

ASIAN DEVELOPMENT BANK

TAR:OTH 36267

TECHNICAL ASSISTANCE

(Cofinanced by the Japan Special Fund and Global Environment Facility)

FOR

**PREVENTION AND CONTROL OF DUST AND SANDSTORMS
IN NORTHEAST ASIA**

December 2002

ABBREVIATIONS

ADB	–	Asian Development Bank
CNY	–	yuan (unit of Chinese currency)
DSS	–	dust and sandstorm
ESCAP	–	United Nations Economic and Social Commission for Asia and Pacific
GEF	–	Global Environment Facility
PRC	–	People's Republic of China
TA	–	technical assistance
UNCCD	–	United Nations Convention to Combat Desertification
UNEP	–	United Nations Environment Programme

NOTE

In this report, "\$" refers to US dollars.

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I. INTRODUCTION

1. Dust and sandstorm (DSS) is the generic term for a serious environmental phenomenon 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, and often with severe impacts across the countries in the region. The major sources of DSS in the region are the desert and semidesert areas of the People's Republic of China (PRC) and Mongolia (DSS originating source areas). To address the long-range transboundary environmental problem of DSS, a regional cooperation mechanism must be established among the countries in the region so that the problem can be addressed in a coordinated manner. At the request of the governments of the PRC and Mongolia, in early May 2002 the Asian Development Bank (ADB) started to prepare a regional technical assistance (TA) for prevention and control of dust and sandstorm in Northeast Asia.¹ In parallel, three agencies of the United Nations—United Nations Environment Programme (UNEP), United Nations Economic and Social Commission for Asia and Pacific (ESCAP), and United Nations Convention to Combat Desertification Secretariat (UNCCD)—initiated a similar project proposal to seek support from the Global Environment Facility (GEF) to address the same environmental problem in the region.

2. To integrate the support from the international community and maximize its effects, at a meeting among the environment ministries of PRC, Japan, Republic of Korea, and Mongolia in June 2002, the governments of the four countries proposed that ADB, ESCAP, UNCCD, and UNEP jointly develop an expanded and integrated TA to promote regional cooperation on DSS to be cofinanced by GEF. A joint fact-finding and consultation mission comprising representatives from ADB, ESCAP, UNCCD, and UNEP and led by ADB visited PRC and Mongolia from 26 August to 2 September 2002. The mission reached an understanding with the governments of PRC and Mongolia on all aspects of the TA including the goals, purpose, scope, implementation arrangement, cost estimates, financing plan, and terms of reference. The TA framework is provided at Appendix 1.

II. ISSUES

3. 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. PRC statistics available indicate that average occurrence of DSS was 5 times a year in 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.

4. 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 life. For instance, the DSS on 5 May 1993 directly affected 1.1 million square kilometers in the PRC, which resulted in 85 dead, 246 injured, 4,412 houses destroyed, 120,000 livestock dead or lost, and 373,000 hectares of crop land damaged. The direct economic cost of this DSS within the PRC alone was more than CNY550 million (about \$66 million at the current exchange rate). The two most severe DSSs in decades took place in March and April 2002. They swept across Mongolia and hit 18 provinces in PRC, the Korean Peninsula, 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

¹ The TA first appeared in *ADB Business Opportunities* (Internet version) on 13 June 2002.

early April was so severe that Mongolia had to close its international airport in Ulaanbaatar for 3 days, and the Republic of Korea had to close primary schools and cancel more than 40 flights departing from Kimpo Airport in Seoul. Satellite images of DSSs and analysis of the dust samples collected on the ground have revealed that impacts of strong DSSs are not limited to the region, but reach as far as North America across the Pacific Ocean.

5. A preliminary study indicates that 18 of the 32 DSSs in 2001 originated from the deserts of Mongolia, and the remaining 14 originated from the desert or semidesert areas of Inner Mongolia Autonomous Region, the PRC. Natural elements, large desert and semidesert areas, the strong winds from Siberia sweeping these DSS originating source areas, lasting drought, natural disasters, and other factors contribute to DSS. Their effects have been strengthened and intensified significantly, however, by human interventions over the last few decades, particularly through overgrazing, overreclamation, deforestation, and overexploitation of water resources in the DSS originating source areas, which lead to rapid land degradation and desertification. Although all the countries in the region are affected by DSS, effective actions are urgently needed in the DSS originating source areas in PRC and Mongolia to arrest deterioration of the land, before the situation becomes irreversible.

