THE NINTH NORTHEAST ASIAN CONFERENCE
ON ENVIRONMENTAL COOPERATION

26-28 July, 2000　Ulaanbaatar　Mongolia

平成 12 年度環境庁委託

第 9 回　環日本海環境協力会議 報告書

平成 12 年 11 月

社団法人　海外環境協力センター

はじめに

本報告書は、平成12年度に社団法人海外環境協力センターが、環境庁から委託を受けた「環日本海環境協力推進事業」により、平成12年7月26日(水)から28日(金)にモンゴル・ウランバートルにおいて開催された「第9回環日本海環境協力会議」(The 9th Northeast Asian Conference on Environmental Cooperation)に参加し、その結果をまとめたものである。

本会議はモンゴル政府自然環境省の主催により、日本政府による支援の下、中国、韓国、モンゴル、ロシア及び日本の5カ国並びに国連環境計画(UNEP)、国連アジア太平洋経済社会委員会(ESCAP)及び国連開発計画(UNDP)の参加の下に開催された。

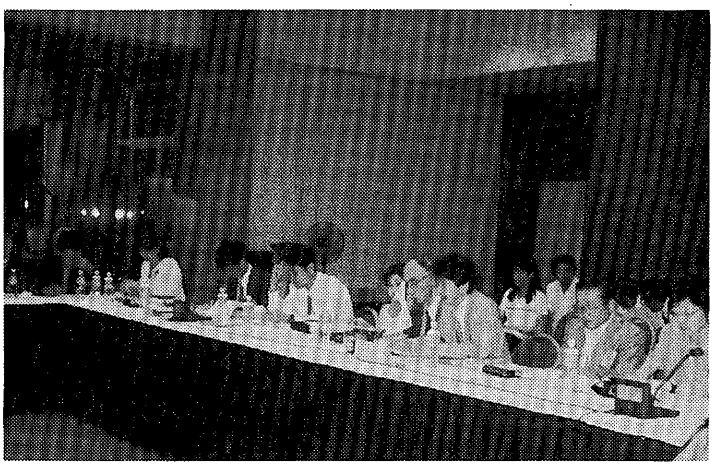
会議では、各国・機関による基調演説及び4つの分科会が行われ、①森林保護及び植林、②水質汚濁と浄化、③特別保護区ネットワークの拡大と保護区管理の改善、④北東アジアの環境協力のレビューと将来像がテーマとして取り上げられ、活発な議論が行われた。

各国の参加者は、本会議が情報及び意見交換のための重要なフォーラムであるとの一致した認識の下で、地域内におけるより効率的な協力推進のための触媒機能としての役割への期待が表明された。各国参加者は、本会議の新たな方向及び原則の展開を検討するために、韓国政府から提出された「NEACの枠組み(案)」に基づき、第10回会議での合意に向けての調整作業を継続することとなった。

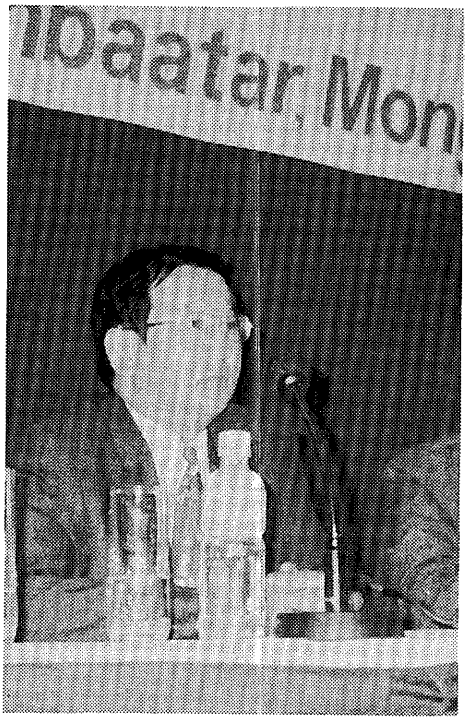
本会議の性質である、中央及び地方政府、研究機関、NGOといった様々な主体による対話の場としての役割はますます重要性を増し、北東アジア地域における協力促進のために「環日本海環境協力会議」のより一層の貢献が期待されている。

平成12年11月

社団法人海外環境協力センター
理事長　森　仁美



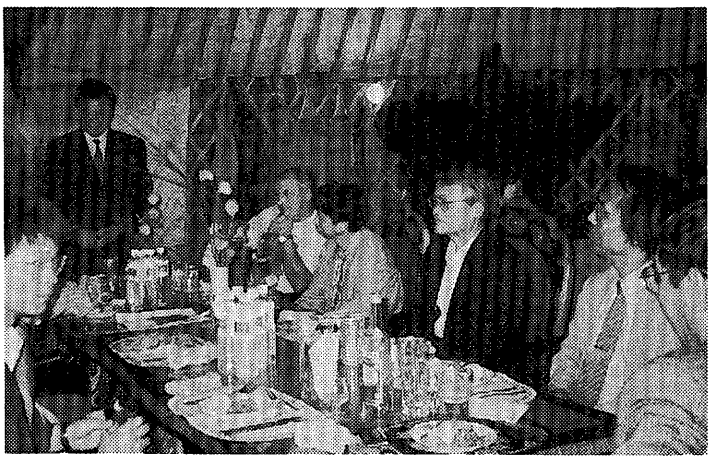
会議風景



モンゴル自然環境省次官
Mr. Samdangiin Banzragch



記者発表



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Ⅰ　概　要

概　要

1．会議名称：　第9回環日本海環境協力会議
The 9th Northeast Asian Conference on Environmental Cooperation

2．主　催　：　モンゴル自然環境省

3．開催日時：　平成12年7月26日(水) － 28日(金)

4．開催場所：　チンギスハーン・ホテル(モンゴル　ウランバートル市)

5．出 席 者：

中国	4名
日本	12名
モンゴル	8名
韓国	8名
ロシア	2名
国連環境計画(UNEP)	1名
国連アジア・太平洋経済社会委員会(ESCAP)	1名
その他NGO代表及びオブザーバー等	

【日本からの参加者】

環境庁	田口 博之	環境庁地球環境部環境協力室長
	清野 達男	環境庁地球環境部環境協力室係長
	岩谷 智子	環境庁地球環境部環境協力室環境専門員
	番匠 克二	環境庁自然保護局国立公園課計画係長
	稲森 悠平	国立環境研究所地域環境研究グループ総合研究官
	徐　開欽	国立環境研究所水土壌圏環境部主任研究員
名古屋大学	加藤 久和	名古屋大学法学部大学院国際開発研究科教授 財団法人地球環境戦略研究機関環境ｶﾞﾊﾞﾅﾝｽﾌﾟﾛｼﾞｪｸﾄﾘｰﾀﾞｰ
IGES	高橋 若菜	財団法人地球環境戦略研究機関研究員
北海道大学	福田 正己	北海道大学低温科学研究所教授
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OECC	伊藤 政志	社団法人海外環境協力センター技術部長
	清水 玲子	社団法人海外環境協力センター研究員

6．議　長　：

全体議長	Mr. Bandi Ganbaatar(モンゴル自然環境省国際協力部課長)
第1ｾｯｼｮﾝ	Mr. Hong Yong (中国内モンゴル自治区環境保護局課長代理)
第2ｾｯｼｮﾝ	加藤 久和(名古屋大学法学部大学院国際開発研究科教授)
第3ｾｯｼｮﾝ	Dr. Andrei S. Peshkov (ロシア連邦自然保護研究所所長)
第4ｾｯｼｮﾝ	Dr. Han Gee Bong(韓国国立環境研究院主任研究官)

7．使用言語：　英語

8．プログラム・会議内容：

(1) **開会式　開会挨拶**　　*7月26日(水)午前*

モンゴル自然環境省次官　　Mr. Samdangiin Banzragch

(2) **基調講演**　　*7月26日(水)午前*

【講演者】

中　国	国家環境保護総局自然保護司副司長	Mr. Guotai Zhuang
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モンゴル	自然環境省政策調整部長	Mrs. Namsrai Sarantuya
ESCAP	環境政策専門家	市村　雅一
UNEP	アジア太平洋事務所次長	名執　芳博

(3) **テーマ別セッション**

第1セッション「森林保護及び植林」　　*7月26日(水)午前*

【発表者】

中　国	国家環境保護総局自然保護司副司長	Mr. Guotai Zhuang
韓　国	韓国環境運動連合(KFEM)国際ｾｸｼｮﾝﾁｰﾌ	Ms. Kim Choony
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ロシア	ロシア連邦自然保護研究所所長	Dr. Andrei S. Peshkov

第2セッション「水質汚濁と浄化」　　*7月26日(水)午後*

【発表者】

中　国	国家環境保護総局水環境管理課長	Ms. Hongzhi Liu
韓　国	国立環境研究院主任研究官	Dr. Han Gee Bong
日　本	国立環境研究所地域環境研究グループ総合研究官	稲森 悠平
ロシア	ロシア連邦自然保護研究所所長	Dr. Andrei S. Peshkov
モンゴル	自然環境省政策調整執行部オフィサー	Mr. D. Batbayar

第3セッション「特別保護区ネットワークの拡大と保護区管理の改善」　*7月27日(木)午前*

【発表者】

中　国	内モンゴル自治区環境保護局課長代理	Mr. Hong Yong
韓　国	韓国消費者保護市民同盟ｴｸﾞｾﾞｸﾃｨﾌﾞ･ﾀﾞｲﾚｸﾀｰ	Ms. Kim Jai Ok
日　本	環境庁自然保護局国立公園課計画係長	番匠　克二
ロシア	ロシア連邦自然保護研究所所長	Dr. Andrei S. Peshkov
モンゴル	自然環境省環境保護庁保護地域局課長	Mr. D. Myagmarsuren

第４セッション「北東アジアの環境協力のレビューと将来像」　　*7月27日(木)午後*

【発表者】

中　国	国家環境保護総局上級ﾌﾟﾛｸﾞﾗﾑ・ﾏﾈｰｼﾞｬｰ	Mr. Jing Guo
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(4) 全体会合　議長総括の採択、閉会　　*7月28日(金)午前*

II　議長総括

議長総括
第9回環日本海環境協力会議
2000年7月26日～28日

1　第9回環日本海環境協力会議(NEAC)は、2000年7月26日から28日までモンゴル ウランバートルにおいて、日本政府の支援により、モンゴルの自然環境省が主催し開催された。本会議には、中華人民共和国、大韓民国、日本、モンゴル、ロシア連邦の代表が参加した。参加者には、中央及び地方政府の行政官及び専門家、並びに、研究機関、NGO を含む。さらに、国連アジア太平洋経済社会委員会(UN/ESCAP)、国連環境計画(UNEP)、国連開発計画(UNDP)の代表が出席した。

2　会議はモンゴル自然環境省 Banzragch 次官の歓迎挨拶により始まり、引き続き、各国参加者、UNESCAP、並びに、UNEP の代表が基調演説を行った。

3　第9回 NEAC の議題は以下の通りである：
a.森林保護及び植林
b.水質汚濁と浄化
c.特別保護区ネットワークの拡大と保護区管理の改善
d.北東アジアの環境協力のレビューと将来像

4　分科会1「森林保護及び植林」では、各国代表が発表を行った。森林保護及び植林に関する国の戦略と対策、アジア地域の森林保護のための政府及び NGO の責任、森林火災の影響と森林再生に関する研究、森林再生活動、森林保護及び植林の傾向、優先区域並びに問題点など、様々な課題に関する発表と議論が行われた。参加者は、各国が森林保護及び植林を非常に重要なものとしてとらえ、一層の対策を取る為に多大な努力を払っていることに注目した。問題の世界的及び地域的な規模を考慮すると、北東アジア地域における森林伐採及び砂漠化に対する取り組みに一層の注意と努力を払うべきことが強調された。参加者の多くは、生態系の問題を、UNEP、UN/ESCAP、UNDP、ADB（アジア開発銀行）、世界銀行といった国際的組織と協力して、一体化した長期的観点から取り扱うべきであると強調した。

5　「水質汚濁と浄化」に関する分科会2では、参加国の水環境の現状、政策及び展望に関する報告が行われた。報告では、行政的手法による水質汚染防止の向上、都市における水質改善システム、生物・生態工学を利用した水環境の回復、水質浄化のための国際協力等が取り上げられた。さらに、関連する政策や情報を共有するための、参加国間の水質汚濁の防止と専門的知見に関する専門家ネットワークを創設し、大気モニタリングデータとトレーニングに関する NEASPEC(北東アジア地域環境協力プログラム)のプロジェクト及び NOWPAP(北西太平洋地域海行動計画)等の現在進行中の活動を支援できるようにすることが提案された。UNEP の代表は、参加者に対し、UNEP が現在進めている「世界的な国際水質アセスンメント(GIWA)」プロジェクトを説明し、NEAC 参加国の協力を求めた。

6　分科会3は、「特別保護区ネットワークの拡大と保護区管理の改善」に関するもので、各国の代表団が発表を行った。会議では地域レベルでの協力の必要性、特に地域内での人材養成、参加国間に跨る保護区設立の可能性、並びに、更なる議論ための専門家会合の開

催に関して意見交換が行われた。

7　分科会4は、「北東アジアの環境協力のレビューと将来像」であった。参加国による発表に基づき、会議ではNEACの成果、役割と目的、並びに、将来の展望に関して意見交換が行われた。主な成果として、地域内の政策対話の提唱、様々な組織間の対話促進、新たに生じた問題含む幅広い環境問題に関する情報交換、さらに、異なる形態の新しい協力イニシアティブ促進の触媒としての機能といったことが挙げられた。

8　会議では、北東アジア地域における現在の環境協力イニシアティブとの互恵的結び付きを作り出す必要性を考慮し、NEAC の新たな方向／原則の展開に合意した。会議では、大韓民国の環境省から提出された「NEACの枠組み」案を歓迎し、今後の推敲のため議長総括に添付した。参加国におけるNEACの担当者には、次回のNEAC会議における基本原則合意の採択の可能性を求めて、特にインターネットを活用し、現在の文書を見直し、調整を継続することが要請された。大韓民国環境省及びモンゴル自然環境省は、この過程において、合同で事務局の役割を果たす。

9　参加者は、NEAC が地方政府、NGO、研究機関といった様々な利害関係者の幅広い参加を伴う、自由で開放的な政策対話の場としての現在の機能を維持すべきであるという見解で一致した。

10　参加者は、モンゴル自然環境省による歓待と、第9回 NEAC を成功裏に主催したことに対し、深い感謝の意を表明した。

11　参加者は、韓国代表団からの大韓民国の仁川で2001年10月に実施される第10回NEAC開催の申し出を歓迎した。日付、期間、会議の議題については、主催国が他の参加国と協力して、少なくとも会議の3ケ月前までには決定される。

NEACの枠組み

A．目的

(1) 地域全体に渡り急速に環境が悪化し、抜本的な解決には地方自治体、民間、市民の関わりがより多く求められるようになっているのは明白なため、NEACの主要目的は、自由な論議と政策交換の促進、さらにあらゆるレベルでの有益かつ正確な情報へのアクセスを可能にさせることとする。

(2) こうした活動を通して、NEACは大気汚染、自然保全、水質及び廃棄物管理といった国内、地域内および地球規模の環境問題への効果的対処、また最終的には、北東アジア全体での汚染低減に貢献するようにする。

B．役割

(3) NEACは、いくつかの役割を果たすべきである。NEACのメカニズムを通して、様々な利害関係者の参加を促進することができる。こうした関係者には、関係する政府省庁だけでなく、環境機関、地方自治体、NGOも含まれる。

(4) NEACは主に、オープンな政策対話を維持するフォーラムであるため、他の環境プログラムに対する基盤として機能する。そのため、TEMMやNEASPECといった他の会議やプログラムへの結びつきは、強化されるべきである。こうした目的のため、主催国はその後のTEMMやNEASPEC会議でNEACを通じて生み出された成果及び情報を発表する。主催国はプレゼンテーション文書や合意結果を文書化し報告するといったNEACの成果を分かち合うための作業を行う。

(5) 類似したプログラムの会議開催の時期を考慮しつつ、NEACの枠組みの中で越境大気汚染、自然保護、生物多様性といった特定の分野に関しての暫定的なレビュー会合や専門家グループ会議を開催する機会をTEMMやNEASPECに提供するために、様々な対策を取ることが可能である。

C．参加国並びに主催国

(6) 北東アジア6ヶ国、すなわち、中国、北朝鮮、日本、モンゴル、韓国、ロシアは、参加国としてこの会議に出席する。

(7) 参加国は持ち回りでNEAC会議を主催する。しかしながら、特別な状況下では、開催地は他の会議参加国へ変更することができる。

(8) 主催国は各参加国の中からそれぞれ2名分の費用を負担する。

D．議題並びに活動

(9) レビューする活動は、前回の会議の結果に従って国内及び地域内の対策の進展状況を検証するために非常に重要であると考えられる。

(10) 会議は4つの分科会で構成され、各分科会の議題には、前回の会議で採択された北東アジアの様々な環境問題が含まれるものとする。他の環境プログラムに政策ベースを提供するために、NEAC会議の議題選択過程において、他の環境メカニズムにおける承認項目並びに進行中のプロジェクトを考慮する。

(11) 地方自治体や民間組織と協力して、主催国は公開シンポジウムや展示会のような特別な催しを実施することができる。

III　基調演説

基調演説
2000年の中国における環境保護

中華人民共和国
国家環境保護総局自然保護司副司長
Guotai Zhuang

議長、ご列席の皆様
北東アジア地域における環境保護問題を議論する機会を得られましたことは非常な大きな喜びです。中国代表団を代表して、中国におけるこの先2年間、また5年間に渡る環境保護の目標並びに内容を手短にお話ししたいと思います。

I．2000年の中国における環境保護
A．1999年の中国における環境保護
1999年は国の経済が安定的に発展を続けた一方で、中国の環境保護は、大きな成果を上げ、一層向上しました。いくつかの都市や地域における環境の質はある程度向上し、そのことが中国における改革並びに近代化の促進に大きな保証を与えたと言えましょう。

－ 汚染物質の排出総量規制と工業汚染源の基準達成は非常に促進され、1999年末までに11の汚染物質の総排出量は、排出基準を下回りました。工業汚染企業全体の基準達成率は74％で、重点企業の達成率は56％です。環境モニタリングの基本的能力は一層向上し、全国の100以上の都市で、大気質の報告が毎週実施されています。上海をはじめ10都市では、毎日報告が出され、天津等いくつかの都市では大気質予報が実施されています。

－ 都市、河川の流域、地方並びに海洋地域における汚染防止では、段階的に成果が出されています。北京の大気環境質は際立って改善されました。太湖、巣湖、滇池流域では、工業汚染源の排出基準達成がようやく満たされ、海河及び遼河流域の重点企業の汚染処理については成果が上がりました。SO_2の排出量は「酸性雨及び二酸化硫黄規制区域」において約80万トン削減されています。渤海における汚染防止はさらに向上し、陸地ベースの汚染は規制されています。中央政府が直接管理する全国の11の沿岸地域、自治区、自治体では、10年をかけて沖合いの海洋地域に環境機能ゾーンを設けました。

－ 自然の生態系保護も進展し、最新の統計では、1999年末には全国に1,146の自然保護区があり、その総面積は88,128,000haで、国土の8.8％を占めています。総合的タイプ、合理的な場所、完全な機能を備えた自然保護区のネットワーク・システムを確立し、1999年に中国は生物多様性に関するカントリー・レポートを発表し、生物の安全管理に関する法律を施行させました。

－ 生態系構築のために一層の投入が行われ、1998年に国家生態環境建設計画が施行されました。中国は自然林保護、総合的生態環境管理、防風林の構築、砂漠化防止、水質及び土壌の保全という一連の重要な生態系構築プロジェクトの策定を開始し、1998年と1999年には、生態系構築のための投資を180億元(RMB)増額しています。

2．中国における現在の環境保護状況

当面、中国における総合的環境状況は以下の通りです：汚染物質排出総量は、未だ非常に多い；汚染は高レベル；地域によっては相当深刻；生態系破壊の進展がまだ効果的に抑制されず、かなり厳しい環境状況にあります。

中国における環境保護の問題は：第一に、汚染構造に新たな変化が見られます。すなわち、工業汚染は安定して減少傾向にあるものの、家庭や農業汚染は増大しています；第二に、計画及び実際の要求に従った環境保護の投資が十分ではなく、都市の下水道やごみ処理施設の建設が非常に遅れています；第三に、環境保護の法律に不備が多く、あまり厳しく施行されず、環境モニタリング、科学技術及び情報サービスの能力が微弱と言えるのです。

現在、中国の環境保護政策において２つの大きな変化が進行中です：

第一に、様々な地域、流域、分野における汚染防止と処理に焦点を合わせる一方、経済成長の移行を積極的に促進しており、特に政策を通して経済構造、生産構造の調整を実施し、基準の改善とクリーナー・プロダクションの促進を通して生産モード、生産プロセスの改善を推し進め、都市部及び地方における環境インフラの構築を高め、汚染防止目標達成をめざします。

第二に、環境保護は、汚染防止から汚染防止及び生態系保護へと移行しており、特に、地域の持続可能な発展と流域の環境改善に関する生態系悪化の阻止は、日常的な生活の改善、安全で健康的な食料、すばらしい生態系の行楽地への要求と共に、生態系保護を展開するための重要な流れとなっています。

