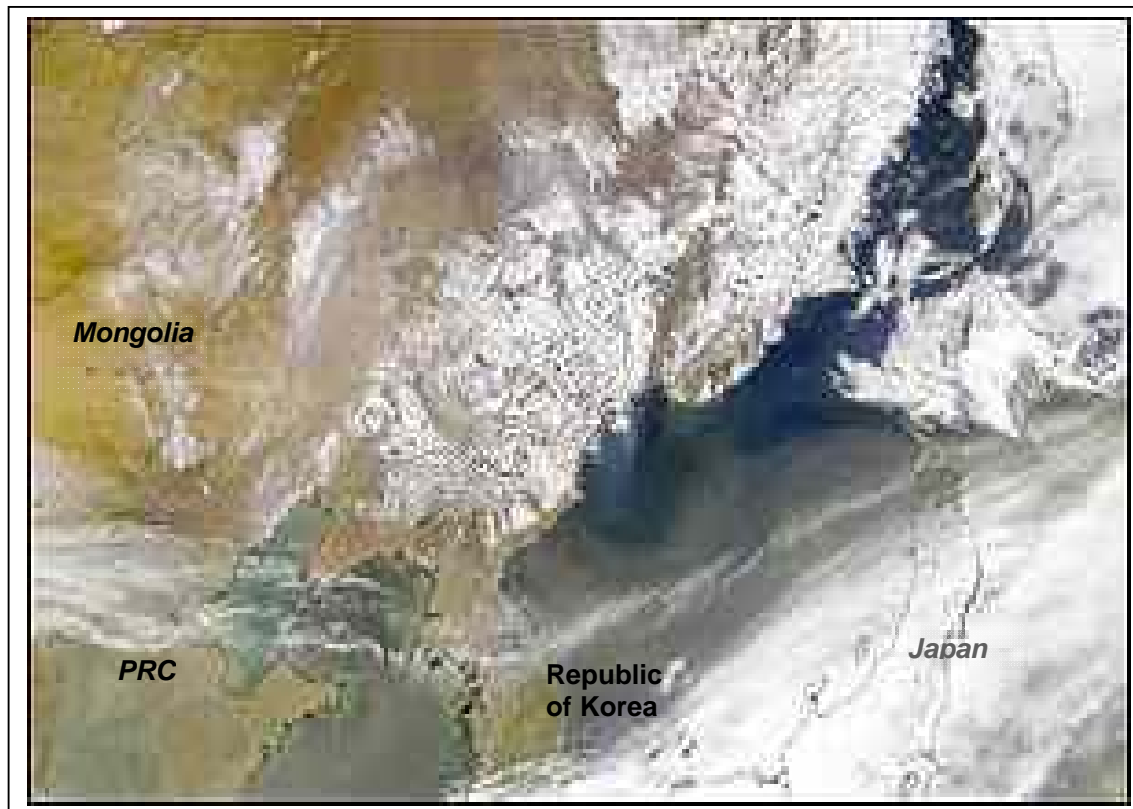
The main objective of this collaborative project is to promote the establishment of a regional cooperation mechanism for the prevention and control of DSS in Northeast Asia. In this connection, the specific output of the study is a master plan to guide regional collaborative activities to alleviate DSS in Northeast Asia. The components of the regional master plan are: (a) a phased program to establish a regional monitoring and early warning network for DSS in Northeast Asia, and (b) an investment strategy to strengthen mitigation measures to address root causes of DSS in source areas. The first component was implemented under the guidance and supervision of a technical committee chaired by UNEP and focused on the establishment of a regional network for monitoring, early warning, and forecasting of DSS. It presents a phased program to establish a regional DSS monitoring and early warning network by strengthening the monitoring capacity in the two DSS source countries (i.e., the PRC and Mongolia), establishing an institutional framework among the four partner countries, and improving the information flow for effective early warning services.

The second component was implemented under the guidance and supervision of a technical committee chaired by UNESCAP and focused on: (i) the selection of sites for nine demonstration projects (four in PRC and four in Mongolia and a sub-regional demonstration site that straddles the border of both countries), (ii) the identification of best practices for the demonstration projects for DSS prevention and control, and (iii) the development of an investment strategy including recommendations on sustainable financing mechanisms for the promotion and dissemination of best practices in addressing the causes of DSS.