6. The governments of PRC and Mongolia have formulated comprehensive programs to combat land degradation and desertification, which serve as their main thrust to alleviate DSS. With support from ESCAP, UNCCD, and UNEP, PRC and Mongolia have developed their national action programs to combat desertification. In early 2002, the PRC Government announced a 10 year program with a total investment of CNY54 billion (about \$6.5 billion) to address the DSS concern in the northern PRC. With support of ADB, the PRC Government has also established a partnership with GEF for an overall program on land degradation in dryland ecosystems. However, the linkage of these national initiatives to the regional concern of transboundary DSS is yet to be established through cooperation beyond national borders. Without an effective policy and coordination at a regional level, the effectiveness of the national initiatives will be limited.

7. The intensified transboundary DSS has mobilized very strong public will for regional cooperation on combating DSS, particularly in the DSS-affected areas, where hundreds of millions of people have been exposed to the impacts of DSS on living standards, public health, and economic wealth. In addition to various initiatives of the governments, nongovernment organizations and volunteers from the DSS-affected countries have been actively undertaking cross-border activities to mitigate DSSs (e.g., planting trees in the DSS originating source areas), but in a sporadic and uncoordinated manner. Regional cooperation will maximize the effects of the initiatives from the private sector and civil societies in the affected countries.

III. THE TECHNICAL ASSISTANCE

A. Purpose and Outputs

8. The objective of the TA is to promote establishment of a regional cooperation mechanism for prevention and control of DSS and to facilitate cooperation for and coordination among interventions by the major stakeholders of the region.

9. The main outputs of the TA will include (i) an initial regional institutional framework that will enable international policy and operational coordination among the major DSS stakeholders at a regional level, and (ii) a regional master plan for alleviating DSS, based on a comprehensive assessment of scientific findings. The master plan will include, *inter alia*, (i) a

phased program for establishing a regional monitoring and early warning network for DSS, and (ii) an investment strategy including recommendations on sustainable financing mechanisms and identification of eight priority demonstration projects to disseminate the best practices in addressing the causes of DSS: four in the PRC and four in Mongolia.

B. Methodology and Key Activities

10. The TA will be implemented in the context of the ongoing joint efforts of the major DSS stakeholders in the region, including the governments of PRC, Japan, Republic of Korea, and Mongolia; and four international institutions: ADB, ESCAP, UNCCD, and UNEP. These four governments and four institutions will be collectively referred to as the participating parties. The key activities under the TA fall into two major components, one for initiating an institutional framework for regional cooperation on DSS, and the other for developing a master plan for regional cooperation on alleviating DSS.

11. **Initiating the framework.** To initiate an institutional framework for regional cooperation on DSS, the participating parties will form a steering committee to be cochaired by PRC and Mongolia. The committee will provide overall guidance for implementation of the TA. Under the steering committee, the participating parties will set up three technical committees: one for promoting a regional cooperation mechanism, to be chaired by UNCCD; one for preparing a phased program to establish a regional monitoring and early warning network for DSS and a comprehensive assessment of scientific findings, to be chaired by UNEP; and one for preparing an investment strategy for mitigation measures in DSS originating source areas, to be chaired by ESCAP. The membership of the technical committees will be open to all the participating parties, and other countries and institutions that can contribute, technically or financially, to alleviating DSS in the region.

12. By involving DSS-affected countries and international institutions in the initial regional cooperation mechanism, the TA will help establish a standardized DSS monitoring and early warning system in the region covering both DSS-originating and DSS-affected countries. The TA will also help mobilize technical, financial, and operational supports from the DSS-affected countries, international institutions, and other stakeholders to supplement the mitigation actions that have been, and will be, undertaken by the PRC and Mongolia in the DSS originating source areas. The initial framework will provide a forum and enabling mechanism for these stakeholders to develop a more permanent institutional structure for regional cooperation on DSS that will sustain beyond the implementation period of the TA.