3．2000年の中国における環境保護事業

2000年の中国における環境保護の重要な課題は、環境汚染の悪化と生態系破壊を根本的に抑制し、都市や地域で環境の質を向上させ、新世紀に環境保護のための基盤作りをする努力を行うことです。

－「はなはだしく汚染をする企業を新世紀に持ち越さない」ために検査と監督の実施を強化し、今年の末までに汚染を排出する企業の基準達成を確実なものとします。・河と太湖の水を浄化します：海河、遼河流域のCOD年間排出量を計画した割り当て数値内で抑制します：巣湖、滇池流域で、水質目標を達成します：青い渤海行動計画の策定と実施を早めます。

－ 汚染防止と生態系保護に同時に注意を向けるという原則に従い、生態系保護を積極的に展開し、2000年までには、全国の自然保護区は国土の9%を占め、景勝地、森林公園を含めた場合には10%を達するでしょう。その間にも、耕作地を森林や草原に戻すプロジェクト、北京周辺の自然の草原や生態系ベルト地帯を保護するといった新たな生態系構築プロジェクトを開始します。

II．今後５年間の中国における環境保護

国内及び国際的な状況の変化と新世紀における環境保護の発展と、持続可能な発展並びに環境の質改善の必要に焦点を置くことで、今後５年間の環境保護は以下の主要な問題に主な重点が置かれます：

1．汚染抑制

第一に、社会経済発展源での環境保護を高め、環境保護を様々なレベルの社会経済発展に組み込み、計画の初期段階で環境保護を社会経済発展に統合します：

第二に、地方自治体や部門の積極的な環境保護向上を促進し、流域、都市、海域における対策をさらに強化しつつ、化学工業、製紙、鉄の精練、発電、セメントといった重要な部門に焦点を合わせて汚染負荷を軽減させ、各分野での取り組みによる地域対応を促進します。

第三に、環境保護管理システムを改善し完全なものとするために、重要な経済・技術政策の環境影響評価(EIA)の拡大、地域のEIAシステムを確立、改善してマクロ管理システムを強化します。汚染の総量規制と許可制度の促進及び段階的汚染許可取り引きの実施に向けて積極的に努力します。公的な参加システムと環境監督システムを設立し、また改善を致します。

2．生態系保護

第一に、川の水源域、重要な水源保護、水と土壌の保護ゾーン、また自然水害の調整貯水ゾーンを含む重要な生態系機能ゾーンと、川の流域と地域の生態バランスにとって非常に重要な防風林や防砂地域と共に早急な保護を実施し、生態系と環境についての安全性を確実なものとします。深刻な生態系の悪化を伴う場合、重要な生態系機能ゾーンを設け、保護回復処置を実施します。

第二に、重要資源開発ゾーンでは、生態系環境に関して強制的な保護を実施します。水、土壌、草原、森林、海、動植物及び鉱物資源といった自然の要素の生態的機能を一層明確にすべきです。上記天然資源開発における生態系環境の破壊と生態系機能の新たな悪化を防ぐために、法の施行並びに管理・監督を強化すべきです。

第三に、良い生態系が残っている地域では、積極的な保護を実施します：生態系経済構築を証明し、健全な地域社会経済、持続可能な発展と生態系環境にやさしいサイクルを伴う一連の論証モデルを設けます。こうした努力は、4～6の生態系実演地域を設け、6%の郡や市町村で環境にやさしいサイクルを達成することに向けられます。同時に、典型的な自然生態系が残っている地域にを新たな自然保護区に設定します。

中国は、主に揚子江や黄河で総合的環境対策プロジェクトを実施します。汚染防止を生態系保護と結び付け、経済構造調整と環境対策、産業からの汚染防止と家庭からの汚染防止、汚染対策とクリーナー・プロダクションとを結び付けるという原則に則って、総合対策を揚子江並びに黄河の環境汚染並びに生態系破壊に対して実施します。さらに、中国は生態系環境構築計画の取り決めに従って生態系環境構築をさらに促進します。

III．中国の西部地域開発における環境保護

中国は現在、西部地域において発展戦略の実施を準備中です。西部地域は、厳しい自然条件の下、独自の生態系が存在します。環境保護と生態系構築は、西部地域の開発戦略実施の成功に関連するだけでなく、国の生態系の安全、地球規模の環境保護を確実にする上でも非常に大きな意味を持っています。

1．西部地域の総合的環境政策決定能力の改善、並びに環境管理・監督の向上。

西部地域における生態系環境の現状に関して調査を実施します。調査に基づいて、西部地域の生態系環境機能ゾーン及び生態系環境保護計画を策定し、国の政策決定のための科学的根拠として利用します。

厳密に実施致します。様々な種類の工業建設プロジェクト、資源開発プロジェクト並びに輸送、水源、エネルギーといったインフラ建設プロジェクト、また重要な生態系構築プロジェクトの環境監督・管理を高める努力を行い、工事中に破壊が生じるといった後ろ向きの状況を防ぎます。

西部地域における環境保護のため人材育成を強化します。生態系モニタリング・ネッ

トワーク、並びに生態系災害警告システムを設けます。トレーニング・コースを設け、環境監督・管理スタッフの法律に則った行政能力を向上させます。

2．重要な生態系機能区域並びに自然生態系システムの保護を強化し、地域経済と生態系発展を調整したデモンレーション･モデルを設けます。

重要な生態系機能保護区域を、重要な防風林、防砂地域と共に、揚子江及び黄河の水源域に設けます。保護区域では、生態系環境の破壊を引き起こす様々な種類の開発工事活動を禁止します。必要な生態系の移動を催します。適切な開発と活用は、厳しい保護と共に実施します。生態系回復対策は、出来るだけ早く保護区域の生態系環境を回復させるために、人工的な対策と自然を結びつけて実施します。

当面西部地域には486の自然保護区があり、その中で国レベルのものは69あります。早急に揚子江及び黄河の上流と中流を自然保護区に設定し、様々な種類の野生生物と動物資源を保護します。

耕作地を森林や草原に回復させるプロジェクトは、計画通りに実施されます。環境保護と改善、経済発展と貧困の緩和は、環境にやさしい製品の開発と西部地域におけるエコツアーとの結びつきと共に奨励されます。

3．汚染防止の強化並びに主要な地域、流域、都市における環境の質の改善。

「西部地域天然ガスの東部地域への輸送」及び「西部地域電気の東部地域への送電」といったプロジェクトに関連して、都市の大気質を向上させるために、都市エネルギーの再構築、並びに送電線に沿ったインフラの改善を促進する努力をすべきです。工業、及び都市排水処理を加速させます。一連の家庭排水処理場を、中央政府の西部地域インフラ工事への支援を受けて建設します。一方、他の都市環境インフラの工事を促進し、小都市における工事を合理的な方法に指導します。

クリーナー･プロダクションを、西部地域における産業構造の調整と共に促進し、環境産業と環境ラベルを貼った製品を開発します。既存の技術能力を、十分に活用し、環境産業の発展を指導します。

ご列席の皆様、

我々は、北東アジアに住み、北東アジアにおける環境を保護するという共通の責任と義務を有しております。中国は、北東アジア地域における環境保護並びに社会経済発展のために、関連する国々並びに地域との関係及び協力を強化する努力を進んで行うつもりです。

有り難うございました。

基調演説
環日本海環境協力会議
モンゴル、ウランバートル
2000年8月26～28日

大韓民国環境部
国際協力局長
Chong Chun KIM

Banzragch閣下、参加者の皆様：

韓国の環境経験と政策展開を皆様と分かち合い、また北東アジアにおける成功例を学ぶことはこの上ない喜びであります。この意義ある会議に参加し、より緊密な環境協力に向けて協力出来ますことは名誉なことであります。この機会を利用しまして、この会議を主催されたモンゴル自然環境省、並びにその支援をされた日本環境庁に対して心からの感謝申し上げたいと思います。

これから2つの話題についてお話しさせて頂きます。まず、NEACの構造を明確化する提案を行い、その主要な目的と役割を定義したいと思います。これは、本地域内で成功に向けて NEAC の能力を構築する上で重要な事柄です。その後、韓国における現在の環境政策体系の最新情報をお伝えしたいと思います。

(1)

御存知のように、1999年11月に京都で開催された第8回NEACでは、参加者が次のような主要な問題を論議しました：(1)地方自治体における環境保全への取組、(2)環境協力における地方自治体の取組、(3)気候変動問題、及び、(4)環境協力におけるインターネットの活用。政府、企業、専門家、一般を含めたパートナーシップが非常に重要であることが合意されました。また、NEACが環境保護対策に関わる情報や意見を交換する重要なフォーラムであり、NEACを強化すべきであるとの見解が出されました。

韓国は、先のNEAC会議の成果や合意採択に積極的に働きかけました。この意味において、韓国の環境大臣は、北東アジア環境協力に関する全国専門家ネットワークを組織する等して、北東アジアにおける環境協力に対する地方自治体や民間の意識向上に努力しています。このネットワークには環境専門家、地方及び中央政府の行政官、環境NGOのメンバーが含まれています。このメカニズムを通して、一般の意識と理解、ガラス張りの情報交換促進といった、進展には欠かすことができない要素の促進を図っています。

さらに、三ヶ国環境大臣会合(TEMM)のインターネット・サイトが韓国環境部(MOE)の国立環境研究所によって設けられています。環境データの分析及び効果的な利用に役立てるために、北東アジア環境データ・トレーニング・センターもウエブサイトを設立しつつあります。この点において、レビュー・プロセスとメカニズムはNEACの発展にとって非常に重要であることを強調したいと思います。

(2)

NEACはここ9年間に渡り(1992年以来)、環境意識、並びに、北東アジアにおける他のプログラムの発展に貢献してきたことに注目したいと思います。

しかし、NEACの役割と機能は、最初の段階を超えて発展、向上していないこと

も事実です。専門家や行政官の中には、北東アジア環境協力における重複を主要な問題と認識し、連携や効果の不足を指摘する人もいます。

この点において、各プログラムや会議は特定の役割や重要な機能を持っていることを強調したいと思います。そのため、添付資料1で、明確な目的や方向を含めて、NEACの役割と構造に関する提案を行いたいと思います。

要するに、NEACは、北東アジアにおける既存の環境協力機構内で、環境問題に関するアドバイスや知識へのアクセスを増やすことができる政策フォーラムとして機能すべきでしょう。それにより、一般の意識や政策立案者の理解を高め、環境省庁だけでなく、地方及び中央政府、民間の間のより密接な環境協力を促進することになりましょう。

添付書類1に示しましこの提案は、セッション4で発表予定ですが、皆様に御検討、御議論頂ければ幸いです。

(3)

今年は、北東アジアにおける環境協力には実質的な進展が見られました。大半の方々は、おそらく御存知だと思いますが、第2回三カ国環境大臣会合では、日本、中国、韓国の環境大臣が9つの具体的プロジェクト実施に合意しています。

3月にソウルで開催された第6回北東アジア地域環境協力プログラム(NEASPEC)では、北東アジアにおける環境協力のビジョン声明が採択されました。さらに、参加国は北東アジア環境データ・トレーニング・センターを承認し、中核資金の設立に合意しました。こうした成果とそれに続く成果は、本地域内の環境協力を強化することになるでしょう。

北東アジアは、本地域内だけでなく、世界においても、環境アジェンダの設定において指導的役割を演じるであろうことを強調したいと思います。世界の急成長国は北東アジアに多く、結果として、急速に悪化している生態系もまた、この地域に見られる可能性があります。これにはポジティブな面とネガティブな面があります。ポジティブな面の一つは、我々の環境問題に関する挑戦や協力を密接に分かち合うことに成功すれば、世界に対し、いわゆる経済周辺国*(the economic periphery)*からの道標を示すことが出来るだけでなく、環境危機に対応した道も示すことが出来るのです。

そのため、我々の間の密接な協力は、リオ＋10及び第4回ESCAP環境大臣会合への準備プロセスにおいて強く求められているものと思います。

(4)

ここで話題を変え、韓国の環境政策並びに方策を御紹介したいと思います。1999年は、この10年間の成果を整理し、新世紀のための環境政策の方向を明らかにする期間と言えます。韓国の日常生活の質を向上させるために、周囲の環境、すなわち大気、水、土壌における評価可能な改善に焦点を合わせる決定を行いました。

首都地域の源泉である、漢江流域における水質の総合対策を成功裏に確立した後、洛東江流域を管理する同様の対策を、地域の住民をそのプロセスに巻き込んで確立しました。こうしたことで、上流と下流の地域社会間の軋轢をうまく解決することが出来ました。さらに、環境部は、Kuem川とYoungsan川の流域でも同様の対策を確立する予定になっています。

この先10年間、韓国で水が不足するという予測に備えて、節水装置の設置、公的キャンペーンの拡大を含めた全国規模の節水対策が確立されました。

環境部は、ディーゼルバスを部分的にCNG(圧縮天然ガス)バスに転換し始めています。政府は今年ソウル、プサン、その他の大都市に1,500台のCNGバスを導入するために、334億ウオン(US$2.9億)を投資しています。

総合的なごみリサイクル・システムの確立も目指しています。使い捨て製品や包装材への規制の強化等、さらなる廃棄物管理対策の実施を計画しています。食糧廃棄物の最小限化とリサイクルも引き続き促進されます。食糧廃棄物の排出に対してはリサイクル手数料を導入することで、この分野における現在の対策を拡大して行きます。引き続きリサイクル能力を拡大し、食糧廃棄物収集に効率を導入します。

環境部は、野生生物の規制を体系化し統合する過程にありますが、これは総合的な保全システム強化に役立つことになるでしょう。例外的に健全、あるいは生物学的に多様な生態系を持つ区域を、特別に、正式な保護地域とする計画を立てています。一方、しばしば、生物多様性の宝庫と表現される、こうした繊細で生態学的に重要な土地を保護するために、湿地保全法が新たに施行されました。

もう1つの重要な目標は、環境影響評価プロセスを制度として義務化するシステム作りです。様々な影響評価システムを統合することで、影響評価を簡素化かつその効果を向上させることが出来るものと思います。こうしたものには、環境影響評価だけでなく輸送、災害、人口も含まれます。

こうしたアプローチに向けた風潮を作るために、環境部は、世界環境デーに21世紀における環境政策のための国家ビジョンを発表しました。そこには、新たな千年紀における環境倫理と価値に関する指針、環境にやさしい発展、及び朝鮮半島におけるいわゆる「環境コミュニティー」の構成が盛り込まれています。

新たな千年紀においては、生産を直接制限するというよりはむしろ、需要を統制し、効率を増大させることを主眼とした環境政策を促進することになるでしょう。また、社会の様々な部門に渡るパートナーシップに基づいた政策に重点が置かれるでしょう。環境政策は、環境管理に対する経済的インセンティブを強化し、健全な環境と経済を同時に構築する役に立たなければなりません。

この環境政策の焦点及び展望のレビューが、我々がどのような道を歩んできたのか、またこれからどうしていくのかという認識の御理解に役立てば幸いです。我々の活動をもっと詳細にお知りになりたい方は、後程詳しくお話しさせて頂くか、あるいは適当な人物あるいは情報源を御紹介させて頂きます。

(5)

韓国を代表しまして、この歴史的に有名な都心で開催された第9回NEAC会議に出席出来ましたことは非常な喜びであります。またこの会議に韓国の著名な環境運動家であるKim Jae Ok氏、CACPKの専門家、地方自治体の行政官と共に参加出来ましたことはこの上ない名誉であります。様々な方が出席されていますことは、NEACが真にオープンなフォーラムとなり、あらゆるレベルで環境知識、アプローチ、アイデアを共有するという我々の期待を反映していると言えましょう。

最後に、次回の会議から朝鮮民主主義人民共和国がNEACに参加されることを心から願っております。皆さんは御存知かもしれませんが、先月、朝鮮半島では南北朝鮮の歴史的なサミット会談が実現しました。この平和的なムードが北東アジアにおける環境協力促進に役立つことを信じております。そのため、北朝鮮のNEAC参加は、この枠組みの発展に貢献するでしょう。このことに皆様が関心を持たれ、御協力頂けることを願っております。

再度モンゴルの自然環境省並びに日本の環境庁に御礼申し上げたいと思います。

NEACが各国の積極的な参加と協力、並びに皆様方のような個人の参加を通して本地域内の環境問題解決に貢献しますことを心から願って演説を終えたいと思います。

有り難うございました。

（添付資料 1）

NEACの目的と役割

1．目的

(1) 地域全体に渡り急速に環境が悪化し、抜本的な解決にはNGO、民間、市民の関わりがより多く求められるようになっているのは明白なため、NEACの主要目的は、自由な論議と政策交換の促進、さらにあらゆるレベルでの有益かつ正確な情報へのアクセスを可能にさせることとする。

(2) こうした活動を通して、NEACは越境大気汚染、自然保護、水質及び廃棄物管理といった国内、地域内および地球規模の環境問題への効果的対処、また最終的には、北東アジア全体での汚染低減に貢献するようにする。

2．役割

(3) NEACは、いくつかの役割を果たすべきである。NEACのメカニズムを通して、様々な利害関係者の参加を促進することができる。こうした関係者には、関係する政府省庁だけでなく、環境専門家、研究機関、地方自治体、NGOも含まれる。

(4) NEACは主に、オープンな政策対話を維持するフォーラムであるため、他の環境プログラムに対する基盤として機能する。そのため、TEMMやNEASPECといった他の会議やプログラムへの結びつきは、強化されるべきである。こうした目的のため、主催国はその後のTEMMやNEASPEC会議でNEACを通じて生み出された成果及び情報を発表する。主催国はプレゼンテーション文書や合意結果を文書化し報告するといったNEACの成果を分かち合うための作業を行う。

(5) 類似したプログラムの会議開催の時期を考慮しつつ、越境大気汚染、自然保護、生物多様性といった特定の分野に関しての暫定的なレビュー会合や専門家会議を開催する機会をTEMMやNEASPECに提供するために、様々な対策を取ることが可能である。

3．参加国及び主催国

(6) 北東アジア6ヶ国、すなわち、中国、北朝鮮、日本、モンゴル、韓国、ロシアは、参加国としてこの会議に出席する。

(7) 参加国は持ち回りでNEAC会議を主催するものとする。しかしながら、特別な状況下では、開催地は他の会議参加国へ変更することができる。

(8) 主催国は各参加国の中からそれぞれ2名分の費用を負担する。

4．構造及び議題

(9) 会議は4つの分科会で構成される。第1及び第2セッションは中央政府レベル、一方、第3セッションは地方政府レベルで組織され、第4セッションは民間組織が係わるものである。

(10) 各分科会の議題には、前回の会議で採択された北東アジアの様々な環境問題が含まれるものとする。他の環境プログラムに政策ベースを提供するために、NEAC会議の議題選択過程において、他の環境メカニズムにおける承認項目並びに進行中のプロジェクトを考慮する。

(11) 地方自治体や民間組織と協力して、主催国は公開シンポジウムや展示会のような特別な催しを実施することができる。

基調演説

2000年7月26日（水）

環境庁地球環境部環境協力室長

田口 博之

1　はじめに

議長、ご出席の皆様。

我が国の代表団を代表して、基調演説の機会を与えていただいたことを光栄に思うとともに、深い感謝の意を、モンゴル国政府に表明いたします。

今回は、初のモンゴル国での開催であり、記念すべき会議であると言えましょう。また、第９回会議ということで、ＮＥＡＣのこれまでの歩みを振り返り、これからの１０年間について議論する最良の機会となりました。１９９２年に環日本海環境協力会議の第１回会議が開催されて以来、政策対話は進展を続けております。地球温暖化や大気汚染をはじめとした環境問題に対処するために、この進展を一層拡げ、発展させることは、私たちの責務であると考えます。

2　日本の環境行政

まずはじめに、我が国の環境政策について紹介いたします。現在、我が国では、環境基本計画の見直しを行っています。この計画は５年前に策定されたものですが、これを２１世紀初頭にふさわしいものとするために、見直しにあたっては、以下のような問題を優先政策事項としています。

＜地球環境問題＞

まず第一に、地球温暖化をはじめとする地球環境問題に率先して対応することです。地球温暖化対策については、本年１１月に予定されている気候変動枠組条約第６回締約国会議を成功させ、遅くとも２００２年までに京都議定書を発効させるためのあらゆる努力を尽くします。同時に、国内においては、温室効果ガスの６パーセント削減の目標を達成するための総合的な国内計画を推進します。また、日中韓三ヶ国大臣会合、Ｇ８環境大臣会合、ＥＳＣＡＰ環境大臣会議、エコ・アジア及びリオ＋１０といった大臣級の国際会議を通じ、地球環境問題に取り組んでまいります。

＜環境負荷の少ない循環型社会づくり＞

第二は、環境負荷の少ない循環型社会の実現に向けた社会的・経済的システムの確立です。これは、生態系からの必要最低限の資源を、最大限有効に活用し、環境負荷を最小にして戻すということです。先の国会においては、環境負荷の少ない循環型システムの形成を促進するための基本法である「循環型社会形成推進基本法」と、リサイクル製品等への需要の転換を促進する新たな仕組みを形成する方策として「国等による環境物品等の調達の推進等に関する法律」が成立しました。また我が国では、環境保全型の製品・技術の開発・普及を推進するとともに、草の根の活動等に対する支援や環境教育・環境学習の充実強化を図っています。

