

The Third Session
of the Scientific Advisory Committee
on the Acid Deposition Monitoring Network
in East Asia
24-26 November 2003, Pattaya, Thailand

**Activities in line with
“The Strategy Paper for Future Direction of Soil and Vegetation Monitoring of EANET”**

Network Center for EANET

1. Strategy Paper for Future Direction of Soil and Vegetation Monitoring of EANET

The Strategy Paper for Future Direction of Soil and Vegetation Monitoring of EANET was endorsed by the Scientific Advisory Committee at its Second Session (SAC2) in November 2002 in Bangkok, Thailand, with a few modifications to the final draft developed by the Task Force on Soil and Vegetation Monitoring.

The Strategy Paper describes that the following four items would be implemented as the milestones, which are reflected to the specific work plan for coming five years:

- Joint Workshop by ICP Forests and EANET: 2002
- Implementation of the next monitoring: 2002-2005
- Start of case studies in selected reference catchments: 2006
- Preparation of sub-manual on forest monitoring: 2005

After the endorsement, the Task Force has been promoting some of the above activities in line with the Strategy Paper, and the Network Center for EANET (NC) has been supporting their activities as the secretariat of the Task Force.

2. Workshop on Elaboration and Development of Forest Monitoring in East Asia

The Joint Workshop, “The Workshop on Elaboration and Development of Forest Monitoring in East Asia” was held in Seremban, Malaysia, from 16 to 19 December 2002, organized jointly by the Network Center for EANET and the Programme Coordinating Centre of the International Co-operative Programme on Assessment and Monitoring of Air Pollution Effects on Forests (ICP Forests), and hosted by the Government of Malaysia.

The Workshop was attended by 28 participants from ten EANET participating countries, namely Cambodia, China, Indonesia, Japan, Lao PDR, Malaysia, Mongolia, Philippines, Thailand and Viet Nam, and Delegation of ICP Forests and Integrated Monitoring Program on Acidification of Chinese Terrestrial Systems (IMPACTS). Experts from East Asia and Europe discussed numerous technical issues, and the major conclusions in the Joint Workshop were summarized in the Chairperson’s Summary (see the Proceedings).

3. Clarification of sampling plan/schedule for soil and forest monitoring

For surely implementation of the next monitoring in the respective monitoring sites, detailed next sampling plan/schedule should be clarified based on the National Monitoring Plans. The following items should be described in the detailed plan:

- a) Monitoring sites: locations, soil types, and vegetation types
- b) Monitoring items: soil and/or forest
- c) Parameters: pH, exchangeable cations, exchangeable acidity, etc. for soil; general description of forests, survey of tree decline, etc.
- d) Monitoring year: 2003, 2004, 2005, 2006, and/or 2007
- e) Monitoring seasons and/or months: spring, summer, autumn, and/or winter; rainy season or dry season; month
- f) Organizations in charge of the sampling and analysis:

The above plan should be reported to the Task Force and SAC3. Sufficient efforts should be made in the participating countries to implement the described plan in the coming five years for promotion of continuous monitoring.

In this connection, Network Center (NC), as the secretariat of the Task Force, drafted a document "Sampling plan/schedule for soil and vegetation monitoring of EANET 2003-2007" based on the National Monitoring Plans and the latest information. In the mid July 2003, NC requested the National Centers to check the document and inform NC of actual plans if any mistakes/missing showings would be found in the document. NC revised the document based on the information from the National Centers and introduced it in the Fourth Senior Technical Managers' Meeting (STM4) in October 2003. The document was updated based on the latest information and discussions in STM4 as shown in the Annex 1. NC is still waiting for information from the participating countries for updating the Annex 1.

4. Discussion on sub-manual for forest monitoring in East Asia

According to the Strategy Paper, discussion on improvement of forest monitoring should be promoted based on the result from the Joint Workshop in the coming years towards the preparation of sub-manual for forest monitoring in 2005.