13. The major activities under this component will include (i) setting up the steering committee and organizing up to four plenary sessions of the steering committee for policy consultation and decision making, (ii) establishing the three technical committees and organizing up to four plenary sessions of each technical committee to provide technical advice and guidance, (iii) setting up a project secretariat under the guidance of the steering committee to provide operational coordination and administrative support to facilitate TA implementation, (iv) establishing and maintaining a computerized data bank for DSS for the participating parties, and (v) launching and operating a public awareness program through a project website and multimedia presentation to strengthen public awareness of the DSS and mobilize public support for alleviating DSS.

14. **Developing a Master Plan.** The master plan for regional cooperation on alleviating DSS will be developed through participatory consultation. Specific components of the draft master plan will be reviewed and cleared by the relevant technical committees and approved by the

steering committee. Public participation will be facilitated through design workshops and a special web site under the public awareness program. The preparation of the phased program for establishing a regional monitoring and early warning network for DSS will include (i) organizing an international workshop for a review of the national monitoring and early warning system to identify the issues that need to be addressed in developing the program, (ii) providing a team of consultants to develop the draft program, (iii) organizing two design workshops for technical review and participatory design process, and (iv) undertaking official survey and site visits to selected DSS monitoring facilities.

15. For preparing the master plan and investment strategy, emphasis will be placed on examining innovative financing mechanisms to mobilize continued support from public and private stakeholders and civil society to strengthen the sustainability of the regional cooperation on combating DSS. In designing the investment strategy, special emphasis will be placed on disseminating the best practices that can offer environment-friendly jobs to improve the livelihood of people in the DSS originating source area. This will be done by introducing and promoting the successful demonstration projects that have both poverty reduction and DSS mitigation effects. The major activities will include (i) providing a team of consultants to draft a master plan and an investment strategy; (ii) organizing two design workshops to present the best practices and to enable a technical review and participatory design process; (iii) organizing site visits of the officials concerned to selected pilot antidesertification projects in the DSS originating source areas, to identify the best practices and suitable demonstration projects; and (iv) inviting international experts as resource persons to present at the workshops best international practices for technology transfer and experience sharing.

C. Cost and Financing

16. The TA is estimated to cost \$1.215 million equivalent, comprising \$745,000 in foreign exchange and \$470,000 equivalent in local currency costs. ADB will provide \$500,000 equivalent to cover \$426,400 of the foreign exchange cost and \$73,600 equivalent of the local currency cost. The TA will be financed on a grant basis from the Japan Special Fund, funded by the Government of Japan. The TA will be cofinanced by GEF on a grant basis in the amount of \$500,000 equivalent to cover \$318,600 of the foreign exchange cost and \$181,400 of the local currency cost. The governments of PRC and Mongolia will finance \$125,000 equivalent and \$90,000 equivalent, respectively, to cover the in-kind expenditures for counterpart support services and office space and office facilities occurred in their countries. Appendix 2 provides the details of the cost estimates and financing arrangements.

D. Implementation Arrangements

17. The TA will be implemented over an 18 month period from January 2003 to June 2004. ADB will be the Executing Agency, responsible for overall management and administration of the TA. The TA will be implemented in cooperation with ESCAP, UNCCD, and UNEP. UNEP, which serves as the GEF implementing agency for the GEF cofinancing resources, will chair the technical committee for developing a program for establishing a regional monitoring and early warning network for DSS and comprehensively assessing the scientific findings. In this connection, UNEP will provide 12 person-months of professional services and office space, free of charge, as its in-kind contribution to the TA. ESCAP, which serves as a coexecuting agency for technical coordination, will chair the technical committee for developing an investment strategy. ESCAP will provide 10 person-months of professional services as its in-kind contribution. In cooperation with UNCCD, the TA will establish a project secretariat to provide operational and administrative support for the steering committee and ADB as Executing

Agency. In this connection, UNCCD will provide 18 person-months of professional services and office space, free of charge, for the project secretariat. All the three agencies of the United Nations— UNCCD, UNEP, and UNESCAP—will endeavor to mobilize, with their influence and expertise, supplementary technical and financial resources to support the TA.