＜ダイオキシン類等の化学物質問題＞

第三は、ダイオキシン類等の化学物質問題対策です。

ダイオキシン対策については、「ダイオキシン類対策特別措置法」が本年１月に施行され、これに基づき、大気・水質・土壌に係る環境基準等の維持・達成を図るため、ダイオキシン類対策を実行してまいります。また、「特定化学物質の環境への排出量の把握等及び管理の改善の促進に関する法律」の着実な施行に向けて、化学物質の排出量等の把握、公表等が円滑に行われるための基盤整備等を進めます。さらに、環境ホルモンの問題については、科学的知見を早急に収集するための調査研究等を推進してまいります。

＜大気汚染問題＞

第四は、大都市地域の自動車環境対策等の拡充です。

大都市地域における窒素酸化物及び粒子状物質に係る大気汚染の改善を図るため、その対策のあり方について、年内に中央環境審議会から答申を得て、来年の通常国会において自動車ＮＯｘ法の改正を行う予定です。また、ディーゼル車の排出ガス規制については、その大幅強化の前倒しについて、中央環境審議会において検討を進めているところです。浮遊粒子状物質については、更に微小な粒子状物質について、測定・評価手法及び健康影響についての調査を進めています。また、先の国会では、悪臭を伴う事故時の措置の強化、臭気測定体制の整備等を内容とする「悪臭防止法の一部を改正する法律」が先の国会に提出され成立しました。これを受けて、悪臭防止法に基づく対策の強化の方策について鋭意検討を進めてまいります。

＜生物多様性＞

第五は、森林や湿原など国土のそれぞれの場所に応じた多様性のある自然の戦略的保全を進めることです。我が国では、人と野生鳥獣との共存を図るため、昨年改正された「鳥獣保護及　および　狩猟ニ関スル法律」に基づき、科学的で計画的な鳥獣の保護管理を積極的に進めています。さらに、自然公園等において環境との共生や自然環境学習等に重点を置いた施設整備を進めるとともに、自然体験学習などの機会を充実しています。

＜環境省＞

最後は、環境省実現のための体制整備です。来年１月に環境省が設置されるにあたっては、廃棄物行政の一元化、化学物質対策をはじめとする幅広い事務の共管化、地球環境問題への取組の充実等をポイントに、人員の拡充・部局の再編など、組織・体制の強化がなされることとなっています。

３　環境政策の近年の傾向：ポリシー・ミックス

次に、近年の国内外での環境政策の傾向について述べたいと思います。私の考えでは、環境政策に関する問題は、以下の３つの型のポリシー・ミックスに焦点を当てることができると思います。

＜環境と開発の統合＞

第一は、政策分野でのミックスです。つまり、環境と開発の統合です。持続可能な開発は、いわゆる環境政策だけで達成されるものではなく、経済の全てのセクターで環境負荷の低い政策が執られることが必要です。例えば、森林や水、エネルギーに関する政策は、資源生産・利用の効率を高めるような環境負荷の低い方式に改善されるべきです。開発計画は、環境と調和するものとするために「戦略的環境アセスメント」を経る必要があるでしょう。ＵＮＤＰやＵＮＥＰのような国際機関は、すでに、全てのセクターにおいて環境を主流に据えた戦略を推進しています。ＯＥＣＤ－ＤＡＣは、開発途上国に対する政策統合のガイダンスを通じて、新たな開発戦略を促しています。世界銀行は、現在、環境問題を貧困削減と経済発展への努力に統合することを目指して、本年１２月に向けて新たな環境戦略を策定中です。

＜規制と経済手法のミックス＞

第二は、政策手法におけるミックスです。一般に、政策手法は２種類あり、ひとつは、厳格な管理統制アプローチで、典型的な例としては、大気及び水質汚濁抑制のための排出・排水規制基準を設け義務づけるということです。もうひとつは、経済的誘因策で、排出・排水費用や排出量取引といった市場ベースの手法が典型例として挙げられます。近年、とりわけ排出量取引の枠組みが京都メカニズムのひとつとして作られて以降、いくつかの国ではその効率性と有効性のために経済手法を導入する動きがあります。しかし、有毒あるいは危険廃棄物など、少量の汚染物質が重大なダメージを引き起こす場合など、管理統制手法が適切である場合もあります。そのため、環境管理は、規制手法と経済手法の組合せに基礎をおくべきです。

＜公共と民間のパートナーシップ＞

第三のタイプは、政策主体のミックスです。環境問題に取り組んでいる主体は数多く、中央政府、地方政府、民間企業、研究機関、ＮＧＯと多岐に渡っています。各主体がそれぞれの活動において、固有の役割と比較優位を有しています。例えば、中央政府は、全国的な計画・ガイドライン・基準設定といった基礎的政策に責任があり、地方政府は、空間利用計画やモニタリングなど、地域に即した方策に多くの経験を蓄積しています。ＮＧＯは、植林や環境教育などの草の根の活動に取り組んでいます。環境へのチャレンジに対処するために、全ての主体の活動が、国内での環境保全と国際協力の双方の分野で、活かされ、統合されることが不可欠となっています。それゆえ、各主体が、その活動においてパートナーシップを取り結ぶことが期待されています。ＮＥＡＣは、パートナーシップを支えるための一つの機会だと思います。この点については、今会合で議論されることと思います。

以上のように、重要な問題は、政策分野、政策手法、政策主体において最善のポリシーミックスを見つけ達成することです。つまり、環境と開発を統合し、経済政策と規制的手法を組み合わせ、政策主体間にパートナーシップを築くということです。

４　おわりに

参加国は、歴史、文化、社会制度、経済規模、天然資源などの点でそれぞれが固有の状

況にあります。こうした違いがあるとはいえ、地球規模での環境問題に対処していこうという意志は、我々全てに共通であると考えます。各主体間で情報を交換し、協力関係を一層強化させることができる本会議は、大変有意義であり、ご出席の全ての方々にとって、大きな成果をもたらし、成功することを願っています。

最後に、お手元にお配りしましたように、前回会議開催地の京都府知事 荒巻禎一氏及び舞鶴市長 江守光起氏からは、前回会議で大きな成果を得たとのメッセージ、そして今回会議の開催への祝辞をいただいております。このこともあわせて皆様にお伝えいたします。

第９回 環日本海環境協力会議へのメッセージ

第９回環日本海環境協力会議に御出席の皆様、

第８回会議の開催地である京都府から、第９回会議の御成功を願い、心からご挨拶を申し上げます。

第８回会議は昨年１１月に日本海沿岸における日本の主要な交易拠点の一つである京都府舞鶴市で開催されました。

この会議では国際環境協力を推進するための地方自治体の役割について熱心な議論が行われ、自治体間での連携・協力の重要性を再認識するなど、大きな成果を得たところであります。

また、今回の第９回会議では、環日本海環境協力会議のこれまでの活動のレビューと将来の課題についての検討が行われると聞いております。この会議が実り多いものになることを心から祈念いたしますとともに、京都府といたしましても、地方自治体の立場から、これらの成果を踏まえて環日本海地域の環境協力に積極的に取り組んでいきたいと考えております。

結びに、この会議が環日本海地域の環境協力の新たな展開につながることを期待いたしますとともに、御出席されている皆様の御健勝・御発展を心から祈念いたします。

2000年７月26日

京都府知事　荒巻禎一

第９回環日本海環境協力会議が、古くからの伝統と近代的な顔を併せ持つ草原の国、モンゴル国ウランバートル市において盛大に開催されますことを心からお祝い申し上げます。

京都府舞鶴市で開催された前回の会議では、公開シンポジウムを含め、４日間にわたり活発な情報交換・政策対話がなされました。

これは、本市が北東アジア地域との連携・交流を推進するうえで、また、市民と行政が一体となった環境施策を進めていくうえで、大変意義深く、大きな成果をもたらしました。

今日、環境問題は、地域社会、国、地球環境規模のそれぞれのレベルで、解決を図っていく必要があります。

ウランバートル市での会議においても、地球環境に関する様々な情報や意見の交換が活発に行われ、舞鶴での会議で培われた相互理解と協力関係がさらに強化されますことを期待しております。

あとになりましたが、第９回環日本海環境協力会議の実り多い成果と、各国からご参加の皆様のご健勝とご多幸をお祈りいたしまして、前回開催市からのメッセージとさせていただきます。

平成 12 年(2000 年)7 月 26 日

舞鶴市長　　江　守　光　起

基調演説
第9回環日本海環境協力会議
2000年7月26－28日
モンゴル、ウランバートル

大臣顧問/ロシア連邦自然保護研究所所長
Dr. Peshkov

記念すべき10回目の会議を前に － 総括と新たな展望

代表団、参加者の皆様。

最初に、第9回環日本海環境協力会議の開催にお祝いを申し上げ、またこの重要な会議を準備されたモンゴル共和国自然環境省、並びに支援組織の皆様に対して、心から御礼を申し上げたいと思います。本地域内の環境状況に関して意見や関心を交換する機会を持てますことを非常にうれしく思います。今回で9回を数えますこの会議も、次回で記念すべき10回を迎えることとなりました。これを機会に過去の成果と会議の今後について述べさせて頂きたいと思います。

これは私の個人的見解に止まらないことだと思いますが、これまでは、活動の非常に良い基礎作り、すなわち、相互理解と共同作業の基礎作りが非常にうまくいったと言えましょう。当会議は、域内において環境に優しい政策促進を支える非常に重要な手段となっており、また様々な分野で参加国が協力する機会を提供しています。会議毎に、いくつかの議題を設定し、集中して討議することは、大きくかつ複雑な環境問題を扱うには優れた、また実り多い方法のように思えます。しかしながら、あらゆる問題を非常に速やかに解決しますので、こうした取り組みを数年続けた後には、合意を得て、協力を実施したいくつかの分野においてはその成果を総括し、成果を検証し、研究すべき問題に対しては新たな目標を設定する必要もあると思われます。これは、急速に進展している分野において、我々の活動をより高いレベルで進展させる必要があるものの、あまり先行きが芳しくない場合には、とりわけ有効でありましょう。一度の会議であらゆる問題を取り上げることは出来ないものの、代表団の皆様の御意見により、最大の関心を集める問題をから始めたいと思います。

事前に立場を明らかにすることは、非常に有益なことです。まず、ロシアにおる環境保護管理に関する行政機構の変化について触れたいと思います。8月7日に環境保護に関するロシア連邦国家委員会の一切の機能は、ロシア天然資源省へ移行するため、委員会は現在その最後の日々を迎えているところであります。天然資源省は、3年前に設立され、資源開発、すなわち地質学等を専門とする数名の閣僚が加わっております。多分、その将来像について弁護するには早すぎるかもしれませんが、現実的に見てみると、環境保護規制、特に生物資源保護は、あまり先行きが明るくないことを指摘する必要があります。省内で天然資源の開発とその利用の規制が共存するという今日の構造が、状況を物語っていると言えましょう。これは、天然資源保護にはあまり良いことではありません。というのも、新たに任命された大臣は地質学者なのです。そのため、鉱物産地の開発が、保護区域を設けることよりも好ましい場合には、状況を変えるという意思を表明したのです。こうした立場は、「環境にやさしい」とは言いがたいわけです。しかし、これは一時的な状況であること、自然保護の振子が、保護と反対方向に向かった後、近い将来、再び保護の方向に戻ってくることを願っています。実際、社会学的調査では、今では大半の人々は環境問題は他の事柄、例えば、経済不安、物価の上昇、社会犯罪の増大といっ

た問題に比べてあまり重要ではないと考えていることが示されています。恐らく、そうしたことが、我々が社会全体で立場を失い、政府の構造にそれが反映される理由なのでしょう。しかし、私は「憂いの反面には喜びがある」と言いたいのです。現在の状況は、我々が、一般の参加をもっと活発にすることを含め注意を喚起し、現代の技術を活用し、影響を行使し、科学的に証明するために、政府当局と力を合わせるための新たな方法を模索するよう求めているのです。また、我々は、国際的な接触を求め、他国の仲間や組織からの支援を得て、政府に環境指向の政策を取るよう促すという正しい方向にあるのです。

次に、主要な分野における最近の活動、並びに優先事項について一般的な見解を手短に述べたいと思います。

まず、森林保護について次のことを述べたいと思います。ロシアの森林は、ロシア全土の 69% を占めています。密林のほぼ 78%がロシアのアジア地域に位置しており、この最大の森林地帯に対して我々は特別の関心を寄せています。

最近の森林に関する慣行に関しては、1997 年にロシア連邦森林法が導入され、森林の所有構造が大幅に変更されたことを重要なこととして申し上げたいと思います。森林法は、連邦の所有権の部分的移転を実施し、森林の所有、処分、並びに利用といった他の形式を規定するものです。森林の生物多様性及び生物資源は、ロシアの領土のほぼ半分に住む人々の生活や経済構造を決定するものです。年間およそ 1 万平方 km から伐採される材木の供給に加え、森林は素晴らしい環境、資源、リクリエーション機能を有しています。生態系のために森林開発を支えるので、経済的な面から人が生きるための森林の価値を、環境機能に組み込むことは大切なこととなるでしょう。こうした目的のためには、非木材の森林生産を増加させるプログラムの実施が可能で、既にある地域ではプログラムが策定されています。今我々は、森林管理を持続可能な開発プロセスに組み込む方法を作り上げ、投資する過程にあるのです。

今日、ロシアの森林を保全する際の大きな問題の中でも、特に次の点を指摘したいと思います：それは、森林管理局が開発範囲を定め、無償で森林資源を利用する一方で、森林を監査するという矛盾した状況にあるのです。新たに設けられた天然資源省に森林管理局が統合されるという現状は、状況の変化を何ら意味するものではありません。状況を改善する方法がいくつかあります。既存の森林法を森林の保全と荒廃の予防という環境の保障を確実に行うためには変更する必要があるのです。また、森林管理形態を確立し、森林管理と森林産業の一体化を止める必要があります。最近のこうした一体化によって招かれた、未回復の傷痕が残る広大な区域、木々のない里山や湿地帯が、かつて森林が存在した場所に混在しているのが確認出来るのです。森林管理機能は、適切な森林管理と修復を実施出来る特別な権限によって行われるべきなのです。森林保全の重要な部分は、ロシアの非政府組織や国際的な組織と協力して実施可能です。例えば、IUCN、WWF、グリーンピース等は、森林保護に非常に熱心です。一例として、IUCN は、1995 年から 1998 にかけて、「中東欧の一次・二次森林の保全と利用」プログラムを展開しました。他の組織が展開する複数の森林プログラムもあります。運の悪いことに、得られた結果は時として、実際に利用出来ないことがあります;結論は野心的なものですが、非常に主観的なものになるのです。現在、科学機関、政府の環境研究所、政府組織は、より適切なプログラムを策定しています。

次に、保護区域の概要について述べたいと思いますが、ロシアは保護区域に関しては非常に発達したユニークなシステムがあり、zapovedniks(最重要保護区、IUCN カテゴリーでは最高の保護分類)と呼ばれる国の自然保護区、国立公園、自然公園、天然記念物、国の鳥獣保護区等で構成されています。ロシア保護区のリーダー格とも言うべき、国の自然保護区システムは、80 年も前に設けられています。zapovedniks は、「自然史」や貴重なまた危機に瀕した植物相、動物相の種の監視といった自然条件を、科学的に研究しています。近年、国立公園、天然記念物、自然公園といったシステムは、急速に発展しています。保護区域展開の目的は、保護区域

のネットワーク・サポートであり、それによって貴重な、また危機に瀕している種、生態系、景観、を存続させ、あらゆる区域における生態条件を確実に持続可能にするのです。今日、ロシアの特別保護区域のコンセプトに関する作業は積極的な展開を見せています。保護区域でのエコ・ツーリズムも展開し始めており、またこうした活動に世界の保護区域の経験を蓄積する必要もあります。自らの力だけで行うより、他の人々の経験や過ちを学ぶようにするべきなのです。我々の国立公園システムは形が整い始めたばかりで、ロシアの国立公園を管理する方法を確立する途上にあります。今日、35の国立公園があり、貴重な、また国にとって重要な区域が保護されています。しかしながら、法律やその発展に対する明確な展望はまだまだ不十分なのです。国立公園と公園内の居住地との相互関係の問題は、公園管理方針において特別に取り上げるべき問題と言えます。管理方針の最重要点は、持続可能な存続に関連するもので、次のようなものが挙げられます:

・貴重な自然及び文化的場所を保護する際に、地元の人口問題も組み込む;
・国立公園等の経済的発展を管理する際に、地元の地域社会が参加する状況を作り出す。

自然の持続可能な発展の重要な要素は、信頼のおける公的支援と結び付いた管理を必要とします。今、我々は国際的な経験を活用し、新しい形式を試しつつ、社会との相互理解を達成する機構を形成するプロセスにあります。

最後に、環境問題をより効果的にまた適切に解決する必要性を、また国々の間で情報を積極的に交換する人材育成の必要性を強調したいと思います。アジア北東地域に生態系の安全保障を確立するのに役立つ意識の昂揚との特別な結び付きは、非常に有益なものとなるでしょう。

僭越ながら、ロシア連邦の環日本海環境協力会議への参加は、ロシア域内における環境保護促進に非常に有効であることを申し添えたいと思います。会議の決定事項を実施した実例は、分科会における報告で示されることでしょう。

第9回環日本海環境協力会議
基調演説
2000年7月26日
モンゴル、自然環境省
政策調整部長
Dr. N. Sarantuya

議長
参加者の皆様

第9回環日本海環境協力会議の基調演説をさせて頂くことは、光栄であり、この上ない喜びであります。主催国の代表として、皆様を心から歓迎申し上げると共に、はるばるウランバートルまでおいで頂いたことを御礼申し上げます。

新たな千年紀の始めに、地球規模の環境問題の深まりと自然の多様性喪失の増大により、自然環境の悪化、天然資源の減少、国家の発展進歩へマイナスの影響がもたらされています。温室効果ガス、オゾン層の破壊、地球温暖化、干ばつ、砂漠化、生物多様性の喪失、酸性雨、自然災害といった深刻な環境問題が世界的な脅威となっています。

自然の所有者として、人類は天然資源の枯渇や自然へ損害を与えるような急速な開発への道を拒否して来ました。その代わりに、持続可能で自然と調和した生き方に向けた持続可能な開発戦略を最善の選択肢として考えてきました。環境の汚染や悪化には国境はなく、環境問題はそのスケールにおいてよりいっそう国際的なものとなりつつあります。

議長
参加者の皆様

この機会を利用しまして、モンゴルの現在の環境問題に対する挑戦とこの分野における国の政策を御紹介したいと思います。

モンゴルは中央アジアとシベリア・タイガが出会う生態学上の移行ゾーンに属す内陸の際立った大陸性気候の下で生態系はやや脆弱で繊細であると言えます。

古代から自然環境を保全し、天然資源の適切な使用を目指して来たモンゴル国民の価値ある伝統は、今では、持続可能な発展という新たな概念によって高められたものとなっています。しかしながら、今世紀の中頃からの発展、工業化、人口増加により、モンゴルの伝統的な生活様式や遊牧民の文化にかなりの影響が出ています。

ここ20年間で、再生可能なまた再生不可能な天然資源の開発度合いは急速に進展し、環境に悪影響が出始めています。鉱業品はモンゴルの総輸出の2/3以上を占めています。また、耕作に関する協力の動きや耕作地に新たな区域を設けることで、伝統的な生活様式に顕著な変化が見られるようになりました。協力政策を通して、同種の大量の家畜が1ヶ所にその維持能力を上回って集められるため、土壌の生産性、水の供給悪化を招きました。総森林面積は、140万ヘクタール、総牧草地は690万ヘクタール減少しました。近年の公的企業の民営化と何千にも上る民営企業の出現は、監督官庁による活動の監視がほとんどなされないために、短期利益の追求による天然資源の無分別な開発、不適切で汚染を発生する廃棄物管理、経済活動によりダメージを受けた天然資源回復の失敗という結果を招いています。

モンゴルが直面している最も差し迫った環境並びに天然資源問題は、天然資源の悪化と過剰開発、大気汚染、過剰開発と限りある水資源の汚染、有害固体廃棄物処理、牧草地と生物の多様性保全とが対峙する土地利用、土地と森林資源の持続不可

能な活用、自然及び人の影響による砂漠の拡大、度重なる自然災害といった都市化と社会・経済発展による環境への挑戦なのです。

1990年代に、民主的な市場指向の政策が開始され、環境改善が可能な条件が設けられました。1994年から2000年にかけて、モンゴル議会は、自然の保全及び天然資源の合理的利用に関する一連の法律及び計画を制定しました。法律では、天然資源の保護、回復、合理的利用に関する権限は地方自治体にあります。すなわち、こうした事柄における地方自治体や地域社会の役割が増大しているのです。