As a kick-off of the discussion on improvement of forest monitoring, NC has drafted "Technical subjects to be discussed for sub-manual on forest monitoring in East Asia" (Annex 2). This paper is based on the Chairperson's Summary of the Joint Workshop in line with the Strategy Paper. As described in the paper, NC expects that at least the following three specific subjects and two general issues would be discussed for development of the sub-manual:

(Specific subjects)

- Visible assessment of crown condition
- Plant sensitivities to acid deposition
- Chemical analysis of needles and leaves

(General issues)

- Sub-regional approach for the monitoring
- Quality assurance in collaboration with other networks

NC drafted “Procedures and schedule for preparing sub-manual on forest monitoring in East Asia (Draft)” considering the technical subjects above, and sent the document to the Task Force Members for their consideration on 12 September 2003. The document was revised based on suggestions and comments by the Task Force Members and National Focal Points as shown in the Annex 3.

**Sampling Plan/Schedule for Soil and Vegetation Monitoring of EANET 2003-2007
(As of 13 November 2003)**

Network Center for EANET

1. Introduction

The Strategy Paper for Future Direction of Soil and Vegetation Monitoring of EANET was prepared by the Task Force on Soil and Vegetation Monitoring to promote activities toward the initial and ultimate objectives. The Strategy Paper describes issues to be implemented for the objectives and specific work plans for coming years. The Strategy Paper was endorsed by the Second Session of Scientific Advisory Committee (SAC2) in Thailand in November 2002, and activities in line with the Strategy Paper are being promoted.

Continuous monitoring in accordance with the Technical Manual is one of the issues to be implemented for achievement of the initial objective, "establishment of baseline data", which was described in the Strategy Paper. As the first step on continuous monitoring, the next sampling/observation activities should surely be carried out according to the Technical Manual. In most monitoring sites, the next sampling would be carried out from 2003 to 2007 because the previous samplings were done at least once from 1999 to 2002 meanwhile the monitoring interval was adopted as 3-5 years. Therefore, implementation of the next sampling was described as one of the milestones for coming five years (2003-2007), and clarification of detailed next sampling plan was proposed among the specific work plans in the Strategy Paper.

This document with the detailed plans should be reported to the Task Force and SAC3. Suitable efforts should be made in the participating countries to implement the described plan for continuous monitoring.

2. Description of the sampling plan

The detailed plan for the respective monitoring sites should be clarified based on the National Monitoring Plans. The following items should be described in the detailed plan:

- a) **Monitoring sites:** locations, soil types, and vegetation types
- b) **Monitoring items:** soil and/or forest
- c) **Parameters:** pH, exchangeable cations, exchangeable acidity, etc. for soil; general description of forests, survey of tree decline, etc.
- d) **Monitoring year:** 2003, 2004, 2005, 2006, and/or 2007
- e) **Monitoring seasons and/or months:** spring, summer, autumn, and/or winter; rainy season or dry season; month
- f) **Organizations in charge of the sampling and analysis**