18. The PRC Government has designated its State Development Planning Commission as the national coordination agency for the TA. The PRC Government will establish a multiagency working group including representatives from the State Development Planning Commission, Ministry of Finance, State Environmental Protection Administration, and State Forestry Administration to guide and support the TA. The Government of Mongolia has designated the Ministry of Nature and Environment as the national coordination agency for the TA. The Government of Mongolia will also establish a multiagency working group including representatives from the Ministry of Nature and Environment, Ministry of Finance and Economy, and other concerned agencies to guide and support the TA.

19. The TA will require about 11 person-months of international consulting services in policy and strategic planning, DSS monitoring and mitigation, antidesertification, and international investment. The TA will require about 42 person-months of domestic consulting services from PRC and Mongolia in strategic planning, DSS ground monitoring, remote sensing, sandy land revegetation, and environmental management. All consultants will be selected and engaged by ADB as individuals in accordance with its *Guidelines on the Use of Consultants* and other arrangements for the selection and engagement of domestic consultants. Outline terms of reference of the consultants are provided in Appendix 3.

20. The project secretariat will launch and operate an Internet web site to disseminate information about the TA to the general public. The master plan for regional cooperation on DSS and the major findings and recommendations of the research and studies conducted by the consultants under the TA will be published by the end of implementation period.

IV. THE PRESIDENT'S DECISION

21. The President, acting under the authority delegated by the Board, has approved (i) ADB administering a portion of technical assistance not exceeding the equivalent of \$500,000 to be financed on a grant basis by the Global Environment Facility; and (ii) ADB providing the balance not exceeding the equivalent of \$500,000 on a grant basis, for Prevention and Control of Dust and Sandstorms in Northeast Asia, and hereby reports this action to the Board.

TECHNICAL ASSISTANCE FRAMEWORK

Design Summary	Performance Indicators/Targets	Monitoring Mechanisms	Assumptions and Risks
<p>Goal To reduce the frequency, severity, and damage of the transboundary environmental problem of dust and sandstorms (DSSs) in northeast Asia through regional cooperation</p>	<p>Reduced damage by introducing an effective regional monitoring and early warning network</p> <p>Reduced frequency and severity by arresting the land degradation in the originating source areas of DSS in the People's Republic of China (PRC) and Mongolia</p>	<p>Continued monitoring of DSS and the damage reports</p> <p>Continued monitoring and regular report on land degradation and improvement in the originating source area</p>	<p>The frequency, severity, and damage of DSS can be reduced through well planned and coordinated public intervention</p> <p>Land degradation in the DSS originating area is one of the major causes of increased DSSs in the region</p>
<p>Purpose To promote establishment of a regional cooperation mechanism for prevention and control of DSS in northeast Asia to encourage and facilitate coordinated interventions of all the stakeholders on DSS at regional level</p>	<p>To establish a regional cooperation mechanism that is supported with operational capacity to coordinate interventions on DSS and to mobilize support of stakeholders for combating DSS</p> <p>To prepare a regional master plan for combating DSS that will be supported with the following:</p> <p>(i) a phased development program for establishing a regional monitoring and early warning network for DSS</p> <p>(ii) an investment strategy including recommendations for sustainable financing mechanism and identification of eight demonstration projects</p>	<p>All the parties involved (i.e., the PRC, Japan, Republic of Korea, and Mongolia and Asian Development Bank (ADB), United Nations Convention to Combat Desertification (UNCCD), United Nations Environment Program (UNEP), and United Nations Economic and Social Commission for Asia and Pacific (UNESCAP)) will establish a steering committee to provide overall guidance for project implementation</p> <p>All the parties will also set up three technical committees to provide technical advice on specific technical issues during implementation of the technical assistance (TA)</p>	<p>All the four countries have the political will and policy commitment to addressing DSS through regional cooperation</p> <p>All the four international institutions will cooperate with due diligence</p>
<p>Outputs An initial institutional framework for regional cooperation on DSS</p>	<p>The initial institutional framework will provide a forum and enabling mechanism for the major DSS stakeholders to coordinate their policy and intervention on DSS at a regional level</p>	<p>All the activities of the initial institutional framework will be under close monitoring of the major stakeholders through the steering committee</p>	<p>The steering committee can make decisions on policy and operational issues on behalf of the governments concerned</p>