1995年から、数多くのイニシャティブやプログラムがモンゴルの環境問題に対応してきました。その成果には次のようなものがあります；

- 例えば、天然資源管理、大気への排出、廃棄物排出、環境税、天然資源の開発からのロイヤルティといった特定の環境法立案において顕著な進展が見らます。
- 過去5年間で非常に多くの戦略並びに行動計画が承認され、今では、こうした計画を実施することが重要な課題となっています：生態系に関する国家政策、生物多様性の保全に関する行動計画、砂漠化対策国家行動計画(NAPCD)、保護区に関する国家計画、水政策国家計画、森林計画、廃棄物計画：大気質保護計画、環境教育国家計画、及び一般投資プログラム(PIP)1999-2002。
- 21世紀のためのモンゴル行動計画(MAP-21)が、地球の持続可能な開発方法と原則に従って策定されています。この計画は、環境のチェック&バランスを維持しつつ、モンゴルの生活のあらゆる分野の開発のための必要条件、政策目標、作業方向及び方法を複合的に包含し、定義する国の指針となるものです。
- 環境保護へのNGO及び一般の参加が増えています。
- 国土の14%が保護区ネットワークに組み込まれています。
- 環境影響解析（EIA）の知識、手順、実施能力が強化されています。
- 生態系データベースを伴う環境情報システムを含めた国家環境モニタリング・システムが開発されています。
- 多くのプロジェクトが、地方レベルの環境と天然資源の管理・保護に焦点を合わせています。
- 2000年2月に、モンゴル議会は、「環境保護並びに天然資源回復に拠出する天然資源利用金からの収入割合」に関する法律を承認しました。環境保護及び天然資源管理を強化発展させるための資金源と財政構造を機能させるために非常に重要な法律です。

1993年以後、モンゴルは、生物多様性の保全、気候変動、砂漠化対策、オゾン層破壊の減少、植物相及び動物相の希少種と絶滅危惧種の取り引き、有害廃棄物の越境移動と処理、湿原の保護、化学兵器の製造、保管、並びに処分、移動性動物の保護といった重要な地球規模の環境問題を規制する9つの条約に加わっています。また、モンゴルは、外国や交際的な組織とも効果的に協力し合っています。モンゴルは国際条約を締結しているので、世界の生態系を生態学上の脅威からから守り、国際的な場における評判を高めることに貢献する機会を得ています。現在までに、モンゴルの全土、特に国境周辺の自然を守るために非常に重要な20の二国間環境合意のうち、1990年から1999年の間に7つの政府間合意が締結されています。1994年に環境分野においてロシアと中国政府と締結した合意は、隣国との多国間越境協力展開の基礎となるものであることは、注目に値します。さらに、国境周辺の水質の保護と利用に関して隣国と締結した政府間合意により、参加国は、水の枯渇や水質汚濁の防止といった水質管理活動、調査や自然災害時の情報交換が実施出来るよ

うになりました。関係当局の代表者により数回に渡って会議が開催されています。

モンゴルにおいて環境的に持続可能な発展を達成するための基本的かつ重要な要素は、健全な環境立法、能力ある機関の枠組み、適切な情報及び知識のベース、一般の理解と参加、環境悪化を抑制し、地域社会に仕事と発展の機会を生み出すという目標を定めた投資プログラムです。政策や計画以前に述べられた一切を現実化するための法的環境、個人的、財政的、技術的資源と条件を整えるとともに、我々は、実施を開始する必要のある作業、義務、必要性に取り組んできました。国または地方レベルで自然保護と回復に資金提供する財源が不足しています。こうしたプログラムを成功裏に実施するには、国の機関、NGO、民間企業を含めたキープレイヤーの全国的な参加を確実にすることが重要となるでしょう。

議長

参加者の皆様

1992 年の第 1 回環日本海環境協力会議以来、参加国は地域協力のための効果的な対策を求める努力を継続してきました。第 9 回会議は、問題取り組みの一切の成果と協力を論議し、地域協力チャンネルを強化する非常に重要な機会だと考えます。

最後に、NEAC は地球温暖化、砂漠化対策、生物多様性の保全といった地球規模及び地域的な環境問題を取り上げるという役割を果たすことが出来るということを強調したいと思います。地域の先進国は協力の様々な分野、とりわけ発展途上国への技術移転や財政援助において、積極的に関わって頂けるものと思います。

皆様の御成功をお祈り致します。

御静聴有り難うございました。

第9回環日本海環境協力会議
2000年7月26～28日
モンゴル、ウランバートル

北東アジアにおける地域環境協力
－展望2000－

国連アジア・太平洋経済社会委員会(UN/ESCAP)
環境・天然資源開発部環境政策専門家
市村 雅一

1985年以降5年毎に、環境と発展に関する本地域の環境大臣会議が開催され、環境に対する意識が広がり、また地域内の環境と持続可能な開発問題の追求する国々と利害関係者間の強調が強化されて来ました。特に、1995年11月にバンコクで開催された先の環境大臣会議では、地域内でのアジェンダ21の実施促進方法を集中審議し、閣僚宣言並びに地域の環境優先事項を取り上げた、環境上健全で持続可能な開発のための地域行動計画1996-2000が採択されました。

この成果を基に、第4回環境大臣会議が北九州市で今年の8月31日から9月5日まで開催される予定で、その第一目的は、地域の環境状況評価とアジェンダ21実施の更なる強化へコンセンサスを求めることとなっています。会議では、新たな千年紀の始まりに当たって、国別また地域別フォローのための新たな地域行動計画の採択が期待されています。期待される成果には、クリーンな環境のための北九州イニシャティブも含まれており、これを、RAP(環境上健全で持続可能な開発のための地域行動計画)実施のための優先的機構とすることが提案され、都市環境、優先的な政策と方策実施のための意思決定者のコミットメントを再確認する新たな宣言、及び、アジェンダ21の地球規模での実施をレビューする「リオ＋10」へのアジア・太平洋地域からの共同メッセージに特別な重点が置かれることになっています。

地域協力の重要性はこれまで、絶えず、環境大臣会議の審議の中(特に1995年に採択された地域行動計画 1996-2000)で強調されて来たことに注目したいと思います。1995年以降の進展を評価するために、「アジェンダ21の実施、国際環境会議、環境上健全で持続可能な開発のための地域行動計画1996-2000のレビュー」という文書が北九州で開催される次回の環境大臣会議への提出及び審議のために作成されており、この文書の中では、地域活動の展開が実施における主要な指標の一つとして認識されています。地域活動における顕著な進展を検証し、「環境上健全で持続可能な開発のための地域行動計画2001-2005」という別の文書も採択のため会議に提出されることになっており、地域活動の一層の促進、特に協力のための効果的な域内機構の展開を求めています。

「実施のレビュー」という文書の中で評価されている進行中の活動には、地域プログラムにおける主要な展開が報告されています。例えば、東南アジアからは、ヘイズ行動計画、ASEAN生物多様性保全地域センター、大メコン計画、また大気汚染の抑制と防止及び越境汚染の影響の可能性に関するマレ宣言に関して南アジアからも報告がなされています。また、東アジアの海、南アジアの海、北西太平洋、黒海に対する行動計画の策定、並びにプロジェクトの実施を含む、UNEPの地域海計画を通しての地域レベルでの海洋汚染への取り組みに対するイニシャティブも報

告されています。カスピ海やアラル海流域では、より多くの地域環境協力プログラムが実施されています。

北東アジアにおける地域協力の展開はまた、ここ数年印象的なものでした。この環日本海環境協力会議は、参加5ヶ国の価値ある継続的な努力の結果として、毎年開催されてきました。この会議では、地域の環境当局や実践者の優先的な関心を反映し、様々な問題が取り上げられ、論議されてきました。環境問題の検証や情報交換は、参加国の環境状況に関し深い理解を生み、域内において様々な形の環境協力プロジェクトを形成する堅実なよりどころを提供してきました。

しかし、多分この地域では、中国、日本、韓国三ヶ国環境大臣会合が、過去2年間において最も印象的な展開を見せたと言えましょう。昨年と今年に開催された過去2回の会合では、三ヶ国の大臣は、地域環境協力並びに持続可能な開発をさらに促進する大臣レベルの定期フォーラム設定の有効性を再確認し、6つの優先分野においてこの三ヶ国間でより具体的なプロジェクト形式の協力を展開するための行動を起こすことに同意しています。

この地域から始まった別の優れたイニシャティブとしては、東アジア酸性雨モニタリング・ネットワーク(EANET)の設立に向けた努力が挙げられます。2年間の準備期間を経て、EANETは現在、北東アジア及び東南アジア諸国を含むネットワークの正式な設立に向けて、組織的並びに財政的合意を締結する最終段階に達しています。

北東アジア地域環境協力プログラム(NEASPEC)の最近の展開についてご報告することを大変うれしく思います。皆様の大半は、当地域における総合的環境協力のためのユニークな政府間機構であるの NEASPEC の展開と活動についてよく御存知のことと思います。しかし、このプログラムについてよく御存知ない方のために、NEASPECの背景、過去の展開、並びに現在進行中の活動について手短に説明させて頂きたいと思います。

北東アジアにおける地域環境協力促進の努力は、1992年のリオ会議のすぐ後に、国連開発計画(UNDP)、国連環境計画(UNEP)、アジア開発銀行(ADB)、世界銀行との協力の上で、国連アジア・太平洋経済社会委員会(ESCAP)が最初に着手しました。第1回高級事務レベル会議は、1993年2月にソウルで開催されましたが、本地域内において事務レベルでそうした会議が開かれるのは初の試みでした。それ以後、一連の高級事務レベル会議における協議のプロセスを通して、NEASPECは、関連する分野における環境協力プロジェクトを中国、モンゴル、日本、韓国、ロシア、北朝鮮といった北東アジアの6ヶ国の参加を得て遂行しつつ、本地域の国々の共通の関心である環境問題を取り扱う政策対話のフォーラムとしての第一機能を継続的に発展させてきました。

この発足プロセス全体に渡って、まず注目すべきは、1996年9月にウランバートルで開催された第3回高級事務レベル会議における北東アジア地域環境協力プログラムの枠組みの採択と言えるでしょう。枠組みでは、とりわけ、地理的な範囲、プログラムの目的、高級事務レベル会議の意志決定機能、以後の協力活動のための強固な土台をとなるNEASPECの調整、管理、財政機構が策定されました。

そうした協力上の枠組みを適確に設けて、NEAPEC はプロジェクトの策定並びに実施においても前進をみています。1994年11月に北京で開催された第2回高級事務レベル会議では、各エネルギー分野における大気汚染抑制、生物多様性の管理並びに環境データを含むプロジェクト確認のための5優先分野が承認され、3つの副プロジェクトが、アジア開発銀行とESCAPからの資金援助を得て実施されてい

ます。

初の中国におけるクリーン・コール・テクノロジーに関するデモンストレーションと現場におけるワークショップで始まったNEASPECのプロジェクトは、6つの技術のデモンストレーションと現場におけるワークショップ、4つの専門家会議、2つのプロジェクト・レビュー会合を含む16の活動を通して実施されました。さらに、フォロー・アップ活動のための4つのプロジェクト・プロファイルが、まもなく提供されるアジア開発銀行及びESCAPによる第二フェーズ資金のために展開されています。その間、インター・フェーズ活動として、とりわけ韓国での環境データ及び石炭火力発電所の汚染防止に関する2つのNEASPECトレーニング・センターの設立が、韓国及び日本政府のイニシャティブの下で進行中です。

今までに述べましたこれまでの進展の中でも、まず、今年の3月にソウルで開催された第6回高級事務レベル会議は、非常に重要なビジョン声明が採択され、NEASPECの新たな時代の始まりのための記念碑とも言うべきものとなりました。このビジョン声明は、とりわけNEASPECがNEASPECの現在の枠組みを北東アジアにおける環境協力のための総合的プログラムへ、恐らく2年後にここウランバートルで開催されることになる第8回高級事務レベル会議までに、発展させることをうたっています。

ソウル会議のもう1つ重要な決定は、地域環境協力及び承認されたプロジェクトの実施を強化することを目的とした「北東アジア環境協力のための中核基金」の設立です。韓国から100,000USドルの寄付が約束されましたことは、喜ばしい限りです。疑いなく、他の国々も先例に従い、中核資金へ自主的な寄付をして頂けるものと思います。

ソウル会議ではまた、北東アジアにおけるいくつかの環境協力イニシャティブ及びプロジェクト、すなわち、東アジア酸性雨モニタリング・ネットワーク(EANET)、アジア・太平洋環境会議(ECO ASIA)、北西太平洋地域海行動計画(NOWPAP)、環日本海環境協力会議(NEAC)、及び豆満江流域開発プロジェクト(TRADP)の活動プレゼンテーションが初めて実施されました。会議ではまた、中国、日本、韓国三カ国環境大臣会合の成果も歓迎されました。会議では、進行中のイニシャティブの情報及び経験を分かち合うことは非常に価値があり、その貢献のより良い理解が促進され、ひいては、こうしたイニシャティブ間の重複を避け、相乗作用を増すことにもなるという観点から継続すべきであると勧告されました。NEASPEC諸国は、長期に渡って、様々なイニシャチィブ間の効果的な協力に向けたパートナーシップの強化を決心されていることと思います。

ESCAP事務局は当地域の国々からUNDP、UNEP、ADB、世界銀行、及び他の関係する機関と協力して事務局、専門的並びに技術的支援を提供するよう委任されてきており、北東アジアにおける地域環境協力の一層の促進に向けてNEASPEC諸国と協力することを非常に喜ばしいことと考えています。しかしながら、地域協力の改革のための最も基本的な推進力は、疑いなく、参加国のイニシャティブです。この点において、当会議並びに参加国の皆様が、セッション4の議題として、北東アジアの環境協力のレビューと将来像を選ばれたことに喜びの意を表したいと思います。

皆様が活気ある、また、実り多い討議をされることを信じております、また北東アジアの環境協力の更なる発展に対して新たな洞察と見解を出されるであろう当会議の成果を楽しみにしております。

基調演説資料

国連環境計画/アジア太平洋事務所(UNEP/ROAP)次長
名執 芳博

世界環境大臣フォーラム
管理理事会第6回UNEP特別会期
2000年5月29日−31日　於:スウェーデン、マルモ

−国連総会により設立
−世界の環境大臣100人以上が出席(参加者600人以上)
−議題：
　−重要かつ新たな環境問題
　−21世紀の環境に関する主な挑戦
　−民間の役割
　−市民社会の役割と責任

マルモ宣言

ストックホルム以降
−大きな進展が見られた
　−国際環境法並びに国内法の枠組
−しかし十分とは言えない
−環境悪化傾向の増大
　GEO-2000/UNEP(「地球環境概要 2000」)
−都市化の加速傾向
−巨大都市の開発
−気候変動
−淡水資源の危機
−生物資源の持続不可能な利用
−干ばつ及び砂漠化
−無節制な森林破壊
−有害化学物質
−陸地ベースの汚染

地球環境の2大脅威
−先進国の持続不可能な生産・消費パターン
　＋
−開発途上世界の貧困

社会のあらゆる関係者による全面参加

民間の役割
−技術革新

－資源効率の良い新技術
－クリーン・テクノロジー
－環境に配慮した技術の移転
－ライフ・サイクル・アプローチ(経済)

市民社会の役割
－政策立案者へ新たな環境問題への注意を喚起
－普及啓発
－透明性の促進

リオ+10(CSD8 の決定)

第 55 回国連総会
－協議事項と予想される主要テーマ
－2002 年のイベントの時期と開催場所
－その他、組織並びに手続き上の事柄

事前活動
－UNEP の役割(関わり)
－国家及び地域レベル

中核基金の設立

マルモ宣言から
－サミット・レベルにおいて
－アジェンダ 21 の再交渉はしない
－協力と緊急性の新たな精神の注入

アジア・太平洋環境と開発に関する閣僚会議 2000 (MCED4)

期間：2000 年 8 月 31 日－9 月 5 日
場所：福岡県北九州市

- 環境と持続可能な開発に関する政策のレビュー
- アジェンダ 21 の実施、環境に関する多国間合意、開発途上小島国の持続可能な開発のための活動計画のレビュー
- 環境上健全で持続可能な開発のための地域行動計画(RAP)1996-2000 年実施のレビュー
- 地域における危機的環境及び持続可能な開発の問題、並びに持続可能な開発の促進のための方策

期待される成果：
- RAP(環境上健全で持続可能な開発のための地域行動計画)2001-2005

• アジア・太平洋の環境と開発に関する 2000 年閣僚宣言
• リオ+10 への地域メッセージ
• クリーンな環境のための北九州イニシアティブ

環境法と政策に関する北東アジア地域ワークショップ
2000 年 7 月 3 日−4 日　於:ソウル

−北東アジア地域環境協力プログラム(NEASPEC)に対する UNEP の貢献
−NEASPEC の 2 つの優先分野への焦点
　(1)特にエネルギーと関連した大気汚染
　(2)生物多様性の保全

大気汚染とエネルギー
−構造・組織的情報普及システムの開発(国連環境計画/アジア太平洋経済社会委員会)
　−諸問題の要約
　−国内/地域/国際情報源リスト

生物多様性分野における協力
−生物多様性に関する地域ワークショップの計画
−生物多様性保全のための地域協力に関する GEF プロジェクトの展開
　−国レベルでの適切な立案への参加
　−域内各国のニーズ並びに能力に基づく

協力機構に係わる
国連気候変動枠組条約及び京都議定書に関する国/地域ワークショップ
2000 年 8 月 28 日−29 日　於:ソウル

目的
　−問題の科学的、経済的関わりと交渉の現状について国家の利害関係者に情報を提供
　−問題への理解を深める(潜在的な開発上の利点、挑戦)

予想される参加者(韓国及びモンゴル)
　−政府機関(環境、エネルギー、運輸、等)
　−民間(エネルギー、工業)
　−NGO、学術等

NOWPAP(北西太平洋地域海行動計画)のプロジェクト

＊ NOWPAP 1：対象海域の海洋保全に関するデータベース及び情報管理システムの構築
＊ NOWPAP 2：各関係国の海洋環境保全に関する法令等の調査
＊ NOWPAP 3：対象海域の環境モニタリングプログラムの作成

＊ NOWPAP 4：海洋汚染に対する地域協力
＊ NOWPAP 5：各分野の活動拠点になる地域活動センターの指定
＊ NOWPAP 6：海洋、沿岸環境に関する普及啓発

北西太平洋地域海行動計画
(NOWPAP)

1994 年(第 1 回政府間会合)
・北西太平洋地域の海洋・沿岸環境の保護、管理、開発のための行動計画を採択
1996 年(第 2 回政府間会合)
・1997/98 年ワークプラン及び予算の承認
1998 年(第 3 回政府間会合)
・1997/98 年のワークプラン及び予算の改訂
・地域活動センターの設立
1999 年(第 4 回政府間会合)
・地域調整ユニット(RCU)設立の必要性

第 5 回政府間会合
(2000 年 3 月 29 日－30 日　於:大韓民国、仁川)

－RCU 設立の提案手続きを承認
　－日本
　－大韓民国
　－中国
(最終決定は、今年度末に東京で開催される第 6 回政府間会議で行う)

－2000/2001 年の作業プログラムの見直しと採択

Ⅳ　テーマ別セッション原稿(和文)

《セッション1》

森林火災の永久凍土環境悪化への影響並びに森林の再生

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東ユーラシアは、世界最大の森林地帯である「タイガ」と呼ばれる北方針葉樹林に広く覆われ、タイガの進展は、その下にある永久凍土の存在と密接に関わっている。シベリア・タイガ全体での降雨量は年間 250~400mm 程度に過ぎない。永久凍土には表面の水分を浸透させないという特徴があるため、タイガは少量の雨量でも成長することができ、永久凍土が解け始めると、表層土は乾燥するため、タイガは育たなくなる。東シベリアの永久凍土は、後期氷河期に垂直および水平方向にその分布を広げたが、地球温暖化の下で不安定な状態になりつつある。完新世初期に永久凍土地域を覆ったタイガは、暖気が永久凍土に届くのを防いでいる。森林火災によって引き起こされる表層植生の乱れは、永久凍土の熱収支のバランスを崩し、永久凍土を氷解させるようになる。

シベリアの永久凍土の南部では、現在の気候条件の下でタイガと永久凍土が共存関係にあり、タイガで大規模な火災が発生すると、表層境界の条件に悪影響が生じ、永久凍土の分布が退化する。森林火災の影響をひどく受けた区域では、かなり短期間の内に永久凍土が消滅し、土壌が乾燥してしまうため、タイガは再生しない。

森林火災の規模が、シベリアの永久凍土地帯のタイガが再生出来るかどうかの鍵である。1996 年モンゴルのタイガ地帯で大規模な火災が発生し、影響を受けた地域では永久凍土が垂直また水平方向にその分布を後退させている。影響をうけた地域における地表温度測定は、急速な永久凍土の劣化を示す可能性がある。消失区域で植林を成功させるには、土壌の注意深い観察が必要である。例えば、タイガが激しく消失した Yakatia 地方は Alas と呼ばれる草地に変わり、土壌断面の表層には、塩分を多く含んだ層が堆積し、タイガの再生を阻んでいる。