3. Summary of sampling plan/schedule in the individual monitoring sites 2003-2007

Country	Organization ^{*1}	Area (Name of nearest deposition monitoring site)	Name of individual monitoring site	Soil type (by FAO/UNESCO)	Forest type (major species)	Latest monitoring/ ^{*1} sampling	Next schedule items ^{*1}	Monitoring interval
China	S, F) Chongqing Institute of Environmental Science	Chongqing	Chongqing	Not reported	Not reported	2000 (S)	2003 (S)	3 year
	S, F) Xiamen Environmental Monitoring Central Station	Xiamen	Xiamen Xiaping	Not reported	Man-made forest (<i>Michelia macclurei</i> , <i>dandyrar</i> , <i>Fokienia hodginsii</i> , <i>Pinus massoniana</i>)	2000 (S, F)	2003 (S, F)	3 year
	S, F) Xi'an Environmental Science	Jiwozi (Xi'an)	Xi'an - Jiwozi	Not reported	<i>Larix gmelini Rupr</i>	2001 (S)	2003 (S, F)	3 year
	S, F) Zhuhai Environmental Monitoring Station	Zhuxiandong (Zhuhai)	Zhuhai - Zhuxiandong	Not reported	<i>Acacia auriculiformis</i> , <i>A. confusa</i> , <i>Dicranopteris dichotoma</i> , <i>Pinus elliotii</i>	2000 (S, F) 2001 (S)	2003 (S, F)	3 year
Indonesia	S, F) Soil and Agro Climate Research Development Center, (EMC)	EMC	Serpong ^{*2} Bogor Research Forest	Not decided (Typic Dystrudepts) ^{*3}	Not decided Man-made forest (<i>Hopea mengarawan</i> , <i>Khaya anthotheca</i> etc.)	Not started 2001 (S)		3 years 3 years
		Medan ^{*2}				Not started		
		Manado ^{*2}				Not started		
		Palangkaraya ^{*2}				Not started		

Japan	S) Gifu Research Center for Public Health F) Forest Science Research Institute, Gifu Prefecture	Ijira	Lake Ijira	Dystric Cambisols	Man-made forest (<i>Cryptomeria japonica</i> , <i>Chamaecyparis obtuse</i> etc.)	2000 (S, F)	2006 summer (S, F) (Another type of soil would be found around Ijira monitoring site in 2003.)	3-5 years
		Banryu	Banryu-2*4 Iwami "rinku" Factory Park*4	Cambisols (Acrisols)*5	Secondary forest (<i>Symplocos lucida</i> , etc.) Secondary forest (<i>Castanopsis cuspidate</i> , etc.)	2000 (F) 2001 (S, F) 2001 (S, F)	2006 summer (S, F) 2006 summer (S, F)	3-5 years 3-5 years
Malaysia	S) Universiti Putra Malaysia F)	-	Pasoh Forest Reserve	Dystric Nitosols/ Rhodic Ferralsols	Natural forest	2000 (S)	2004 August (S) 2004 November (S) 2007 August (S) 2007 November (S)	3 years
		Petaling Jaya	Sungai Lalang Reserve Forest	Dystric Nitosols/ Rhodic Ferralsols	Secondary forest	2001 (S)*7	2004 August (S) 2004 November (S) 2007 August (S) 2007 November (S)	3 years
Mongolia	S) Central Laboratory for Environmental Monitoring F) National University of Mongolia (NUM), Department of Forestry	Ulaanbaatar	Bogdkhan Mountain*2	Not reported	Natural forest (<i>Larix sibirica</i>)	Not started	2004 August (S, F)	3-5 years

Philippines	S, F) University of the Philippine, Los Banos	Los Banos	Mt. Makiling	Eutric Cambisols	Secondary forest (<i>Celtis luzonica</i> Warb, etc.)	2000 (F) <u>2002 (S)</u> ^{*8}	2003 August (S, F)	3 years
Republic of Korea	S, F) National Institute of Environmental Research	Imsil	UP Quezon, Land Grant Mt. Naejang	Dystric Nitisols Not reported	Secondary forest (<i>Pinus densiflora</i> , <i>Pinus rigida</i> , <i>Syrax japonica</i> , <i>Prunus maximowiczii</i>)	2001 (S, F) ^{*8}	2004 October (S, F)	3 years
Russia	S) Laboratory of Hydrochemistry and Atmospheric Chemistry, Linnological Institute of RAS/SD (Irkutsk) F) Siberian Institute of Plant Physiology and Biochemistry, RAS/SD (Irkutsk)	Irkutsk	Irkutsk	Eutric Regosols/ Calcic Luvisols	Man-made forest (<i>Pinus sylvestris</i> , <i>Betula pendula</i>)	2001 (S, (F))	2004 July (F)	3-5 years
		Listvyanka	Bolshie Koty	Mollic Leptosols/ Umbric Leptosols	Natural forest (<i>Pinus sylvestris</i> , <i>Populus tremula</i> , etc.)	2000 (S) <u>2002 (F)</u>	-	3-5 years
		Mondy	Pereyomnaya river catchment	Gelic Podzols/ Dystric Leptosols	Natural forest (<i>Pinus sibirica</i> , <i>Picea sibirica</i> , and <i>Abies sibirica</i>)	-	2005 July (S, F)	3-5 years
			Ilchir Lake	Gelic Podzols/ Gelic Gleysols	Not reported	1999 (S)	-	3-5 years
		Okinskoe Lake	Gelic Podzols	Not reported	1999 (S)	-	3-5 years	
		Solar Observatory	Calcic Gleysols	Natural forest (<i>Larix sibirica</i>)	1999 (S)	2004 July (F)	3-5 years	
		Primorskaya	Primorskaya	Mollic Leptosols/ Umbric Leptosols	Natural forest (<i>Quercus mongolica</i> , <i>Betula daurica</i> , etc.)	-	2004 July (S) 2005 July (F)	3-5 years