Design Summary	Performance Indicators/Targets	Monitoring Mechanisms	Assumptions and Risks
<p>A regional master plan for regional cooperation on alleviating DSSs, which will be supported with, <i>inter alia</i>, the following:</p> <p>(i) a phased program to establish a well-functioning regional monitoring and early warning network for DSS, and</p> <p>(ii) an investment strategy including recommendations for sustainable financing mechanisms and identification of 8 demonstration projects, four in the PRC and four in Mongolia</p>	<p>The master plan will be approved by the steering committee</p>	<p>The master plan will be based on a comprehensive assessment of existing scientific findings and be developed in cooperation with the multiagency national working groups under the guidance of the national coordination agencies of PRC and Mongolia. The master plan will be reviewed by the technical committees concerned before being submitted to steering committee</p>	<p>The technical committees concerned are capable of providing technical advice and guidance</p>
<p>Activities</p> <p>1. To establish</p> <p>(i) an initial institutional framework for regional cooperation on combating DSS;</p> <p>(ii) a regional data bank on DSS; and</p> <p>(iii) a website for the TA as part of the public awareness program.</p> <p>2. To review and analyze</p> <p>(i) existing scientific research findings on DSS and the existing national monitoring and forecasting systems for DSS in the region;</p> <p>(ii) existing national program/action programs on DSS and the national experiment/demonstration projects in PRC and Mongolia;</p>	<p>The initial institutional framework and the web site for public awareness should be in operation within one month of approval of the technical assistance (TA).</p> <p>The detailed work program for all the activities should be available for review and endorsement by the technical committees concerned, and for review and consideration by the steering committee at the inception meeting</p> <p>Findings of the review and analysis should be available for timely review by the technical committees concerned</p>	<p>The work program will be reviewed by the technical committees and approved by the steering committee</p> <p>Consultants are requested to submit weekly report to the project secretariat and ADB</p> <p>Project secretariat will submit a monthly report to ADB, national coordination agencies, and the steering committee</p> <p>Project secretariat will circulate a news letter for information dissemination and public awareness and supervision</p>	<p>The governments will provide the consultants with access to the data and documents for their study</p> <p>The project secretariat should be able to provide operational and administrative support to monitor and facilitate day to day operation of the field work</p>

Design Summary	Performance Indicators/Targets	Monitoring Mechanisms	Assumptions and Risks
<p>(iii) best practices for alleviating DSSs; and</p> <p>(iv) initiatives from the private sector or nongovernment organizations.</p> <p>3. To recommend a regional master plan for alleviating DSS through cooperation at regional level; the master plan should be supported with</p> <p>(i) a phased program to establish a regional monitoring and early warning network for DSS, and (ii) an investment strategy including recommendations on sustainable financing mechanisms and identification of 8 demonstration projects, four in the PRC and four in Mongolia</p> <p>4. To organize</p> <p>(i) four meetings for the steering committee,</p> <p>(ii) four meetings for the three technical committees, and</p> <p>(iii) a series of workshops and seminars for exchange of experiences and participatory consultation.</p> <p>5. To implement a public awareness program to disseminate the project information and mobilize public support for the regional cooperation on alleviating DSSs</p>			