大規模な森林火災発生を防ぐ総合的な管理システムが、遠隔探査分析の応用、現場での実際の土壌計測管理に基づいて確立されるであろう。

《セッション2》

第9回環日本海環境協力会議

日本におけるエコエンジニアリングとバイオエンジニアリングを活用した水環境修復

国立環境研究所
稲森　悠平、徐　開欽

1. 序

わが国の水質汚濁は、全体として改善され、深刻と言われた状況を脱したと言えるが、更に水質改善が望まれる地域も依然として存在している。政府は、1970年に水質に関する環境基準を公表しており、その基準は、大きく2つの分野に分けられる。1つは、人の健康の保護に関する環境基準(健康項目)で、もう1つは、生活環境の保全に関するものである(表1,2)。前者に関する環境基準は、1993年に3つから9つの項目に改正され、1999年には、その達成率は99.5%を超えている。しかしながら、BOD、COD を含む後者のカテゴリーに関して、河川、湖沼、海域における達成率は、それぞれ、81.0%、40.9%、73.6%に留まっている。特に都市部の河川、湖沼、内海、内湾における水は、家庭排水の大部分を占める生活雑排水と小規模の工場からの排水を直接流しているため、極端に富栄養化現象を起こしている。公共水域では、総汚染物質の70%をも占めている。測定した60の湖と112の海域における窒素とリンに関する水質に係る生活環境項目の環境基準に関しては、それぞれ38.3%と70.5%である。富栄養化を抑制する要は、家庭排水と産業排水処理施設におけるリンと窒素の除去にある。

有毒ピコプランクトンの発生とアオコの出現は、水道システムそのものの危機をも引き起した。有機塩素化合物と農薬のような微量汚染物質を規制する事も差し迫った問題である。この為、環境庁を含むわが国の政府は、BOD、COD のみならず、窒素とリンを除去する為に家庭排水処理に関する研究と規制プロジェクトに力を注いでおり、また、一連の法律と規制を制定している。有害物質の土壌への投棄禁止に関する法律、沿岸地域の窒素とリンの排出基準、環境基本法、水資源保全に関する法律は、それぞれ、1989年9月、1992年10月、1993年11月、1993年2月に成立している。地球環境悪化への人々の意識が、高まるにつれて、人類が直面する「持続可能性」に関する危機を打開して人間社会の開発を確かなものにする必要性の自覚が、地球環境問題に関する重要な概念として様々な国際会議で使われ始めた。それゆえ、持続可能性、自立、環境との共存、国際協力に関する政策が、環境基本法で強調されている。

政府、企業、研究機関の共同研究を通して一定の成果を収め、開発された新しい技術のあるものは、実用化されている。これらの技術は、新しい処理方法として取り入れられ、全国に広まり始めた。中でも、エコエンジニアリングとバイオエンジニアリングの応用は、、排水処理と水環境保全にとって重要な問題の1つである。しかしながら、遺伝子操作されたミクロの微生物(GEMs)を使う新しいバイオエンジニアリングは今だ使いられていない。本研究では、日本の水環境修復分野にこのエコエンジニアリングとバイオエンジニアリング応用の現状を紹介し、他国に当てはめられる新しい技術の展望について検討する(稲森ら、1995)。

表 1　日本における生活環境の保全に関する環境基準(BOD、COD)

1) 河川(BOD)　　(mg·L^{-1})

	類型					
	AA	A	B	C	D	E
BOD	1 以下	2 以下	3 以下	4 以下	5 以下	6 以下
利用目的	AA：水道 1 級；自然環境の保全と A-E に掲げるもの A：水道 2 級；水産 1 級；水浴と B-E に掲げるもの B：水道 3 級；水産 2 級；C-E に掲げるもの C：水産 3 級；工業用水 1 級；D-E に掲げるもの D：工業用用水 2 級；農業用水と E に掲げるもの E：工業用水 3 級；環境保全					

2) 湖沼と貯水池(COD)　　(mg·L^{-1})

	類型			
	AA	A	B	C
COD	1 以下	3 以下	5 以下	8 以下
利用目的	AA：水道 1 級；水産 1 級；環境保全と A-C に掲げるもの A：水道 2 級と 3 級；水産 2 級；水浴と B-C に掲げるもの B：水産 3 級；工業用水 1 級；農業用水と C に掲げるもの C：工業用水 2 級；環境保全			

3) 海域(COD)　　(mg·L^{-1})

	類型		
	A	B	C
COD	2 以下	3 以下	8 以下
利用目的	A：水産 1 級；水浴；環境保全と B-C に掲げるもの B：水産 2 級；工業用水と C に掲げるもの C：環境保全		

表 2　日本における生活環境の保全に関する環境基準(窒素とリン)

1) 湖沼と貯水池　　(mg·L^{-1})

	類型				
	I	II	III	IV	V
全窒素	0.1 以下	0.2 以下	0.4 以下	0.6 以下	1 以下
全リン	0.005 以下	0.01 以下	0.03 以下	0.05 以下	0.1 以下
利用目的	I：自然保全と II-V に掲げるもの II：水道 1、2、3 級(特別なものを除く) 水産 1 級；水浴と III-V に掲げるもの III：水道 3 級(特別なもの)と IV-V に掲げるもの IV：水産 2 級と V に掲げるもの V：水産 3 級；工業用水、農業用水、環境保全				

2) 海域　　(mg·L^{-1})

	類型			
	I	II	III	IV
全窒素	0.2 以下	0.3 以下	0.6 以下	1 以下
全リン	0.02 以下	0.03 以下	0.05 以下	0.09 以下
利用目的	I：環境保護と II-IV に掲げるもの(水産 1、2 級を除く) II：水産 1 級、水浴と III-IV に掲げるもの(水産 2、3 級を除く) III：水産 2 級と IV に掲げるもの(水産 3 級を除く) IV：水産 3 級；工業用水とバイテク環境の保全			

2. 環境保全の為のエコエンジニアリング

1960年代に環境問題は、広く認識されるようになった。この問題を解決しようと、多額の投資がなされているが、いまだに満足のいく状況ではなく、人類存亡の危機に晒している。人口の持続的増加と天然資源の減少が続き、10年前、20年前よりも今日の環境問題は、更に深刻さを増しているとさえ主張する者もいる。産業と社会が更に複雑になるにつれて、綺麗で、安全な水は、産業や私達の日常生活には一層必要なものとなり、汚水処理施設は、環境保護に、大きな役割を担う。不適切な汚水処理と廃棄の可能性に加えて、これらの施設を建設、運転するのに高い費用が掛かり、革新的な技術の開発の期待が高まっている。その期待を担う最先端の技術がエコエンジニアリングという生物を使った処理である。

生態工学、エコエンジニアリングは、生態系に工学の力を導入することで浄化機能を強化し、環境修復を図る手法である (Mitschら 1988)。すなわち、生態工学は太陽エネルギーを起源に生態学を基礎とする生態系の機能をコントロールすることで、環境の保全・修復を可能にした地球や環境にやさしく２１世紀をめざして発展が期待される技術である。一方バイオエンジニアリングとは、現存する新しい生物学的技術と方法を営利の為に開発するものである。周知のごとく、人間は、醸造、ワイン作り、パン作り、食品保存と食品変化(チーズ、酢、醤油)、汚水処理などで、何世紀もこの生物学的方法を開発してきている。エコエンジニアリングとバイオエンジニアリングの比較は表3に示す通りである。

表3　エコエンジニアリングとバイオエンジニアリングの比較

特徴	エコエンジニアリング	バイオエンジニアリング
基本的構成要素	生態系	細胞
基本的原理	生態学	遺伝学；分子生物学
制御	生物と環境を組み合わせた機能	遺伝子構造
設計	人間の能力も必要であるが、自己設計システム	人間による設計
生物の多様性	確保	変化する
維持開発費	合理的	莫大
エネルギー源	太陽エネルギー	化石燃料

自然浄化作用は、よく知られたプロセスである。未処理汚水が、河川、池、湖沼、海などの自然に存在する水系に直接流されると汚濁は促進される。自然浄化作用は、大部分の地域で何時も行われているが、環境社会効率と経済的恩恵の両方の観点からも、この方法を効率化する必要がある。また、町や市の近くの河川、池、湖沼の多くは、汚染が進行していることから、自然浄化機能を強化したシステムに改善すべきである。

現在の見解では、生物システム、湿地帯、藻類と高等植物、土壌、水路などの浄化作用を使うエコエンジニアリングは自然浄化作用能力に左右されるが、ハードウエアーとエネルギーの需要量が最低限に制限でき、化学薬品の必要量も小さく押さえられる。更に、本法は廃棄資源の汚水を回収、再生することで、多くの資源とその他経済的恩恵が得られる。そのプロセスを通し、特に面源汚濁負荷の対応が可能となる。なお、生態工学手法の概要

は以下に示す通りである。

1) 湿地システム

湿地の汚水浄化能力は、様々な場所での多くの研究により明らかにされてきている。吸収、沈殿、堆積と同時に、最も重要なバクテリアによる変換等を含む物理的、化学的メカニズムにより、自然、人工の湿地でも汚染物質は除去される。このように湿地には、以前から存在する沼、湿地、潟、沼沢地帯、ピート地帯、イトスギドーム、汚水処理をするために特に作られたシステムなどを含む。水中の茎、葉、有機堆積物は、微生物の生育にとっては格好の場所である。その上湿地植物は、通気組織を通し根の先まで酸素を送る。そこでは、根の組織の浸透率によって、別の嫌気基質の中に酸化帯が存在できるようになる。この根圏は、栄養素、金属イオンその他の化合物を適正に変換してくれる好気性微生物を支える特有の環境をもたらしている。例として、Hosomi (1994)等は、茨城県の 1,200 ㎡の湿地に家庭雑排水(BOD=77、TN=6.2、TP=0.97mg·L^{-1})を流入させて検討を行い、BOD、全窒素、全リンの除去率が、それぞれ 60 - 90%、30 - 70%、10 - 60%である事を明らかにしている。この例からすると湿地システムは、汚水処理施設とし使用できる事も分かる。

表 4 は、三つの基本的な湿地分類型の特徴と期待される能力を示している(Reed 1988)。多くの自然の沼を使う上での大きな制約は、大部分の規制当局が、沼は汚水を受け入れるものと見ていることにある。その結果、その湿地に排出された汚水は、湿地に適用される前の排出基準に見合うように処理がなされなくてはならない。人工湿地システムでは、流入水の質に関する特別の条件は必要とされない。また、そのシステムの水管理体制に対するもっとも信頼のおける活用をすることもでき、自然の湿地よりも信頼性高く機能する事も出来る。

表 4　湿地システムの特徴と期待される成果

概念	処理目標	代表的基準				流出水の特徴	
		必要な気候	HRT 日数	深さ m	水量負荷 $m^3 \cdot ha^{-1} \cdot day^{-1}$		mg·L^{-1}
自然の沼	二次処理、AWT	温暖	10	0.2-1	100	BOD TSS TN	5-10 5-15 5-10
人工湿地	二次処理、または AWT	なし	7	0.1-0.3	200	BOD TSS TN	5-10 5-15 5-10
イグサ/葦床	二次処理、または AWT	温暖	0.3	----	600	BOD TSS TN	5-40 5-20 5-20

AWT: Advanced Wastewater Treatment

2) 水生植物による浄化システム

大型水生植物に基づいた水処理システムは、管理された池や湿地システムの中で汚水を処理するために水中の抽水植物と共存する藻類、微生物着生植物が大きな役割を果たす。大抵の場合、その水処理システムは、二次的な流入水が通る大型植物が多く存在する池、ま

たは、自然／人工的な湿地からなる。このシステムで最もよく使われる植物は抽水植物、ホテイアオイである。本格的規模のホテイアオイ水処理システムは、長い間、中国、フィリピン、ビルマ、米国、インド、タイ、その他亜熱帯の地域で用いられている。それらは従来の二次的処理システムにあるように生物化学的酸素要求量(BOD)や懸濁物質量(TSS)を取り除くのに有効であるだけでなく、栄養素(窒素とリン)、重金属、僅かの有機肥料を除去するのにも有効である。
制御条件下の水生生物(植物と動物相)生産や水生植物の栽培は、主に食品、繊維、肥料を生産するのに何世紀も行われて来ている。ホテイアオイは水処理に有望な植物とし注目されている。しかしながら、その他の植物は、今研究されている段階である。その中には、浮き草、海草、midge larve、ツルノゲイトウなどがある。ホテイアオイは、成長が早く、大きな葉を有しており、薄いラベンダー色の花が咲く水生植物である。このシステムで刈り取られたホテイアオイは、堆肥となって肥料／土壌改良剤、蒸れて柔らかくなったときメタンの発生源として研究されており日本では焼酎(蒸留酒)の原料としても使われた。

水生植物の栽培の利用は、嫌気性、通性嫌気性、好気性処理ポンド、魚養池を含む下水酸化池システムに応用されてきている。汚水処理に水の自然浄化を十分活用するためには、水の生態系中の主な4種類の要素の調和を使うことである。生産者(藻類、水生植物)、消費者(魚とその他水生動物)、分解者(バクテリア)、無生物的要素(太陽エネルギー、他の化学成分を含む水)である。この下水酸化池システムでは、バクテリア-藻類が重要な役割を担っている。バクテリアは、有機リン酸塩、塩化物を含む有機物質を分解あるいは生分解可能なものに分解し、汚水を浄化する。この過程でバクテリアはCO_2、NH_4^+、PO_4^{3-}を作り、それらは、藻類とその他の水生植物が吸収し、日光の下で、消化吸収される。藻類が光合成で出した酸素は、有機物を酸化させる為にバクテリアの利用に供給される。そして、様々な栄養レベルの中での変換を通し、大量の藻類とその他のプランクトンは、稚魚が食べ育ち、水質が浄化される。藻類からのエネルギーは、最後には、魚捕獲に繋がり、更に水は浄化されていく。

このシステムは、水生植物が 1 年中成長するとさらに効果的である。それゆえ熱帯の国にはふさわしい方法である。

3) 土壌処理システム(LTS)による下水処理と利用
土壌生態系は、バクテリア、カビ、原生動物、後生動物などの様々な土壌生物を含む。有機物質は一般的にこの土壌生物の作用で無機化される。農地、草地、森の生態系はすべて土壌に基づいており、汚水中の多種類の汚染物質を減らし、浄化するだけでなく、この汚染物質を使い多くの利用価値の高い物をも作ることができる。土壌システムのなかで、有機物質が分解され、汚水の中に含まれる栄養分は、土壌の中で育つ植物に吸収される。土壌自身は、天然の濾過装置の様に見え、SS、分解できる有機汚染物質、栄養分のある塩、病原性バクテリアとウイルスなど、汚水中の汚染物質を濾過し除去する。その除去率は、BOD、全窒素、SS、大腸菌では90%を超え、リンでは50-80%にもなる。

表 5　土壌処理システムの特徴と期待される効果

概念	処理目標	代表的基準 必要な気候	植生	面積 ha	水量負荷 $m^3 \cdot m^{-2} \cdot year^{-1}$	流出水の特徴 $mg \cdot L^{-1}$	
緩速	二次処理、または AWT	温暖	Yes	23-280	0.5-6	BOD	<2
						TSS	<1
						TN	<3
						TP	<0.1
						FC	0
高速浸透	二次処理、AWT、または、地下水の涵養	なし	No	3-23	6-125	BOD	5
						TSS	2
						TN	10
						TP	<1
						FC	10
表面流出	二次処理窒素除去	温暖	Yes	6-40	3-20	BOD	10
						TSS	10
						TN	<10
						TP	<6

AWT: Advanced Wastewater Treatment; FC: Fecal Coliform, number per 100ml.

土壌処理システム(LTS)は、植物—土壌—水の基盤内で自然物理的、化学的、生物学的方法を通し、目的とした程度の処理をするために表面に汚水を管理しながら流し、処理する事である(US EPA 1981)。LTS には 5 つのタイプがある。緩速浸透(SR)、高速浸透(RI)、表面流出(OF)、湿地(WL)、土壌細管(SC)である。表 5 で三つの基本的 LST の特徴と期待される効果を示している(Reed 1988)。LTS は、生態学の原理と工学技術が結びついた環境工学と見なすことができる。

4) 水路浄化法

水路浄化法は、家庭排水浄化の有効なシステムの 1 つである。これは、パックされた濾過物質のバイオフィルム量が大きく、自然浄化力を高める方法で、水質改善と言う点で注目されている。河川の自然浄化、浸透処理、流水中のパックされた礫の水中のバイオフィルムを使った浄化施設、充填水路(ひも状プラスチック担体、炭など)は、汚水を浄化する効果のある生態系を活用した方法とされている。水中のバクテリア、カビ、原生動物、小さな後生動物、輪虫類、貧毛類、渦虫類のような小動物等が水質浄化に大きな役割を果たしている。

日本の多くの川岸は、以前は洪水を防ぐ為にコンクリートで被われていた。最近、環境庁と建設省は、古い川岸をテトラブロックの代わりに、いわゆる様々な自然の形の河岸に変え、廃棄プラスチック、炭、礫などが水路浄化に使われている。

パイロットプラントと実規模の水路浄化方法が、日本で行われてきているが、目詰まりや、有害昆虫などの発生による浄化効率の低下などの解決すべき問題もある。

表 6 は、礫間接触酸化法を用いた河川水路浄化施設の処理性能を示している。BOD の 50-80%が除去されている。このシステムの更なる開発が行われている。

表6　礫間接触酸化法を用いた河川水路浄化施設でのBOD除去

河川	流水量 ($m^3 \cdot min.^{-1}$)	BOD ($mg \cdot L^{-1}$)	
		流入	流出
野川	90,000	13	4
桑野川	70,000	20	5
大堀川	100,000	25	5
久出川	40,000	30	10
甲陽池入河川	1,000	30	10
平瀬川	160,000	20	5
みちのく公園水路	9,500	2	1
荒川	260,000	15	3

5)湖の人工的曝気

河川の酸素量の減少問題を解決する効果的な方法は、排出された汚水の有機物を取り除く事である。生物学的処理が、そもそも汚水処理施設で行われるべきである。しかしながら、もしも河川に有機汚泥が堆積したら、汚泥の分解を促す為に曝気が必要となる。湖でのこの問題は、更に重要である。湖沼の溶存酸素の低下は、有機物等の流入によるものもあるが、富栄養化に起因し、藻類増殖による夜間の酸素呼吸が重要な要因となる。また、湖は水の滞留期間が長いため、高濃度の栄養素は、急速には減少しない。それゆえ、河川よりも、湖では、人工的な曝気が行われ、底泥の表面の嫌気状態を防止する為に使われる。湖の修復方法に使用された生態学的な方法は表7に要約する。

表7　湖の修復に使用されたエコエンジニアリング

方法	解決すべき問題
湿原システム	非点源からの窒素とリンを除去
曝気循環	藻類の成長を押さえ底泥からのリンとFeの放出を抑える；底層水の酸欠の解消
深水層水のサイホン	リンと酸欠水を除去
底泥に硝酸塩を加える	底泥からのリンの放出を減らす
底泥被覆	富栄養化の抑制
表層底泥の除去	底泥からのリンの放出を減らすか有害物質を除去
水中の藻類とリンの除去	富栄養化(水中のP／藻類)の抑制
滞留時間を減らす	Pと有害物質濃度を減らす
湖のリンの沈殿	水中のリンを減らす
流入水のリンの沈殿	リンの流入を減らす

浮遊生物藻類の大量発生、臭気、味の問題、その他富栄養化問題に対処する為に日本では、多くの水道用の貯水場で人工的に間欠曝気を行っている。相模湖、釜房ダム、下ノ原ダム、室井ダム、作名ダム等の貯水場では1980年代からこの方法が取り入れられて、成果が得られている。人工的曝気は、水の循環を促し、藻類を深い場所まで移動させ、太陽光線を抑え、藻類の成長を抑止する働きがある。この方法で、生物学的生産性は益々抑えることができる。

エコエンジニアリングの経験とその可能性は、今日ではまだ限定的である。得られた結果

は有望である様に見られるが、汚染物にかんする規制、将来の環境計画では更なるエコエンジニアリングの応用を統合する必要がある。これには、生態学、応用生態学、生態学的モデリング、生態工学の引き続いた発展が必要である。エコエンジニアリングは我々の将来に非常に有効な手段であり、この手段を適切に利用することが、人類にとって大きな課題である。

水環境の修復にエコエンジニアリングとバイオエンジニアリングを活用することは、汚染された水に広く使われているので、非常に効果的である。水環境管理で良い結果を得るには、幾つかの方法を組み合わせなくてはならない事がはっきりと示されている。例えば、環境技術的方法と同じ様に生態工学と生物処理工学の方法を同時に使う必要がある。湖の汚染は非常に複雑で単に 1 つの方法だけで問題が解決することは稀である。図 1 では、水環境修復の為のエコエンジニアリングとバイオエンジニアリングの利用を示している。

エコエンジニアリング、バイオエンジニアリング、化学的環境的な技術であっても、すべての技術の利用は定量化が求められる。生態系は、非常に複雑なので、その反応の定量化が容易ではない。

エコエンジニアリング、バイオエンジニアリングを使い解決しなければならない問題が山積している事は、良く知られた事実である。表 8 は、環境保全分野の為のエコエンジニアリングとバイオエンジニアリング開発に関する項目を示している。