Thailand	S) Department of Agriculture, S) King Mongkut's University of Technology Thonburi F) National Park, Wildlife and Plant Conservation Department	Vachiralongkorn Dam (old name: Kao Lam Dam) *6	Vachiralongkorn Dam	Ferric Acrisols	Secondary forest (<i>Xylia xylocarpa</i>)	2000 (S, F) 2001 (S, F) <u>2002 (S)</u>	2003 September (S, F) 2006 April and August (S, F)	2003 September (S, F) 2006 April and August (S, F)	3 years
Viet Nam	S, F) Institute of Meteorology and Hydrology (joint with National Institute of Forest)	Hoa Binh	Vachiralongkorn Puyea	(Now analyzing)	Secondary forest (<i>Dipterocarpus turbinatus</i>)	<u>2002 (S, F)</u>	2003 September (S, F) 2006 April and August (S, F)	2003 September (S, F) 2006 April and August (S, F)	3 years
			Cave of Heaven	Ferric Acrisols	Man-made forest (<i>Pinus sp.</i>)	1999 (S, F)	2004 October (S, F)	2004 October (S, F)	3-5 years
			Thang Ranh	Ferric Acrisols	Man-made forest (<i>Acacia auriculiformis</i>)	1999 (S, F)	2004 October (S, F)	2004 October (S, F)	3-5 years

*1. Items are abbreviated as follows: S, Soil monitoring; F, Forest monitoring *2. New sites, Serpong, Medan, Manado and Palangkaraya in Indonesia, and Bogdkhan Mountain in Mongolia, will be established in the near future. *3. Classification by FAO/UNESCO has not been reported. *4. The sites around Banryu deposition site were relocated in 2001. *5. Further analysis should be carried out for correspondence to accurate FAO/UNESCO classification. *6. Kao Lam Dam was renamed to Vachiralongkorn Dam. *7. Italic data have not been submitted to the Network Center. *8. Underlined data will be published in Data Report 2002.

**Reporting Form for Sampling Plan/Schedule of Soil and Vegetation Monitoring
(2003-2007)**

Items	Examples for description	Sampling Plan/Schedules
a) Monitoring sites	Locations (Area (the nearest deposition monitoring site), Name of individual sites)	
	Soil type (by FAO/UNESCO)	
	Vegetation (forest) type: Natural forest, Secondary forest, or Man-Made forest	
b) Monitoring items	Soil and/or forest	
c) Parameters	Mandatory Parameters for soil: Moisture content, pH, exchangeable base cations, exchangeable acidity, etc.	
	General description of forests, and/or survey of tree decline	
d) Monitoring year	2003, 2004, 2005, 2006, and/or 2007	
e) Monitoring seasons and/or months	Spring, summer, autumn, and/or winter; rainy season or dry season; month	
f) Organizations in charge of the sampling and analysis	Name of organization, Department, etc.	
g) Others	Monitoring interval (if it changed), etc.	