1.2 Scope of the Project

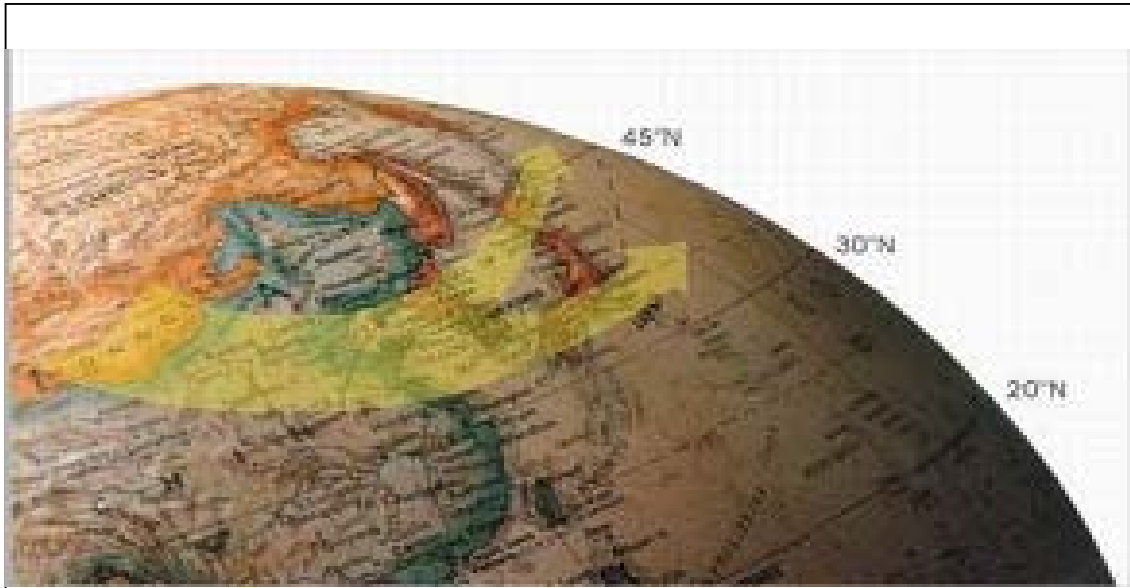
Although DSS in Northeast Asia affects a wide geographic area, the project involves four participating countries—PRC, Japan, the Republic of Korea, and Mongolia—all are members of ADB. Specifically, the geographic area covered includes part of continental Asia (PRC, the Korean peninsula, and Mongolia) and the neighboring islands of Japan (see Figure 1.1). However, the wind and weather patterns of the DSS force may originate in the Russian Federation to the north and west and in Kazakstan to the west of the PRC and Mongolia (see Figure 1.2) and the DSS impact may be felt in Democratic People's Republic of Korea (DPRK) and in North America. Thus, DSS is an example of a transboundary environmental problem.

Figure 1.1 DSS Geographic Coverage



Note: A fast cloud of dust over Mongolia and the PRC with transport path towards the Republic of Korea and Japan.

Source: NASA, May 2001 satellite image

Figure 1.2 DSS Transport Process by Air Flows

Source: SEPA, Beijing

As for the planning timeframe targeted in the project for DSS prevention and control for Northeast Asia, 15 to 20 years was used commencing from 2004/2005. Due to advances in technology and the development of new and substantial information about DSS, however, recommendations specifically on monitoring and early warning are planned within the next two to five years. Recommendations for implementing the demonstration site projects, on the other hand, can take on a longer development period depending on the availability of resources.

1.3 The Dust and Sandstorm (DSS) Phenomena in Northeast Asia

DSS involves strong winds that blow a large quantity of dust and fine sand particles away from the ground and carry them over a long distance with severe environmental impacts along the way. It often has severe impacts across the countries in the region. The major sources of DSS in the region are the DSS originating source areas in the desert and semi-desert areas of the PRC and Mongolia. Long distance transport of dust aerosol particles links the biogeochemical cycles of land, atmosphere and ocean, possibly even influencing the global carbon cycle, and having a significant effect on regional radiative balances, and human health.

DSS as a natural phenomenon has occurred for thousands of years in the region. During the past 50 years, however, the frequency has increased, geographic coverage has expanded, and damage intensity has accelerated. Available PRC statistics indicate that average occurrence of DSS was 5 times a year in the 1950s, 8 times in 1960s, 14 times in 1970s, and 23 times in 1990s. The region experienced 32 DSS in 2001 and the most severe DSS for decades in early 2002.

Large-scale DSS has significant environment effects that cause enormous economic losses, present serious public health concerns over a wide geographic area, and sometimes take human lives. For instance, the DSS on 5 May 1993 directly affected 1.1 million square kilometers in the PRC, which resulted in human casualties (i.e., 85 deaths and 246 injuries)

and destruction of 4,412 houses, 120,000 livestock, and 373,000 hectares of crop land¹. The direct economic cost of this DSS within the PRC alone was more than CNY550 million (about US\$66 million at 2002 exchange rate). The two most severe DSS events in decades took place in March and April 2002. They swept across Mongolia and hit 18 provinces in PRC, the Korean peninsular, and a large area of Japan. Total suspended particulate levels in these affected areas were recorded from tens to hundreds of times higher than the national standards in these countries. The DSS in early April 2002 was so severe that Mongolia had to close its international airport in Ulaanbaatar for three days. Also, the Republic of Korea had to close their primary schools and cancel more than 40 flights departing from Gimpo Airport in Seoul. Satellite images of DSS events and analysis of the dust samples collected on the ground have revealed that impacts of strong DSS are not limited to the region, but reached as far as North America across the Pacific Ocean.

The occurrence of DSS is built upon two prerequisites. They are (i) dry and loose surface and (ii) strong² and persistent wind. Understanding a DSS event would entail the study of meteorological conditions and soil surface properties and how these interface with each other. DSS in Northeast Asia mainly originates from the mid-latitude Desert Zone (N 40-45°E 90-120°). Driven by the East Asia winter monsoon, DSS generated from areas above moves southeast and then to the east parallel along N 40°, passing the Korean Peninsula and Japan to the northern areas of the Pacific Ocean.

¹ Yang Youlin and Lu Qi In "Global Alarm: Dust and Sandstorms from the World's Drylands". UN 2002 for an account of the severe DSS event in the Hexi corridor of Gansu Province, PRC

² Generally 6.5 meters/second (m/s) is regarded as the threshold wind velocity to initiate a dust outbreak provided that the soil surface is dry. Soil texture is also a determining factor.