表 8　環境保全分野の為のエコエンジニアリングとバイオエンジニアリング開発に関する項目

1. バイオマスと未利用資源の利用
   (1)　特定の藻類と水生植物を使う栽培
   (2)　有効な肥料の為の技術
   (3)　飼育技術
   (4)　メタン発酵のための技術
   (5)　アルコール発酵の為の技術
2. 環境浄化と汚水処理
   (1)　有機物質の生物分解
   (2)　液体汚染物質の処理
   (3)　食品と水産加工排水の再利用と処理
   (4)　窒素とリンの生物除去の改良
   (5)　重金属の微生物学的堆積
   (6)　汚泥、固体汚染物質、家畜汚水の有効な再利用と処理
   (7)　生活雑排水の改善
   (8)　汚水処理プロセスからの汚泥の減少
   (9)　アオコと赤潮の生物防止、
   (10)　微生物の固定化法とバイオ処理槽の開発
   (11)　生物脱硫と臭気除去の開発
   (12)　特定の微生物による汚水処理
3. バイオセンサー
   (1)　環境の指標生物と微生物の研究
   (2)　BOD、アンモニア、亜硝酸塩、硝酸塩、窒素測定技術
   (3)　微生物の呼吸測定技術

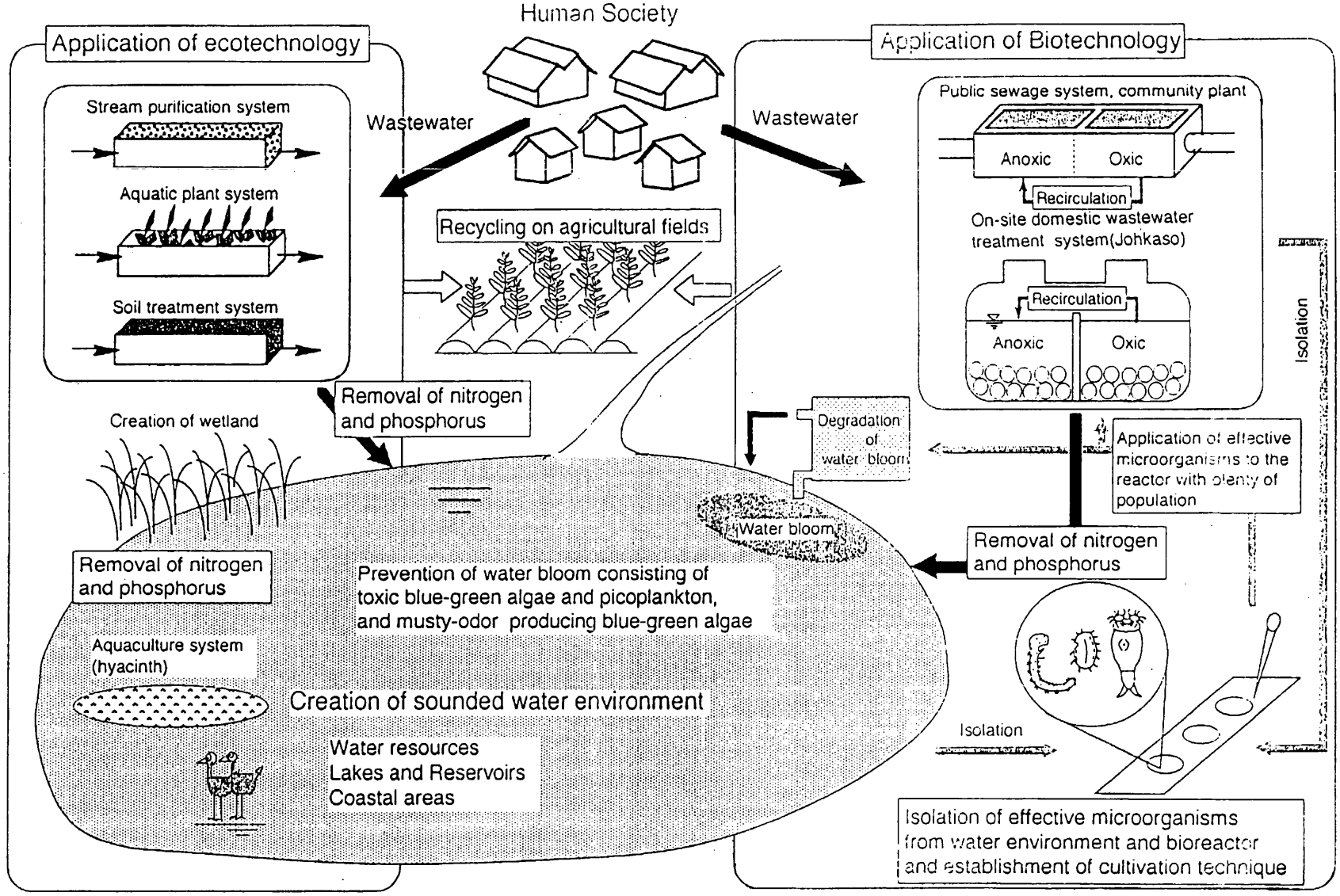

Figure 1 Application of ecotechnology and biotechnology to the restoration of water environment

図 1 水環境修復の為のエコエンジニアリングとバイオエンジニアリングの利用

3. 水環境の修復における有用微生物の役割

自然の生態系では、微生物が様々な有機汚染物質を無機物化するのに大きな役割を担っている。上手く計画された生物汚水処理システムは、適した人工環境を作り至る所で微生物の活動を活発にさせる。このようなシステムの中の微生物は、活性汚泥法のように浮遊した状態で成長することも出来るし、或いは、流動床や回転円板(RBC)法のように付着した形で成長し存在することもできる。かなりの量の担体を使う流動床システムや活性汚泥法は、浮遊物と付着物の両方のバイオマスを含み、ハイブリッドの成長システムと呼ばれている。生物学的成長システムの可能な一般的分類は図２に示すとおりである(Tyagi 1990)。

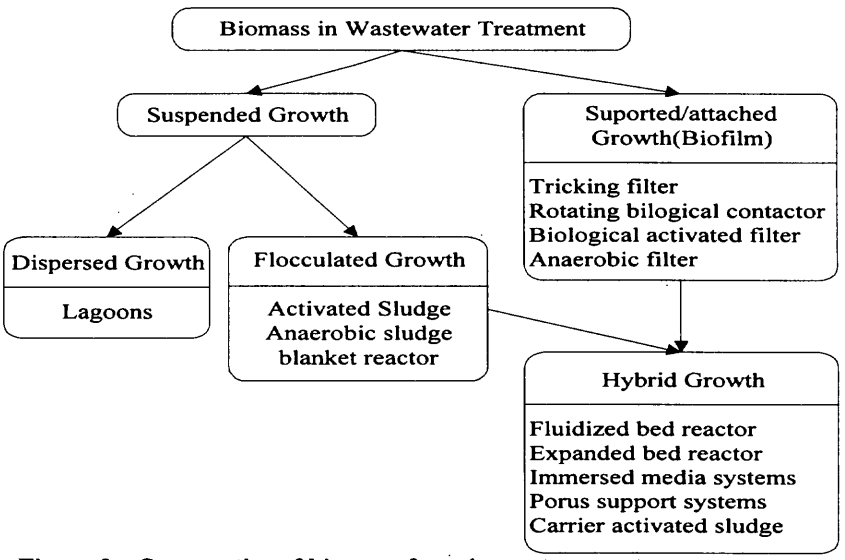

Figure 2　Systematics of biomass form in wastewater treatment systems
図２　汚水処理システムにおけるバイオマスの分類

生物汚水処理システムでは、単位体積当りの基質分解率は、活性バイオマスの可能な最高密度を維持することにより最大限に出来得るであろう。活性の高い微生物の密度を増やす様々な方法は以下に示すとおりである。(1)生物の成長と活性を促す、(2)密度の高いフロックとフィルムを作る事が出来る微生物の増殖を促す、(3)微生物の減少と流失を最小限にする、(4)通常より成長率、基質摂取量割合の高い性質と密集した成長形態をもつ遺伝操作した生物の利用。

微生物の活動と成長は、以下の条件により最大限にでき得る。(1)基質、栄養塩、微生物の電子受容体を利用しやすくする、(2)最適の環境条件をそろえる(温度、pH など)、(3)阻害条件を減らす。密生して成長する性質のある生物のために適切な条件(溶存酸素密度、流体力学条件)を与えると、微生物のフロックとフィルムの密度を増やせる。流出水から分離した後にバイオマスをリサイクルし、表面で動かない様にすると、微生物の減少と流失を最小限にとどめる事が出来る。今のところ遺伝子操作された微生物の利用は一般的ではないが、たとえ汚水浄化に使われても、その有効利用は、そのシステムのバイオマス維持の方法に左右される。

迅速にしかも効率良く処理することに加え、信頼でき、安価で、簡単な汚水処理施設を作る事も大切である。これらのポイントに基づいて様々なシステムの比較が出来る。

もしも、最適な物理、化学的条件とパラメーターを維持できるなら、分解を制限する要素は、

生物学的なものとなる。

以下の条件は、生物処理法の施設に求められる。
1) 安定した質の良い処理水を取得する
2) 有機物質に加えリンと窒素の除去が出来る
3) 余剰汚泥が僅かで、その汚泥は再利用できる
4) メンテナンスに手間が掛からず、操作しやすい
5) 建設費が安く、長持ちし、場所を取らない
6) 消費するエネルギーと化学薬品がほとんどない
7) 施設が小さくコンパクトである
8) 衛生面で安心でき、二次汚染がない

小規模、大規模であっても生物処理法には、この要件は共通である。同時に窒素とリンを除去するので、嫌気、好気活性汚泥法は、普及している処理方法とされている。一般的な従来の生物処理法は、以下の特徴がある。
1) 処理水質が不安定
2) 窒素とリンの除去が困難
3) 汚泥の量が多い
4) 消費電力が多い
5) 操作が難しい
6) バルキングを起こしやすい

これらの欠点を踏まえて、生物処理に関する多くの技術は、本格的又はパイロットプラント実験に利用するように開発されている。その方法は以下のとおりである。

表 9　生物処理法で解決が望まれる具体的な技術項目

1.	処理槽の中での有用微生物密度を上げる
2.	流出水の質(BOD, COD)を改善
3.	硝化、脱窒効果を高める
4.	リンの生物除去を高める
5.	分解できない有機物質の分解を良くする
6.	凝集を促進
7.	バルキングの制御
8.	有害微生物の増殖を抑制
9.	嫌気処理プロセスの安定と改良
10.	微小動物の成長促進
11.	低温での効率を上げる
12.	汚泥の再利用

(1)浸漬ろ床法、(2)回転円板法、(3)嫌気性ろ床法、(4)回分式活性汚泥法、(5)嫌気－好気活性汚泥法、(6)流動床法、(7)生物ろ過法、(8)包括微生物固定化法、(9)UASB(上向流嫌気性汚泥床)法、(10)嫌気性消化法、(11)活性炭造粒法(GAC) 、(12)微生物活性炭流動床法

これらすべての方法の中に少なくとも 1 つの似通った特徴を持つ、1)濾過物質の上にバイオフィルムを付着させる、2)嫌気性微生物を使う、3)嫌気、好気リアクターを周期的に使う。最初の性質は、処理槽の有効な微生物の密度を高める重要な役割を果たし、2 番目のものは、有機物分解のエネルギー消費を節約し、最後のものは、窒素とリンを除去するのに必要な条件を提供する。有効な微生物の密度をどの様に高く保つか、処理法のある部分で嫌気性、任意バクテリアをどの様に管理するかと言う問題は、これらの方法を研究する重要な点である。表 9 では、この生物処理法で解決が望まれる具体的な技術項目を示す。
最初の大切なポイントとして、混合培養システムは、純粋培養システムよりも汚水処理では有効である。例えば、遺伝子操作された微生物を使う純粋培養は、強い微生物を作れる可能

性がある。しかし濃度が低く、構成物が多岐にわたる家庭排水で行うのは簡単でない。活性汚泥法で処理された水を調べると、混合培養での除去効率は、非常に高い事が明らかである。これは、相利共生、競争、捕食などの機能が混合培養システムで作用しており、純粋培養システムでは不可能だからである。この方法は、バクテリア、カビ、原生動物、小さな後生動物からなる複雑な生態系を利用している。バクテリアは、汚染している有機体を二酸化炭素とその他の小さな分子に分解し、原生動物と微小後生動物はそのバクテリアを捕食し、さらに食物連鎖の高次捕食者となる。それゆえ生物処理法でこの相互作用を使うことが大切である。混合培養システムには、多くの長所があるが、微生物の相互作用の操作と管理の最適化はまだ確立されていない。もしも、この相互作用の管理が可能になれば、生物処理法の大きな発展となるが、この方法を開発するには更なる努力が必要である。

一般に、処理槽での微生物を管理する操作条件は以下に示すとおりである。

1) 栄養塩の濃度と負荷
2) 水温、pH、溶存酸素
3) 水理学的及び汚泥滞留時間
4) 微生物の生息場所
5) 曝気、攪拌の光学上の条件
6) 処理槽の組合せと固液分離

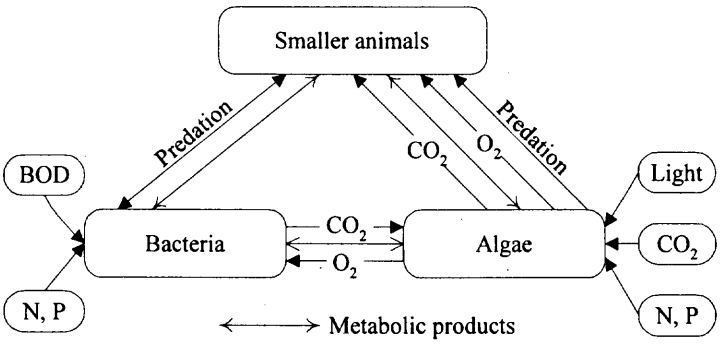

Figure 3 Interactions between bacteria, algae and smaller animals

図 3 バクテリア、藻類、微小動物の相互作用

原生動物と微小後生動物は好気性処理法では有効であることがよく知られている。図 3 では、バクテリア、藻類、微小動物の相互作用を示す。処理率を良くする為には、原生動物と微小後生動物の成長に影響を及ぼす要因を知る事が大切である。

表 10 環境条件が微生物成長に与える影響

	輪中類	貧毛類				原生動物
項目	*P.eythrophthalma*	*A.hemprichi*	*Pristina* sp.	*Nais* sp.	*Dero* sp.	*V.microstoma*
水温(℃)	30	33	30	25	-	25
pH	6.7-7.7	6.0-7.7	6.0-7.7	6.0-7.7	-	6.6-7.5
燐酸塩緩衝液(M)	<1/50	<1/375	<1/150	<1/375	<1/7,500	2/75-1/150
攪拌強度	強	中	弱	弱	弱	強
最大増殖速度(day^{-1})	0.69	0.42	-	0.12	-	2.2
食習慣	広	狭	広	広	-	狭

活性汚泥法から分離された *Vorticella microstoma, Phillodina erythrophthaloma, Nais* sp., *Aeolosma hemprichi* の様な原生動物と微小後生動物の成長環境条件と結果は、表 10 に示すとおりである。水温、pH は、これらの微生物には大切の要因である。水温と pH の適切な範囲は、それぞれ 20 - 30℃、5.6-7.7 である。更に、攪拌力、塩濃度などの物理的、化学的条件は、特定の微生物が成長し優占する事が非常に大切である。以下のような運転条件は汚水処理法にとって重要である。(1)汚泥滞留時間、(2)温度、(3)pH、(4)処理槽への余剰微

生物の返送、(5)有害微生物の成長防止。

4. 汚水処理の新しい技術

新しい技術と処理方法の開発研究の内容(当研究室)は以下のとおりである。

1) 嫌気・無酸素・好気処理技術

汚水に含まれる有機物の濃度が低いと、従来の活性汚泥法の処理効率は、非常に低い。しかし新しく開発された嫌気性汚水処理方法は、汚泥をエアルーションタンクに戻し、微生物の濃度を高くして、有機物濃度が高くても低くても使えるやり方である。その上、固体と液体分離でフロックに付いている泡を取り除く為に装置がセットされ、嫌気性汚泥フィルターの開発も、微生物の濃度を高くする様に作られている。汚泥濃度は、20,000mg·L^{-1} に保持することができる。

UASB 処理槽では、汚水が槽の底部に入れられ、バイオマスの活発なろ床を通り上へ移動する。UASB 技術は当初 Lettinga(1980)が開発し、オランダの炭水化物の豊富な汚水処理に使われていた。この処理槽は、今世界中で食品、飲み物、パルプ、製紙産業からの汚水処理に使われている。UASB の長所は、微生物群を高濃度に出来(ペレット)、高いバイオマス量を保てる事にある。元の UASB デザインの重要な改良点は、嫌気性ハイブリッド処理槽である。これでは、処理槽の上部 20-30%はバイオマスを維持する浮遊物質で埋まっている。この物質は、ポリウレタンの泡、ポリマーボール、任意のプラスチックのリングである。維持されたバイオマスもこの生物学的な方法で積極的に関わるので、ハイブリッド型式は、標準的な UASB のものに比べ効率的で信頼性がある。他の嫌気ろ床法も、処理槽の担体に高濃度の微生物と生物膜を付着できるように開発されている。

窒素の除去を高める為、セラミック濾材を充填した UASB 好気生物循環法が我々の研究室で開発された(図 4)。脱窒効率は、好気性生物フィルターの中の硝化作用と相俟って、高まった。この方法で BOD、窒素をそれぞれ 98%、70%除去できている。日本では、ビール会社の処理施設で利用されている。嫌気ろ床法を汚水処理に利用するには多くの解決すべき問題が山積みである。HRT、BOD 負荷、汚水の流れのパターン、温度の影響、充填された濾材の割合と形、ガスの採取、施設の規模、汚泥の引抜き等である。

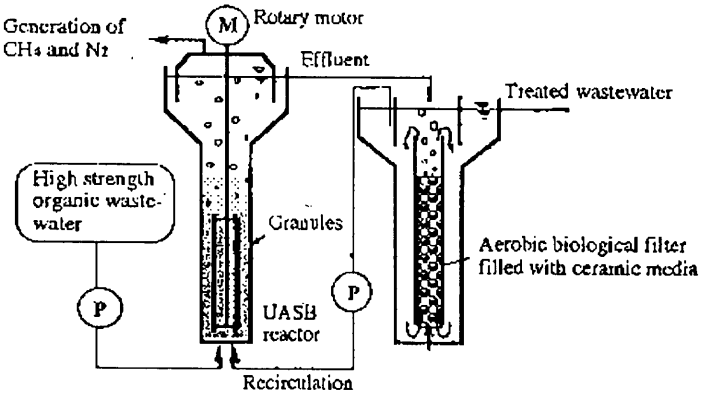

Figure 4 UASB-aerobic biological filter filled with ceramic media recirculation process which removes high strength organic substances and nitrogen

図 4 高濃度の有機物質と窒素を除去する セラミック濾材を充填した UASB 好気生物循環法

2) 窒素の生物除去法

家庭排水処理施設“浄化槽”は、日本では私的に所有する汚水施設で有機物、窒素等を生物的に除去する有効な方法の 1 つである(図 5)。家庭排水を嫌気、好気微生物を使い効果的に処理すると言う点で、この浄化槽は従来の汚水処理タンクとは異なり、高度処理タイプのものでは、BOD と T-N の放流基準 10mg·L^{-1}以下を満たすことができる。浄化槽は、各家庭用の個別処理とコミュニティー用の集中処理に使用されている。下水道はないが水洗トイレを使う地域の家庭やコミュニティーでは、汚水を浄化するために浄化槽を設置する様に法律で義務付けられている。様々な家庭排水処理施設の中で浄化槽は小人数世帯から多世帯の団地のようなコミュニティーまで、住む人の人数により様々の容量のものが作られている。このような汎用は、他の汚水処理システムに勝るところである。

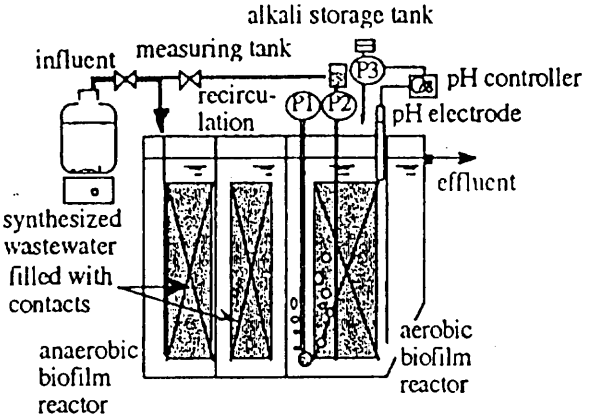

Figure 5 Experimental apparatus of Johkaso

P1 air pump for aeration
P2 air pump for recirculation
P3 perista pump

図 5 浄化槽の実験の装置

浄化槽は 2 種類ある。し尿だけを処理する屎尿処理浄化槽(N タイプ/単独処理浄化槽)(処理されていない生活雑排水は直接排水)と、屎尿と台所や風呂からの生活雑排水も処理する家庭排水処理浄化槽(D タイプ/合併処理浄化槽)がある。元々浄化槽は、下水道はないが水洗トイレを使う地域で設置されていたため、今まで、設置されるものは、N タイプのものが殆どであった。登録されている 7,261,752 の浄化槽の内、6,899,391 は、N タイプ(95%)である。1992 年では、D タイプは 5.0%だけであるが、浄化槽の総数があまり増えないのに D タイプの割合は急激に増えている。未処理生活雑排水が深刻な水質汚濁問題を引き起こすため、D タイプの使用を増やし、N タイプを禁止する事が差し迫った課題である。