The form would be prepared for the respective monitoring sites. Information on a), c) and f) above has already been described in the National Monitoring Plan, and the same descriptions would be filled in the form if they were not changed.

Technical subjects to be discussed for sub-manual on forest monitoring in East Asia

Network Center for EANET

1. Introduction

Soil and vegetation monitoring in East Asia would be elaborated in line with the Strategy Paper on Future Direction of Soil and Vegetation Monitoring of EANET²⁾, which was endorsed by the Scientific Advisory Committee on Acid Deposition Monitoring Network in East Asia (EANET) at its Second Session.

The development/improvement of methodologies for forest monitoring is described in the Strategy Paper as one of the issues to be elaborated, and in this connection, it is expected that the sub-manual on forest monitoring would be prepared by the Task Force in coming years.

EANET and International Co-operative Programme on Assessment and Monitoring of Air Pollution Effects on Forests (ICP Forests) jointly held "Workshop on Elaboration and Development of Forest Monitoring in East Asia" in Seremban, Malaysia on 16 - 19 December 2002. The Joint Workshop is pointed out in the Strategy Paper as one of the milestones and the basis for discussion on development of the sub-manual.

This paper describes technical issues to be discussed among the Task Force members for developing the sub-manual for forest monitoring in East Asia.

2. Technical subjects to be discussed for the development of the sub-manual

The issues on the early detection were discussed mainly in the agenda item 3, "Methodologies for Large-scale Monitoring", and the agenda item 8, "Effect of Ozone" in the Joint Workshop (Para 10-12, and 17-18, respectively in the Chairperson's Summary³⁾). The following subjects were discussed in these sessions.

2.1. Visible assessment of crown condition

Major discussions in the Joint Workshop

- Assessment of crown condition (observation of tree decline) has been carried out as one of the items for the basic survey in the EANET participating countries with similar method used by ICP Forests, and some participating countries reported first results (Item 'a' of Para 11).
- There is a difficulty of applying the current method to tropical forest because it is

difficult to identify and observe crown conditions of the dominant tree species in high density and height of tropical forest (Item 'b' of Para 11).

- As one of the candidate methods, an applicability of hemispherical photograph was mentioned with its usefulness for assessment of canopy gap and light penetration in the forest area (Item 'c' of Para 11).
- The use of the canopy towers and Canopy Walk (passageways between the canopy towers) was also discussed during the field demonstration in the Pasoh Forest Reserve,

□ **Issues to be discussed for the sub-manual on forest monitoring**

New methods and/or guidelines should be considered for visible assessment of forest condition in tropical forest.

2.2. Plant sensitivities to acid deposition

□ **Major discussions in the Joint Workshop**

- Information on plant sensitivities has been relatively accumulated in Japan with special attention to the synergistic effect of air pollutants, such as ozone and SO₂ (Item 'a' of Para 12), and however, the information in other Asian countries is limited.
- Differentiation between symptoms of air pollution and biotic factors was discussed as well as definition of damage and threshold values of air pollutants (Item 'b' of Para 12).
- It was recommended to get the estimate on ozone concentrations and possible injuries on sensitive plant species (bio-indicators) (Item 'c' of Para 18).
- The applicability of passive monitoring of ozone concentration in forest area was also discussed (Item 'a' of Para 18).

□ **Issues to be discussed for the sub-manual on forest monitoring**

The following issues should be considered on the process of development of the sub-manual.

- 1) Accumulation of information on plant sensitivities to acid deposition**
- 2) Definition of damage and threshold values of air pollutants**
- 3) Estimation of concentration of gaseous pollutants such as ozone in forest area**

Research activities according to items 1) and 2) should be promoted at the same time, and the information should be updated accordingly. Also the applicability of passive samplers should be discussed as the methods to use for the item 3) above taking into account the latest scientific information.