Design Summary	Performance Indicators/Targets	Monitoring Mechanisms	Assumptions and Risks
<p>Inputs 1. Level</p> <p>International consultants</p> <p>Domestic consultants</p> <p>Professional service from United Nations agencies concerned</p> <p>Costs</p> <p>Consulting services</p> <p>Conferences for steering committee and technical committees</p> <p>Implementation support</p> <p>Total budget</p> <p>- Japan Special Fund finance</p> <p>- Global Environment Facility cofinance</p> <p>Counterpart support from the governments of PRC and Mongolia</p> <p>In-kind contribution from UNCCD</p> <p>In-kind contribution from UNEP</p>	<p>11 person-months</p> <p>42 person-months</p> <p>40 person-months (in-kind contributions from UN agencies to the TA)</p> <p>\$495,600</p> <p>\$302,000</p> <p>\$202,400</p> <p>\$1,000,000</p> <p>\$500,000</p> <p>\$500,000</p> <p>Office space with basic office facilities for the experts during their field work in PRC and Mongolia</p> <p>Office space for the project secretariat free of charge</p> <p>Office space, free of charge, for the technical committee on establishing a regional DSS monitoring and early warning network and assessing the scientific findings</p>	<p>The consultants' work program to be approved by the steering committee</p> <p>A project secretariat will be established under the supervision of ADB and the steering committee to provide day-to-day monitoring of project implementation in accordance with the approved work program</p>	<p>Timely recruitment and deployment of consultants</p> <p>Consultants are competent</p> <p>Agencies of the United Nations concerned will provide professional services and office space as their in-kind contributions free of charge</p>

COST ESTIMATES AND FINANCING PLAN
(\$'000)

Item	Foreign Exchange	Local Currency	Total Cost
A. Asian Development Bank Financing^a			
1. Consultants	52.2	15.0	67.2
a. Remuneration and Per Diem	22.2	0.0	22.2
i. International Consultants	22.2	0.0	22.2
ii. Domestic Consultants	0.0	0.0	0.0
b. International and Local Travel	5.0	0.0	5.0
c. Reports and Communications	25.0	15.0	40.0
2. Workshops, Training/Seminars, and Conferences	230.0	38.0	268.0
a. Resource Persons	97.0	0.0	97.0
b. Workshops and Conference	133.0	38.0	171.0
3. Miscellaneous Administration and Support Costs	100.0	10.0	110.0
4. Contingencies	44.2	10.6	54.8
Subtotal (A)	426.4	73.6	500.0
B. Global Environment Facility Financing			
1. Consultants	269.0	159.4	428.4
a. Remuneration and Per Diem	229.0	151.0	380.0
i. International Consultants	229.0	0.0	229.0
ii. Domestic Consultants	0.0	151.0	151.0
b. International and Local Travel	40.0	8.4	48.4
2. Workshops, Training/Seminars and Conferences	22.0	12.0	34.0
3. Miscellaneous Administration and Support Costs	8.8	–	8.8
4. Contingencies	18.8	10.0	28.8
Subtotal (B)	318.6	181.4	500.0
Subtotal of (A) and (B)	745.0	255.0	1,000.0
C. Government Financing			
1. Office Accommodation and Transport	0.0	129.0	129.0
2. Remuneration and Per Diem of Counterpart Staff	0.0	86.0	86.0
Subtotal (C)	0.0	215.0	215.0
Total	745.0	470.0	1,215.0

^a from the Japan Special Fund, financed by the Government of Japan.
Source: Asian Development Bank estimates.

OUTLINE TERMS OF REFERENCE FOR CONSULTANTS

1. The technical assistance (TA) for Prevention and Control of Dust and Sandstorms in Northeast Asia will engage four international consultants with expertise in strategic planning, dust and sandstorm (DSS) monitoring, antidesertification, and international investment, who will be supported by 18 domestic consultants from the People's Republic of China (PRC) and Mongolia with expertise in DSS monitoring, sandy land revegetation, ecology, financial analysis, and social economics.

2. Under the guidance of the Asian Development Bank and the technical committees to be established under the TA, the consultants will work closely with the State Development and Planning Commission of the PRC and Ministry of Nature and Environment of Mongolia.

A. International Consultants

1. DSS Monitoring Specialist (4 person-months)

3. The DSS monitoring specialist will provide guidance and professional leadership on formulating a phased program to establish a regional monitoring and early warning network for DSS that will include, but not limited to, recommendations on the following:

- (i) structure of the network,
- (ii) a monitoring indicator system,
- (iii) a ground monitoring network,
- (iv) a remote sensing network,
- (v) a conceptual framework for simulation and forecasting,
- (vi) a data sharing and coordination mechanism,
- (vii) reporting and forecasting,
- (viii) a disaster early warning mechanism,
- (ix) institutional adjustment required,
- (x) hardware and software required,
- (xi) cost estimates, and
- (xii) a phased implementation plan