富栄養化防止という観点からも D タイプの、特に(20 人より少ない)小規模の浄化槽の開発が大切な課題である。設置されている多くの D タイプのものは、硝化が不十分で、脱窒作用も困難である。霞ヶ浦では、従来の D タイプの普及に伴い更に深刻な水質汚濁が広がっている。

従って、BOD と窒素を効果的に処理する新しい D タイプ(A タイプ)の設置が一層重要であり、地域の特性に配慮する事は、言うまでもない事である。

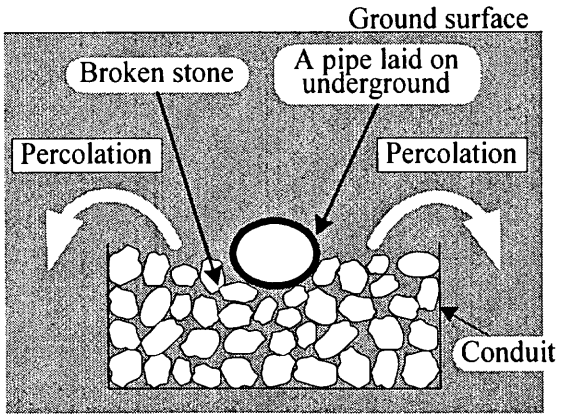

Figure 6 Soil trench system

図 6 土壌トレンチシステム

硝化処理された水を好気タンクから嫌気タンクへ循環させる D タイプの嫌気好気循環生物処理方式は、有望な生物学的硝化脱窒法として注目されている。中には、全窒素の 70%、

10mg·L^{-1} を超えない数値にまで除去する新しい D タイプのものもある。新しい D タイプと土壌トレンチ方式を組み合せて窒素とリンを除去する方法が使われている地域もある(図 6)。図 7 は、土壌トレンチの浄化メカニズムを示している。

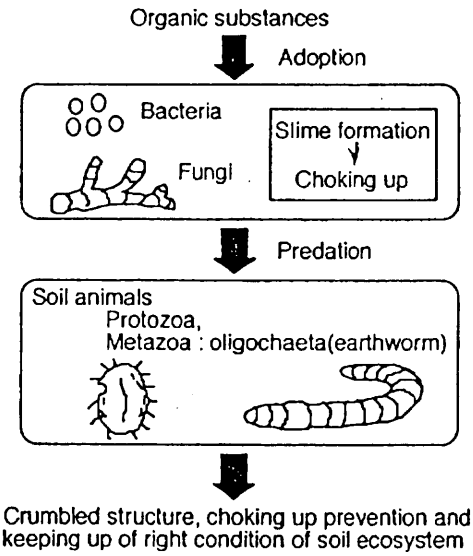

Figure 7 Purification mechanism of soil trench treatment process

図 7 土壌トレンチの浄化メカニズム

汚水処理の過程で排出される CO_2、CH_4、N_2O ガスがもう一つの問題である。これらのガスは温室効果ガスで、地球の温暖化をもたらす。CH_4 の 1 分子当りの温室効果は、CO_2 の 20-30 倍、N_2O は 200-300 倍だと考えられている。特に N_2O の排出を抑える技術を研究することが重要である。

生物学的窒素除去法は、硝化と脱窒からなる。硝化は好気状態で曝気が行われると進み、脱窒作用は嫌気状態で進む。処理が上手く行かない時にどちらの過程でも N_2O が排出される。図 8 で硝化、脱窒プロセスからの N_2O の排出を示す。そのメカニズムと排水処理施設から出される N_2O の量はまだ十分に明らかにされていない。硝化、脱窒プロセスからの N_2O 排出に関わる要因を調べるために実験室レベルと現場プラント実験を通じて研究を進めている。

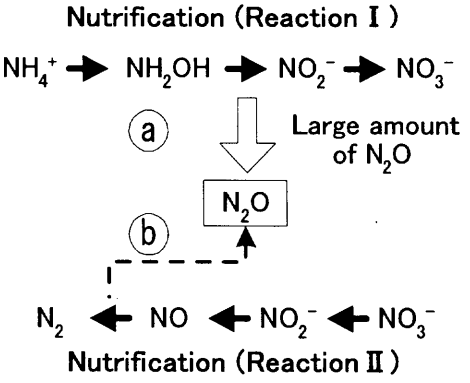

Figure 8 N_2O emission through biological nitrification-denitrification process

$(a \gg b)$

If the nitrification-denitrification (Reaction Ⅰ →Reaction Ⅱ) process is operated appropriately, N_2O emission from nitrification process can be controlled.

図 8 硝化、脱窒プロセスの N_2O の排出

これらの研究を通し以下のことが明らかとなった。間欠曝気は、N_2O の排出を抑え、汚水からの有機物と栄養素を取り除くのに非常に効果があった。嫌気と好気状態の適切な組み合わせで硝化と脱窒を効果的に促すことが分かった。

家庭排水がもたらす富栄養化対策には、A タイプの浄化槽システムが実行される事が強く望まれる。この浄化槽は、日本の歴史的背景をも考慮し、屎尿と生活排水のなかの BOD と窒素を同時に除去する事が出来る。

3) リンの生物学的除去法

リンの生物学的除去法は、リンだけを除去する方法である嫌気/好気(A/O)法とリンと窒素を同時に除去する嫌気/無酸素/好気(A2/O)法がある。A2/O 法は、実際に米国、ヨーロッパ、南アフリカで使われている。日本でも、その方式の本格的なプラントが 2、3 備え付けられている。窒素とリンを同時に除去するためには、以下の操作が必要である。

(1) 好気タンクから嫌気(無酸素)タンクへ処理水を戻す
(2) 100mg·l^{-1}を超えるBODの流入を維持する
(3) 低温でも十分な好気タンクの容量を用意する

この方法で家庭の汚水を処理する場合、放流水の窒素とリンは、それぞれ10mg·l^{-1}および1mg·l^{-1}より少なくできる。

4) 回分式活性汚泥法
この方法はバルキング問題を解決する為に開発された小規模の汚水処理システムである。このシステムの原理は、窒素とリンを同時に除去するのに好気と嫌気(無酸素)サイクルの組み合わせを使うことである。処理槽が一つのみで、汚水の流入の少ない小規模の地方の町などの流入が連続しない場合に利用される。

表11　生物処理による藻類の除去

藻類	除去率(%)
Synedra sp.	63-83
Melosira sp.	45-52
Oscillatoria sp.	40-78
Anabaena sp.	62-100
Myxosarcia sp.	38-51
Phormidium sp.	47-74
Aphanizomenon sp.	40-50
Microcystis sp.	35-100

表12　生物膜に付着した微生物の優占種

繊毛虫類	*Vorticella campanula*
	Vorticella convallaria
	Espistylis sp.
	Carchesium polypinum
	Zoothamnium aselli
	Trithigmostoma cucullulus
	Chilodonella fluviatilis
	Stentor igneus
	Coleps hirtus
	Didinium nasutum
肉質類	*Euglypha* sp.
	Difflugia sp.
輪虫類	*Cephalodella* sp.
	Philodina sp.
渦虫類	*Stenostomum* sp.
貧毛類	*Aeolosoma hemprichi*
	Nais sp.
腹毛類	*Chaetonotus* sp.
緩歩類	*Macrobiotus macronyx*
甲殻類	*Paracyclops* sp.

5) 生物膜法による汚濁水源の処理技術
日本で水源の汚染は、差し迫った社会問題とされ、従来の水処理方法ではこれらの水源を水道原水として引く事が難しくなってきている。そのため、生物処理法と生物活性炭素処理法が前処理法として取り入れられるようになった。例として(Sudoら1990)ハニカム生物処理法が1985年以来、霞ヶ浦浄化プラントで実際に使われている。この方法のHRTは、たった2-3時間で、藻類、臭気、カビ臭化合物はそれぞれ55-93%、50-81%、50-60%除去でき、この方法が有効である事は明らかである。しかしこの除去率は、表11で示したように藻類によって差がある。そして、THM(トリハロメタン)の前駆物質の除去率は70%である。霞ヶ浦で大量のアオコの発生もしばしば認められ、この前処理法が取り入れられる前はカビ臭があった。この方法が取られ、地元住民からのカビ臭被害の文句はなくなっている。藻類とカビ臭の除去メカニズム、藻類の種類とカビ臭と水質の関係などに関して解決しなければならない問題は多い。表12では、生物膜に付着した微生物の優占種を示す。水の流れ方式、処理槽のDO濃度、濾材の形、逆洗のタイミングと頻度、処理槽の汚泥の量など運転条件をハッキリする必要がある。有害な藻類、カビ臭対策のもっと便利で簡単な技術の研究が求められる。

6) 生物活性炭流動床法による高度処理技術(BAC)

この技術は、活性炭の表面に付着した微生物の生物活性を高めて汚濁湖水を処理するのに開発された。実際に富栄養化された湖水を HRT 1 時間、パイロットプラントで浄化実験を行った(実験量 110L)。このプラントで TOC、SS はそれぞれ、50%、40%除去されていることが確認された。BAC 生物膜に多くの微生物、微小動物、原生動物、後生動物が生息していることが分かり、この膜が有機物(TOC)、THM、カビ臭を除去するのに大きな役割を担った(図 9)。活性炭の物理、化学的反応の他に、BAC 流動床法が効果的な生物学的プロセスを作り、処理効率を良くした。BAC を併用した多くの水質浄化法がある(図 10)。我々の研究結果から、この方法を高度処理の効果的な前処理とすることが明らかとなった。

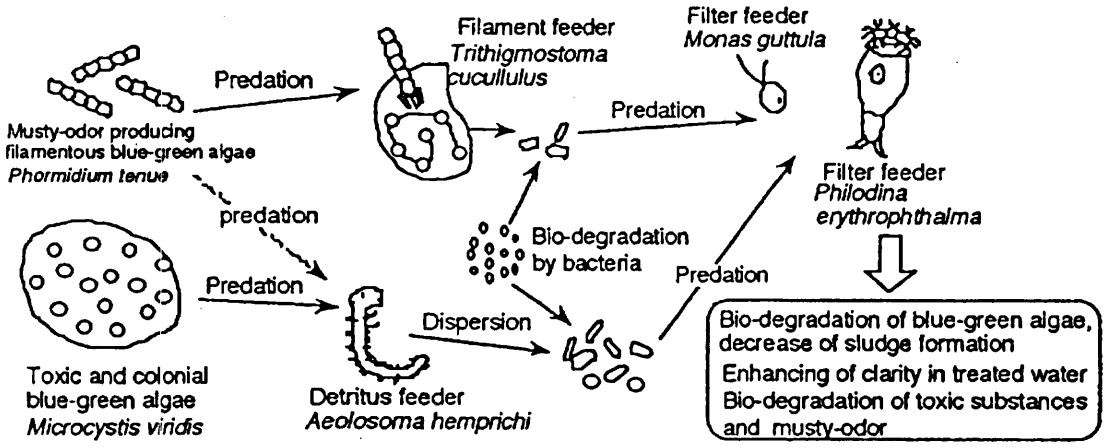

Figure 9 Role of microorganisms in biological treatment of polluted lake water

図 9 汚濁湖水の生物処理における微生物の役割

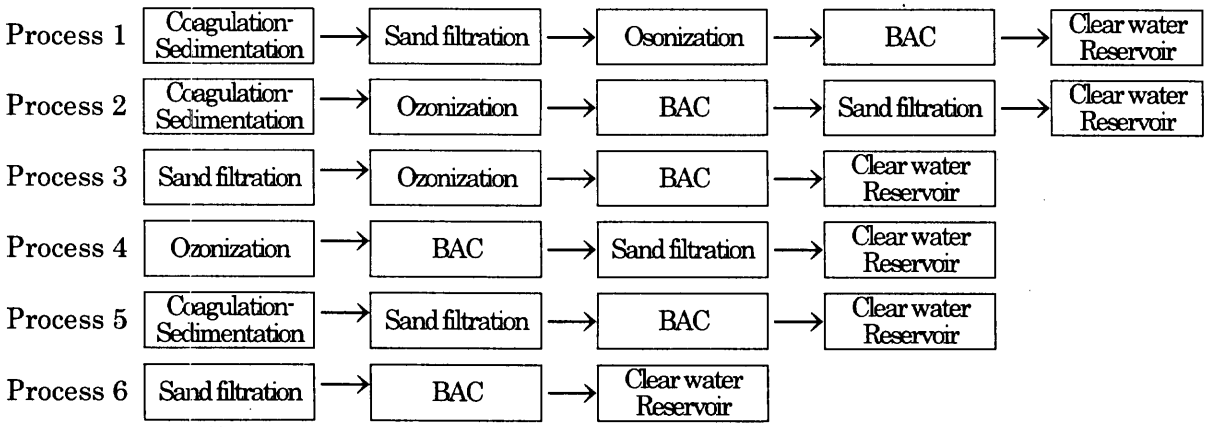

Figure 10 Water purification processes combined with BAC

図 10 BAC を併用した水質浄化法

7)バイオエンジニアリングを用いた埋立地浸出水の処理

下水汚泥を含む大部分の地方自治体と産業の廃棄物は埋めたて処分されている。年月を経た埋立地からの浸出水は、大抵処理しにくい高濃度難分解の有機物とアンモニア窒素を含み地表と地下水の汚染を引き起こす潜在的有害物質である。この浸出水は、BOD／COD の割合が非常に低く、生物分解性が低い事を示している。この埋立地浸出水汚染規制が厳しくなる

につれ、効果的経済的にこの浸出水の処理をする必要が高まっている。そこで、この水を処理するのに生物活性炭流動床法(BACFB、図 11)が使われた。活性炭を交換せずに 700 日を越える運転期間、処理しにくい有機物と窒素が、安定的に、同時にそれぞれ約 60%、70%除去された。BACFB 法による除去された 90%以上の難分解性有機物が生分解可能なものになった。この方法は、埋立地浸出水の処理しにくいものと有機物の生物分解に非常に高い効果がある事を示している。

上記の技術のほかにも多くの新しい技術が開発されている。包括固定化微生物法、微生物活性炭流動床法、高度処理技術(膜処理技術、オゾン化技術等)が日本で開発されている。接触酸化水路と間欠曝気法も小規模の汚水処理には有効である。硝化作用の改善に関し、硝化バクテリアをパックした固定微生物処理法もまた実用的である。

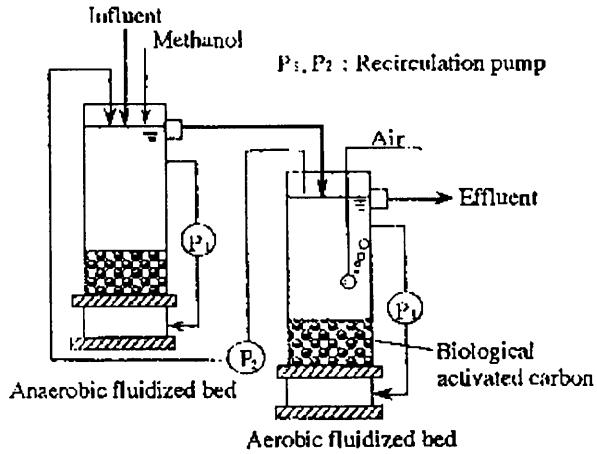

Figure 11 Schematic diagram of biological activated carbon fluidized bed process

図 11 生物活性炭流動床法の略図

微生物固定化手法は、伝統的な方法として様々な生産分野で使われている。例えば、包括固定細胞によるアルコール、アミノ酸の連続生産に使用される事は、既に知られている。包括固定酵素に比べ、包括固定細胞は、多酵素システムの安定性が改善されたと言う利点があり、更なる引きぬきや浄化が必要ない。包括固定細胞嫌気処理槽は、バイオマスを保持する能力が高いため、容量、微生物活性、処理性能と言う点でも有利である。今日設置されている大部分の新しい処理槽は、包括固定細胞技術を使っているが、まだ数多い浮遊バイオマス処理槽の使用がある。しかしながら、産業廃棄物を処理する包括固定細胞システムの割合は引き続き増加している。

有用微生物を使った水環境の浄化法は図 12 に示す。

5. GEM s の環境影響評価

本来、遺伝子操作された微生物(GEMs)は、分離され不純物を取り除かれた形で使われる特定の化学製品を作るのに使われる医学と産業領域で役立つものと見なされていた(Ford 1993)。最近、農業用や環境利用の大きな可能性が知られて来ている。汚染物質を生物的に厄介なものを制御するものや肥料として作用するように変えて、冷却システムと液体運搬、配達システムの消耗と汚れを規制し、その他環境へ利用するのために廃棄物処理技術を高めようと GEMs は、開発されている(Ford 1993)。GEMs は今、生態工学での利用の可能性を含め、特定の商業的に有望な能力のある微生物の研究に使われている。又、窒素の固定、鉱物濾過、有毒汚染物質の分解など様々な環境技術的用途がある。もしも、上手くこの GEMs を汚水処理に使えるようになったら、もっと小さな処理槽で低コスト処理が出来るように

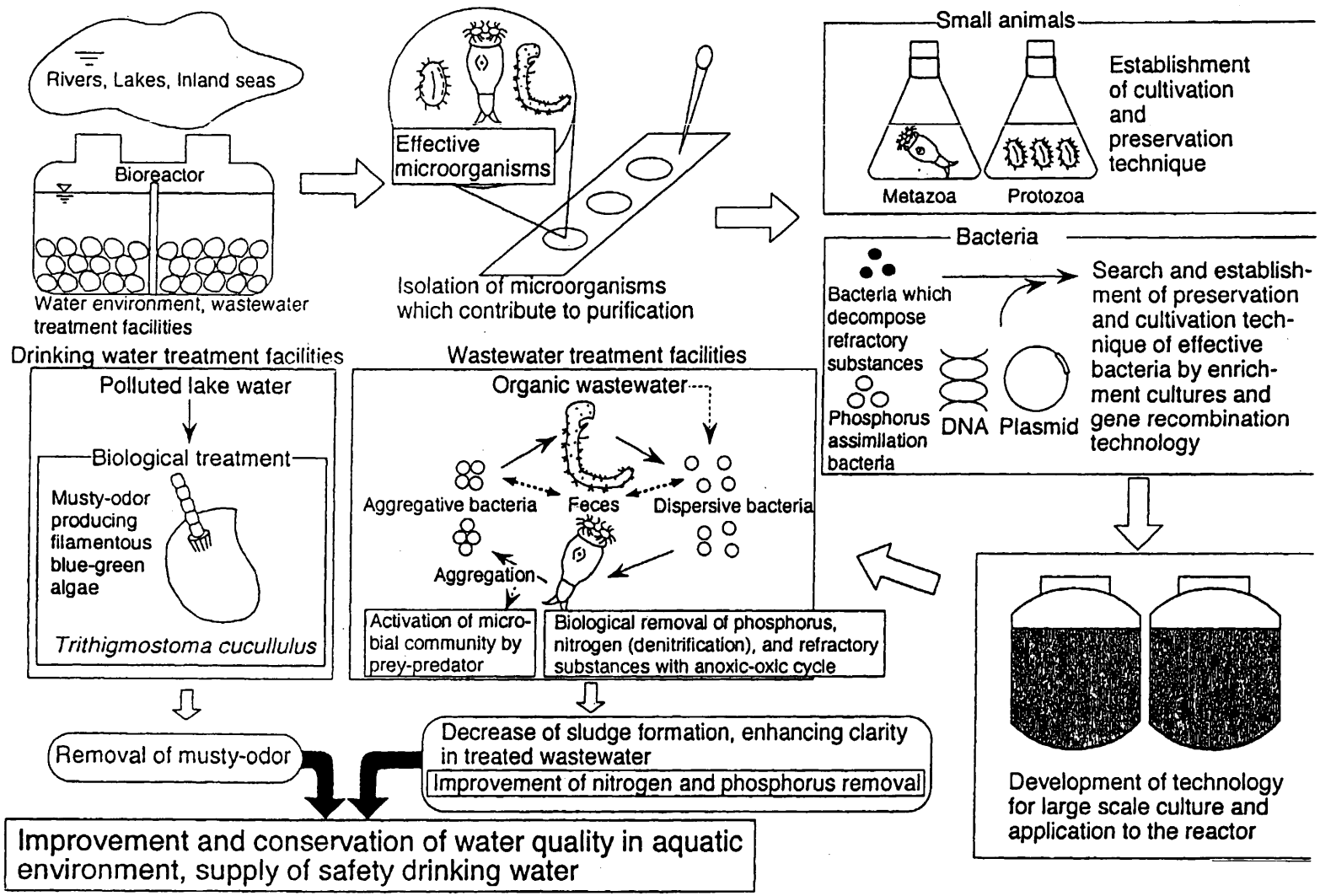

Figure 12　Application of effective microorganisms to restoration of water environment

図 12　水環境を修復する有用微生物の利用による水環境の修復

なるであろう。例えば、PCB、トリクロロエチレン等の分解しにくい物質を、GEMs が分解出来たならば、汚水処理分野は大きな発展を遂げる事となる。この可能性があるにもかかわらず、環境に意図的に取り入れられた GEMs の評価方法がまだ確立されてはいない。環境庁は、1990 年以来公開システムで GEMs 使用の法的規制の必要性を訴えてきているが、まだその規制がなされてはいない。各省でガイドラインは決定されているが、GMEs の環境への影響を評価する具体的方法はない。日本では、公開システムでのこの技術の使用はまだ出来ない。