2.3. Chemical analysis of needles and leaves

□ Major discussions in the Joint Workshop

- The main items of the discussion were the foliage sampling in different part of the crown, relationship between foliage and soil chemistry, and various methods of analyses in the laboratory (Item 'd' of Para 11).

Chemical analysis of needles and leaves has not been included in the items for the basic survey in the Technical Manual on EANET¹⁾, although some participating countries have already treated it in their national monitoring. As discussed at the Joint Workshop, monitoring design would be important to obtain comparable data.

□ Issues to be discussed for the sub-manual on forest monitoring

<p>The following items should be clarified for regular monitoring:</p> <ol style="list-style-type: none"> 1) Sampling design (species, stands, parts (e.g. branch height and direction), needles/leaves age, season, frequency, etc.) 2) Analysis methods (pretreatment (e.g. washing, drying, and powdering), digestion, element/chemical species, analytical instrument, etc.) 3) Evaluation methods (trend assessment, relationship with other parameters (e.g. climate, acid deposition, and soil chemistry), etc.)
--

A few years may be spent to accumulate some basic data such as seasonal trend for the sampling design. Therefore, it is expected to discuss the applicability of the methods to the EANET monitoring step by step.

3. General issues to be discussed

In other part of the Joint Workshop, the following informative comments/suggestions were obtained.

3.1. Sub-regional approach for the monitoring

□ Major discussions in the Joint Workshop

- The meeting concluded that different methods are to be applied in different climatic regions in East Asia (Item 'a' of Para 14).

The East Asian Region is latitudinally wide, and consists of some climatic zones from tropical to sub-arctic zones. These climatic zones should be considered for forest monitoring since forest ecosystem has been developed under effects of the respective climatic and meteorological conditions. As discussed in the Joint Workshop, modified methods suitable to the respective climatic zones should be considered. Modified methodologies for tropical/sub-tropical zones have already been discussed in the Technical Manual.

□ **Issues to be discussed for the sub-manual on forest monitoring**

In practical, the East Asian Region would be divided into some sub-regions (e.g. sub-arctic/temperate, sub-arid, and tropical/sub-tropical zones), and modified methods should be considered for the respective sub-regions.

At least, for visible assessment of forest condition, new methods/guidelines should be considered for tropical/sub-tropical zones as described above.

There are three validation centers in Europe for three correspondent sub-regions (Northern, Central, and Southern Europe) on visible injury by ozone, and the relevant information would be accumulated/validated in the respective validation centers. The experience on the sub-regional approach would be informative for EANET also although it may be difficult to establish such kind of sub-regional centers in East Asia at present.

3.2. Quality assurance in collaboration with the other networks

□ **Major discussions in the Joint Workshop**

- It was pointed out that calibration and/or maintenance of instruments might be more important than use of costly instruments for obtaining reliable data (Item 'd' of Para 14).
- As one term of the cooperation between EANET and ICP Forests, an idea on common quality assurance programs was proposed (Item 'c' of Para 20).

□ **Issues to be discussed for the sub-manual on forest monitoring**

It would be considered that laboratories of EANET would participate in the inter-laboratory comparison project on ICP Forests.

References:

- 1) Second Interim Scientific Advisory Group Meeting of EANET (2000): Technical Manual for Soil and Vegetation Monitoring in East Asia.
- 2) Task Force on Soil and Vegetation Monitoring on EANET (2002): Strategy Paper on Future Direction of Soil and Vegetation Monitoring of EANET. *Endorsed by:* the Second Scientific Advisory Committee on EANET.
- 3) Totsuka T, Haussmann T, and Awang M. (2002): Chairperson's Summary, EANET – ICP Forests/JW/10/1, Workshop on Elaboration and Development of Forest Monitoring in East Asia, 16 - 19 December 2002, Seremban, Malaysia.