2. Antidesertification Specialist (4 person-months)

4. The antidesertification specialist will provide guidance and professional leadership on formulating a master plan for regional cooperation on alleviating DSS. In addition to the phased program to establish a regional monitoring and early warning system, the master plan will include, but not be limited to, recommendations on the following:

- (i) context of regional cooperation on DSS,
- (ii) rationale and justification for a regional master plan,
- (iii) time frame and goals,
- (iv) linkage between the regional master plan and the national program,
- (v) priority of regional public interventions on DSS,
- (vi) cooperation and partnership with the private sector and civil society,
- (vii) institutional framework and structure for coordination and cooperation,
- (viii) financing mechanism for regional cooperation, and
- (ix) identification of eight demonstration projects in PRC and Mongolia.

3. International Investment Specialist (2 person-months)

5. The international investment specialist will be responsible for studying, examining, and making recommendations on innovative financing mechanisms for the master plan on regional cooperation on alleviating DSS. The consultant will explore, among the options, the possibility to establish a regional fund to mobilize financial support from public sector, private sector, and civil society as a sustainable financing mechanism to support the regional cooperation beyond the implementation period of the TA.

4. Policy and Strategic Planning Specialist (1 person-month)

6. The policy and strategic planning specialist will provide guidance and professional inputs/advice to strengthen the policy analysis contained in the master plan for regional cooperation on alleviating DSS, and will be responsible for overall quality control of the document.

B. Domestic Consultants

1. Policy and Strategic Planning Specialist (PRC) (8 person-months)

7. The policy and strategic planning specialist (PRC) will provide professional inputs in formulating the master plan, and be responsible for providing guidance and input to make sure that the master plan, including the studies and recommendations made under the TA, will be consistent and well-coordinated in line with the unique complex mandate structure of the government agencies concerned, and consistent with the national development strategy and program of the PRC Government.

2. DSS Ground Monitoring Specialist (8 person-months from PRC and Mongolia)

8. Under the guidance of the international consultants, the DSS ground monitoring specialist will provide professional inputs concerning the ground monitoring system for the program to establish a regional monitoring and early warning network, and responsible for overall coordination and quality control of the inputs from all the domestic consultants from the country concerned for the regional monitoring and early warning network. The DSS ground monitoring specialist will be working together with the international consultant to finalize the phased program for establishment of the monitoring and early warning network.

3. Remote Sensing Specialist (4 person-months from PRC and Mongolia)

9. Under the guidance of the international consultants, the remote sensing specialist will provide professional inputs for the regional monitoring and early warning network for DSS concerning the existing and potential application of remote sensing technology on monitoring DSS.

4. System Development Specialist (4 person-months from PRC and Mongolia)

10. Under the guidance of the international consultant, the system development specialist will provide professional inputs to develop the conceptual framework for computerized simulation and forecasting of DSS.

5. Sandy Land Revegetation Specialist (8 person-months from PRC and Mongolia)

11. Under the guidance of the international consultants, the sandy land revegetation specialist will provide professional inputs concerning revegetating sandy land and demonstration projects for the master plan for regional cooperation on alleviating DSS. The consultant will also be responsible for overall coordination and quality control of the inputs from all the domestic consultants from the country concerned for the master plan and will be working together with the international consultant to finalize the plan.

6. Ecologist (2 person-months from PRC and Mongolia)

12. Under the guidance of the international consultants, the ecologist will provide professional inputs concerning the protection and rehabilitation of the ecosystem in the DSS originating areas for the master plan.

7. Social Economist (2 person-months from PRC and Mongolia)

13. Under the guidance of the international consultants, the social economist will provide professional inputs concerning the social and economic impacts of the master plan and be responsible for ensuring that the poverty reduction dimension has been fully incorporated in formulating the master plan for a regional cooperation on alleviating DSS.

8. Financial Analyst (6 person-months from PRC and Mongolia)

14. Under the guidance of the international consultants, the financial analyst will provide professional inputs for (i) the cost estimates for the phased program for the regional monitoring and early warning system for DSS, (ii) the cost estimates for the eight demonstration projects identified, and (iii) the sustainable financial mechanisms for the regional cooperation.