**Procedures and schedule for preparing sub-manual on forest monitoring in East Asia
(Revised draft)**

Network Center for EANET

1. Introduction

The development/improvement of methodologies for forest monitoring is agreed in the Strategy Paper on Future Direction of Soil and Vegetation Monitoring of EANET¹⁾ as one of the issues to be implemented, and in this connection, it is expected that the sub-manual on forest monitoring would be prepared by the Task Force on Soil and Vegetation Monitoring (TF) in coming years.

EANET and International Co-operative Programme on Assessment and Monitoring of Air Pollution Effects on Forests (ICP Forests) jointly held "Workshop on Elaboration and Development of Forest Monitoring in East Asia" in Seremban, Malaysia on 16 - 19 December 2002. The Joint Workshop was pointed out in the Strategy Paper as one of the milestones and basis for discussion on development of the sub-manual.

As a kick-off of the discussion on improvement of forest monitoring, Network Center (NC) drafted "Technical subjects to be discussed for sub-manual on forest monitoring in East Asia (see Attachment)" based on the Chairperson's Summary of the Joint Workshop²⁾. The document was circulated among TF members, members of Network of Soil and Vegetation Monitoring Specialists (Network of Specialists) and National Focal Points (NFPs) for their consideration, but NC received no specific comments/suggestions.

NC as the Secretariat of TF has drafted "Procedures and schedule for preparing sub-manual on forest monitoring in East Asia (Draft)" for preparation of the sub-manual based on the document of the technical subjects above. The draft was circulated among TF members, members of Network of Specialists and NFPs. This is a revised draft of the paper based on the comments/suggestions that NC received by the end of October 2003.

2. Procedures and schedule

2.1. Procedures

1) Procedures

NC proposed the procedures and schedule for preparing the sub-manual to TF for their consideration. The procedures and schedule revised based on comments/suggestions by TF will be reported to the Third Session of the Scientific Advisory Committee (SAC3).

2) Contents

NC will draft contents of the sub-manual taking account of the technical subjects and their feasibilities. Contents will be revised and decided based on comments/suggestions

by TF. Authors of the respective chapters will be proposed based on comments/suggestions by TF and Network of Specialists.

3) Manuscripts

Authors will write manuscripts of the respective chapters with editorial advices by NC. Contents and process of writing manuscripts will be reported to SAC4.

4) Editing and reviewing

NC will edit manuscripts, and make a draft of the sub-manual. TF and relevant experts in East Asia and Europe who will be recommended by TF will review the draft sub-manual. All the contents will be reviewed and finalized. An international meeting/workshop will be helpful for reviewing the draft sub-manual. NC will prepare the final draft of the sub-manual based on the reviewing process.

5) Adoption

The final draft of the sub-manual will be reported to and adopted by SAC5.

2.2. Expected schedule

- 1) **Early September 2003:** Proposal of draft procedures and schedule by NC to TF.
- 2) **Late October 2003:** Revision of draft procedures and schedule based on comments/suggestions by TF.
- 3) **November 2003:** Giving a report of the results of EANET-ICP Forests Joint Workshop and the revised procedures and schedule to SAC3
- 4) **December 2003:** Drafting of contents and expected authors of the sub-manual
- 5) **March 2004:** Endorsement of contents and a list of authors by TF, and Start of manuscripts writing.
- 6) **November 2004:** Giving a report of contents and process of manuscripts writing to SAC4.
- 7) **December 2004:** Deadline of the manuscripts. Start of editing and reviewing process.
- 8) **(Spring or Summer 2005:** International workshop for reviewing the draft sub-manual)
- 9) **October 2005:** Preparation of the final draft of the sub-manual by NC.
- 10) **November 2005:** Consideration and adoption of the final draft of the sub-manual at SAC5.

3. Possible contents of the sub-manual

Possible contents based on technical subjects raised in the Chairperson's Summary of the Joint Workshop are shown in the following Table. The technical subjects were classified into four categories, namely "additional methods for survey of tree decline", "optional items for basic survey", "information on research methodologies" and "quality assurance/quality control on forest monitoring" since some subjects need accumulation of basic data and basic research

activities.

As for sub-chapters in the respective categories, “visual assessment of crown condition in temperate/sub-arctic zone”, “photographic assessment for crown condition” and “QA/QC on forest monitoring” were added to the above-mentioned technical subjects taking account of the current Technical Manual³⁾. The possible contents should be reviewed and revised with considering expected authors for the respective chapters.

Table. Possible contents of the sub-manual on forest monitoring in East Asia

<p>I. Introduction</p>
<p>II. Additional methods for “survey of tree decline” on basic survey</p> <p>1) Visual assessment of crown condition in temperate/sub-arctic zone Based on the Technical Manual, more detailed methods would be described.</p> <ul style="list-style-type: none"> ➤ Detailed scale for survey of tree decline ➤ Illustrated/photographic guide for observation (including examples of description/evaluation of the tree crown defoliation) <p>2) Visual assessment of crown condition in (sub-) tropical zone Modified methods for tropical forests would be described.</p>
<p>III. Optional items for basic survey The items would be carried out for accumulation of basic data.</p> <p>1) Photographic assessment for crown condition</p> <ul style="list-style-type: none"> ➤ Hemispherical photograph for assessment of canopy gap and light penetration ➤ Image analysis of tree crown condition assessment <p>2) Estimation of concentration of gaseous pollutants in forest area</p> <ul style="list-style-type: none"> ➤ Measurement of air concentration using passive samplers in forest areas <p>3) Chemical analysis of needles and leaves</p> <ul style="list-style-type: none"> ➤ A few years may be spent to accumulate some basic data for the sampling design; e.g. seasonal trend, spatial distribution, and characteristics of the respective sites/areas.
<p>IV. Information on research methodologies for plant sensitivities</p> <p>1) Accumulation of information on plant sensitivities to acid deposition</p> <p>2) Definition of damage and threshold values of air pollutants</p> <ul style="list-style-type: none"> ➤ Descriptions based on scientific publications and experience in Europe and other areas
<p>V. Quality assurance/quality control (QA/QC) on forest monitoring</p> <p>1) QA/QC on forest monitoring</p> <p>2) Quality assurance in collaboration with other networks</p>

References:

- 1) Task Force on Soil and Vegetation Monitoring on EANET (2002): Strategy Paper on Future Direction of Soil and Vegetation Monitoring of EANET. *Endorsed by:* the Second Scientific Advisory Committee on EANET.

- 2) Totsuka T, Haussmann T, and Awang M. (2002): Chairperson's Summary, EANET – ICP Forests/JW/10/1, Workshop on Elaboration and Development of Forest Monitoring in East Asia, 16 - 19 December 2002, Seremban, Malaysia.
- 3) Second Interim Scientific Advisory Group Meeting of EANET (2000): Technical Manual for Soil and Vegetation Monitoring in East Asia.

(Corrigenda for revised draft)

From the draft to the revised draft, the following parts were modified based on comments/suggestion by Task Force members and National Focal Points.

(Sub) chapter/ Paragraph/ Line of the draft	Draft	Revised draft
Subchapter 2.1/ Para 2)/ Line 3-4	Authors of the respective chapters will be proposed based on comments/suggestions by TF and <u>experts on relevant study fields.</u>	Authors of the respective chapters will be proposed based on comments/suggestions by TF and <u>Network of Specialists.</u>
Subchapter 2.1/ Para 4)/ Line 1	TF and <u>experts on relevant study fields</u> will review the draft sub-manual.	TF members and <u>relevant experts in East Asia and Europe</u> who will be recommended by TF will review the draft sub-manual.
Chapter 3/ Table/ Section II/ Para 1)/ Item 2	➤ Illustrated/photographic guide for observation	<i>The underlined part was added:</i> ➤ Illustrated/photographic guide for observation <u>(including examples of description/evaluation of the tree crown defoliation)</u>

Editorial/grammatical modifications were not listed here.