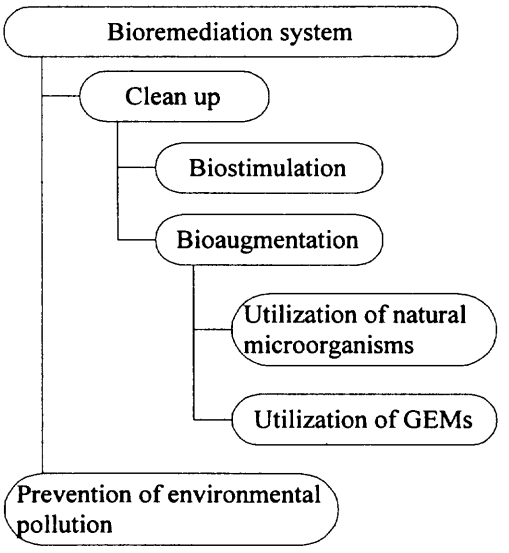

Figure 13 The concept of bioremediation systems
図 13 バイオレメディエーションシステムの概念

従来の地下水と土壌の浄化技術の限界が明らかになるにつれて、代替技術の研究が盛んになってきている。バイオレメディエーションは、従来の方法よりも安価になる可能性があり、特に注目を浴びている。従来よりも浄化に時間が掛からない可能性があり、他の濾過物質に汚染が移動する可能性も低い。このバイオレメディエーションとは、微生物(主にバクテリア)が有害汚染物質を分解し、より有害でない形に変えると言うものであり、このために、汚染物質を分解させるように栄養やその他の化学物質で、この微生物に刺激を与える。このシステムは、汚染場所に住む微生物に依存し、その代謝に欠く事の出来ない栄養と化学物質を適切に与え、微生物が作用するように仕向ける。今日のバイオレメディエーションシステムは、そこに住む微生物の能力によって制限される。しかし、今、研究者達は、特定の場所の懸念される汚染物質を分解するのにピッタリの GEMs を含む、汚染場所に住んでいない微生物を増やす方法を研究している。バイオオーギュメンテーションと言われる方法が、将来もバイオレメディエーションシステムの可能性を広げるであろう(Wood ら 1993)。バイオレメディエーションシステムの基本的概念を図 13 に示す。

GEM を使う事で発生する環境への被害を防ぐ為に、これからの調査手順は、民間、公の部門で、環境又は、経済的損失を引き起こす前に損失の可能性を現実的に確認する幅広い領域で行われなければならない。マイクロコズム、温室、現場データを使う環境工学研究は、GEMs と組換え DNA の運命に関する根本的な生態系情報を生むであろう。マイクロコズム、メソコズムのような生態系技術の評価は、実際に GEM が使われる前に悪影響の可能性を適切に評価するようになされなくてはならない。生態系隔離の重大な機能的特性を調べるマイクロコズムに基づくテストは、様々な生態系に一般に利用されるだろう。

生態系マイクロコズムは、容器の中の小さな生態系である。世界中の学校の教室や家庭の居間に自然の美しさと複雑さを持ち込むやり方として始められたこの小さな世界は、大切

な研究道具となった。生態系の働き方と生態系の中の有毒物質に何が起こるかを知る実際的な目的を研究する有効な方法である。単純化された生態系全体を研究し、妥当なコストで実験研究のためにそっくり複製されるので、マイクロコズムは重要である。深い海を表す水槽、テラリウム、循環する流れ、長いチューブがあり、人を含めるのに十分に広いマイクロコズムがある。生態系マイクロコズムは、ほんの 2-3mm

ほどにもなり得るし、兵器工場ほど広くもなり得る(Beyers ら 1993)。

稲森らは(1990、91)、独自に研究したマイクロコズムシステムを使って GEMs の環境影響を調べた(図 14)。図 15 は、マイクロコズムシステムの中の様々な微生物の段階を示す。このマイクロコズムでは、バクテリア、原生動物、藻類、輪虫類、貧毛類が安定した生態系を作る。GEMs は培養されてこのマイクロコズムに入れられた(図 16)。もしも、マイクロコズムの GEMs がはっきりと減ったり、無くなってしまったら、GEMs の環境への影響がない事を意味する。結果は、一時的に GEMs が減り、均一の密度で、生き残る可能性は、非常に低かった。それゆえ、GEMs を使った新しい汚水処理法が、近い将来期待できると結論づけられる。組替え DNA の生態系、環境への影響を更に研究する必要がある。

マイクロコズムを使った遺伝子組換え微生物の環境評価の方法を図 17 に示す。

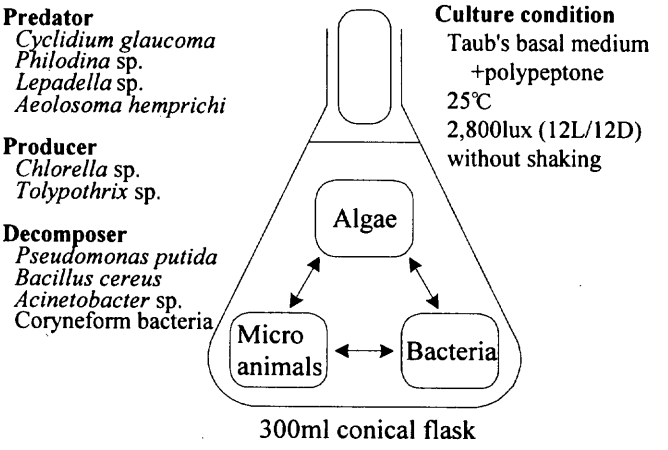

Figure 14 Outline of microcosm test used
図 14 使われたマイクロコズム試験の概略

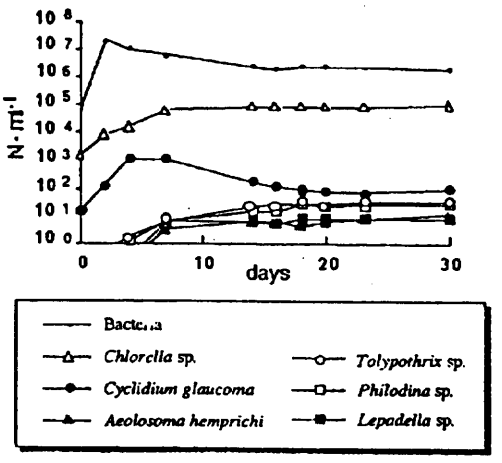

Figure 15 Growth curves of microorganisms in microcosm system
図 15 マイクロコズムシステム中の微生物の成長曲線

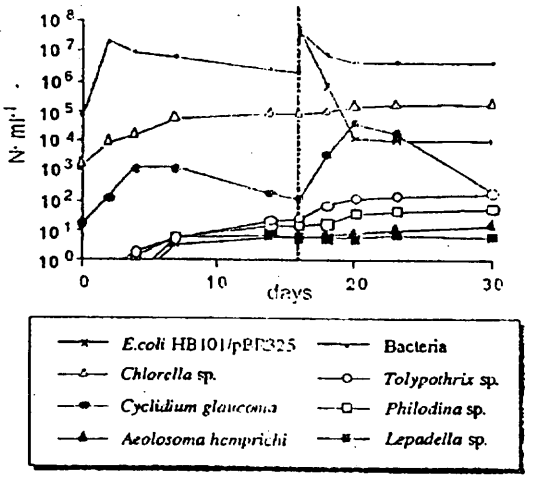

Figure 16 Growth curves of microorganisms in microcosm system inoculated with GEMs
図 16 GEMs を入れたマイクロコズムシステム中の微生物の成長曲線

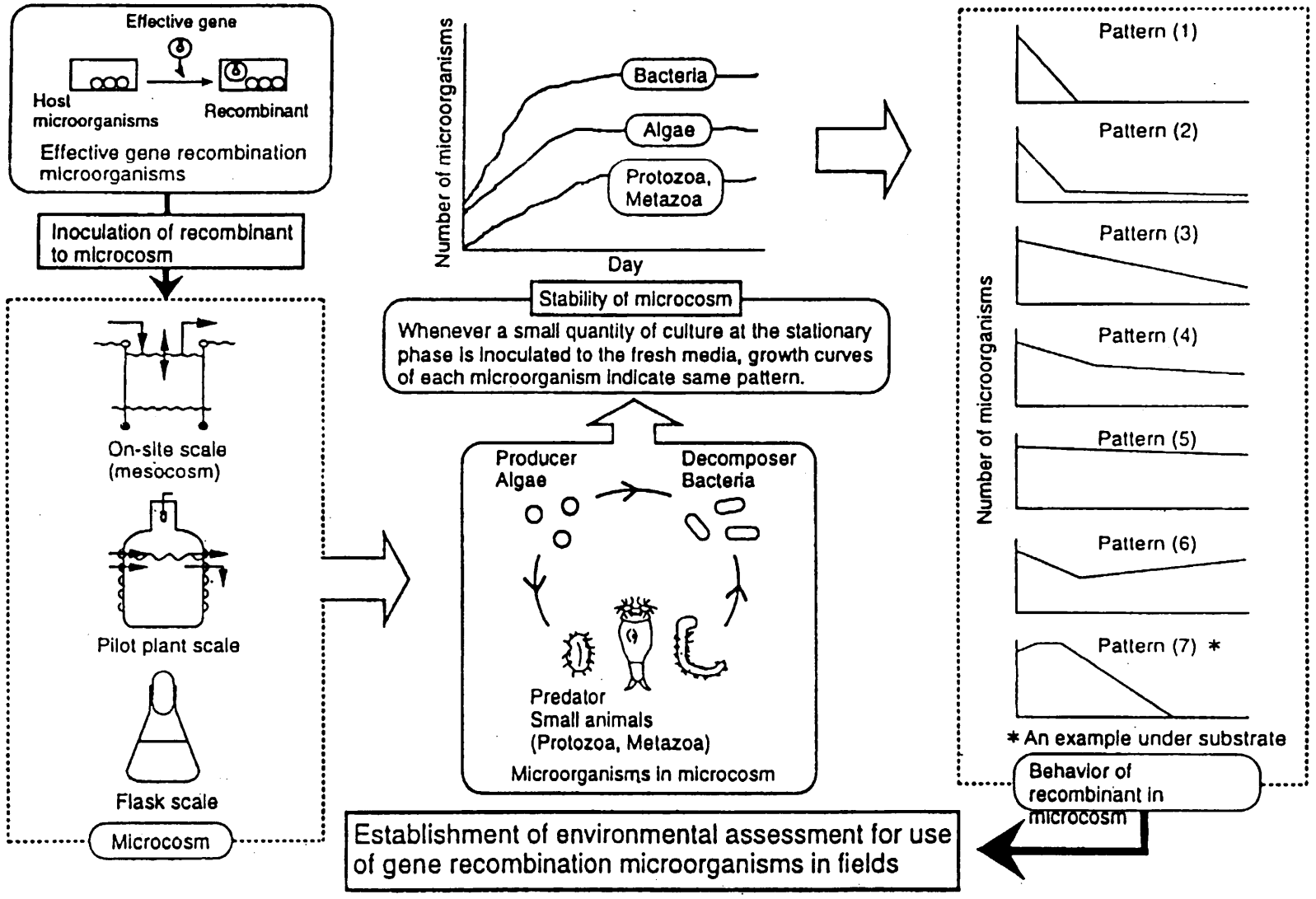

Figure 17 Environmental assessment of gene recombination microorganisms using microcosm

図 17 マイクロコズムシステム中の微生物の成長曲線

6. 要約

(1) わが国の水環境修復の為、エコエンジニアリングとバイオエンジニアリングの現状と効果的な利用、水と汚水の生物処理の新しい技術的展望が示されている。

(2) コストエフェクティブ、省エネルギー、技術集約が少ない新しい技術として、エコエンジニアリングとバイオエンジニアリングは水環境の保全にとって更に重要で有効なものとなり得る。

(3) 湿地システム、水生植物システム、土壌処理システム、水路浄化システム、生物処理システムは、今後確立されるだろう。

(4) エコエンジニアリングとバイオエンジニアリングの組み合わせによって窒素とリンを同時除去する技術開発と、水と汚水の生物処理を促進する効果的働きをする技術開発は、富栄養化防止の為に実行されるべきである。

(5) 生態系への影響の可能性があるので GEMs とバイオレメディエーションは、まだ実用化できないが、近い将来、水環境の修復で使用される事が期待される。

(6) 科学と工学両方の研究で、水生生物に適切な生息地を提供する為の効果的な処理システムの開発が行われる必要がある。

(7) 更に、国境を超えて流れる川と海の汚染が深刻な問題となり、悪化した水環境と汚水処理から出る温室効果ガスが地球環境問題を引き起こすことから、国際的共同研究が益々必要となる。

《セッション3》

保護区の現状とエコツーリズムの展開

第9回環日本海環境協力会議
2000年7月26~28日／モンゴル、ウランバートル
環境庁自然保護局国立公園課公園計画専門官
番匠 克二

1 始めに

日本列島は4つの大きな島と3900以上にも上る小さな島々からなり、面積は約378,000km² で、ユーラシア大陸の東端と平行に広がり、亜熱帯から亜寒帯に属している。

総陸地面積の67%が森林で、農地は14%を占めており、山が多い地形的特徴のため、日本の大部分は、まだ美しい原生林や二次林に覆われ、ヒグマ、ツキノワグマ、ニホンジカが森の中を駆け、イヌワシ、ツル、アオサギが青空を飛んでいる。

気候条件や地理的特徴により、日本の植物相は非常に豊富で、6,000 種以上の高等植物が確認されている。

植物相と野生生物生息地を取り巻く自然環境が多様性に富むため、日本列島ではかなり多くの哺乳動物、鳥類、爬虫類、昆虫等が見られる。哺乳動物は（亜種を含め）188種、鳥類は665種、両生類は59種、爬虫類は87種、淡水魚は200種、昆虫は10万種以上が既に確認されている。

自然環境を保全するため、日本には4種類の自然保護区、すなわち、国立公園、自然環境保全地域、鳥獣保護区、絶滅のおそれのある種の生息地等保護区が設けられている。

2 日本の保護区

2.1 自然公園

自然公園の法的基盤は、自然公園法である。この法律は、風景地とその生態系の保全、その利用促進、および国民の健康、レクリエーション、環境教育への貢献を目的としている。法律に従って、自然公園は以下の3種類に分類される。

国立公園
　我が国の風景を代表する傑出した自然の風景地
国定公園
　国立公園に準ずる優れた自然の風景地
都道府県立自然公園
　都道府県レベルでのすぐれた自然の風景地で知事の指定するもの

種類	公園数	公園面積(ha)	陸地面積に対する割合(%)
国立公園	28	2,047,408	5.42
国定公園	55	1,339,347	3.54
都道府県立自然公園	304	1,948,687	5.16
計	387	5,335,442	14.12

2.2 自然環境保全地域

自然環境保全地域の法的基盤は、自然環境保全法である。この法律は、自然環境保全の基本政策を定めた一般的な法律で、この法律に従い自然保全地域は以下の 3 種類に分類される。

原生自然環境保全地域

人の活動によって影響を受けることなく原生の状態を維持している地域

自然環境保全地域

以下の様な貴重な自然環境を保全する地域：

(a) 高山性並びに亜高山性植生
(b) 貴重な自然林
(c) 典型的な景観、地質、自然現象
(d) 河川、湖、沼、海岸
(e) 海洋地域
(f) (a)~(e)に相当する自然環境を保全している植物や野生生物の生息地

都道府県立自然環境保全地域

自然環境保全地域に準ずる自然環境を保全する地域。海洋地域は含まない。

種類	地域数	面積(ha)
原生自然環境保全地域	5	5,631
自然環境保全地域	10	21,593
県自然環境保全地域	516	73,413

2.3 鳥獣保護区

鳥獣保護区の法的基盤は、鳥獣保護及び狩猟に関する法律である。この法律は、生活環境の改善、及び農業、林業、漁業促進への貢献を目的とする鳥獣保護管理計画、並びに狩猟の実施を通して、鳥獣の保護並びに増加、狩猟による害獣の抑制、危険の防止を意図するものである。

環境庁長官あるいは都道府県知事は、鳥獣の保護及び繁殖に必要であるとみなした場合には、20 年を超えない期間で、鳥獣保護区を設けることができる。鳥獣保護区は鳥類や哺乳動物の保護と繁殖促進を目的に設けられるので、その地域内では鳥獣の狩猟は禁止されている。

54 の国立鳥獣保護区(480,000ha)と、3,665 の都道府県立鳥獣保護区(2,960,000ha)が設けられており、総面積は 3,440,000ha で、国土の 9%を占めている。

2.4 絶滅のおそれのある種の生息地等保護区

絶滅のおそれのある種の生息地等保護区の法的基盤は、絶滅のおそれのある野生動植物の種の保存に関する法律である。野生動植物の種は、生態系の重要な構成要素であることを認識し、また人間社会にとって欠くことのできない価値を有しているので、現在及び将来の世代に確実に自然環境を保全するため、絶滅のおそれのある野生動植物の種の保存に関する法律が設けられている。

絶滅のおそれのある種の保全を確実にする目的で、環境庁長官が国の絶滅のおそれのある種の生息地を生息地等保護区として指定している。

5つの生息地等保護区が指定されており、パトロール、生息並びに繁殖状況の調査といった業務を通して管理されている。

3　国立公園の管理

際立った生態系や名勝を保全するため、自然環境を悪化させる恐れのある多くの活動が制限され、環境庁長官あるいは関係する県知事の事前の許可や認可が必要となっている。許可は、環境庁が設けた「国立公園内における各種行為に関する審査指針」に沿って出される。

多くの人が訪れる国立公園の人気のある区域や主要な区域での美化や清掃を促進、奨励するために、地方自治体、園内売店業者、研究者、地元の人達等から成るボランティア・グループが設立・運営されている。設立された40以上のグループによる様々な美化活動を奨励するために、プログラムに必要な予算の四分の一ずつを環境庁、県、関係する市町村、地元の関連企業が助成している。また、民間の基金もこうした活動を財政的に援助している。特に、自然保全のための非政府活動を支援するために、基金は非常に重要な役割を果たしている。

国立公園の幅広い利用を促進するために、利用者のための施設は、公園の利用計画に沿って地元の自治体や民間団体にも認可されている。公共施設は環境庁の財政援助を得て、環境庁及び県知事が整備することができる。自然公園法に基づいて、民間の組織は国立公園を訪れる人達のためにホテル、宿、スキー場、その他の施設を運営する認可を得ることができ、こうした事業は、地元経済の発展に貢献するので、多くの国立公園で認可が出されている。

国立公園での自然資源の適切な利用促進のため、また人々の自然とのふれあいを求める要求の高まりに応えるために、ビジター・センターのような施設で様々な解説サービスが提供されている。

保護区域を適切に管理するためには、国、県知事、市町村、地元の人々、民間との間の協力を強めることがきわめて重要である。特に、保護区が私有地に設けられることもある日本においては、一般の支援を得ること、また一般と良い関係を維持することが欠かせない。

4　エコツーリズムによる保護区の利用

4.1 エコツーリズムの考え方

既存の周遊型の観光は、自然資源を使用し消費してきた。マスツーリズムはたくさんの人を呼び込むことで地域経済に良い影響を与えてきたが、自然環境に対し悪影響を引き起こすことが多かった。

これに対し、エコツーリズムの考え方は自然環境の持続的な利用を目指すもので、持続的な地域の振興につながるものである。そのねらいを整理すると以下の通り。

①地域の自然環境や文化の保全に貢献する。
②地域経済の活性化に貢献する。
③観光業等関連産業に適切な利益をもたらす。
④地域住民及びツアー参加者の環境に対する意識を向上させる。

エコツアー活動としては、次のようなものが想定される。

タイプ	活動内容
野生生物とのふれあい	野生生物ｳｫｯﾁﾝｸﾞ、ﾎｴｰﾙｳｫｯﾁﾝｸﾞ、動植物の調査ツアー、植物観察、自然観察
自然環境体験	洞窟体験、滝・火山・温泉見学
伝統文化とのふれあい	遺跡めぐり、伝統工芸を学ぶ
陸上活動体験	ﾄﾚｯｷﾝｸﾞ、ﾊｲｷﾝｸﾞ、ｳｫｰｷﾝｸﾞ、登山、ｷｬﾝﾋﾟﾝｸﾞ、ﾌｫﾄﾂｱｰ
海洋活動体験	ｽﾉｰｹﾘﾝｸﾞ、ｶﾇｰｲﾝｸﾞ、ｽｷｭｰﾊﾞﾀﾞｲﾋﾞﾝｸﾞ、ｲｶﾀﾞ下り
参加体験	ﾏﾀｷﾞ体験、農業体験、漁業体験、植林、ﾜｰｸｼｮｯﾌﾟ

4.2 日本におけるエコツーリズム

日本においても、沖縄県の西表島や鹿児島県の屋久島などをはじめとしてエコツーリズムの導入が進んできているところである。保護地域に指定されている地域における観光利用については、資源を消費しない形のエコツアーにしていくことが今後重要である。資源を消費しないエコツアーとすることは同時に、将来に渡って継続的に資源を活用することにつながる。

地域	エコツアー活動
釧路湿原（北海道）	ﾄﾚｯｷﾝｸﾞ、ｷｬﾝﾋﾟﾝｸﾞ、ｶﾇｰｲﾝｸﾞ
小笠原（東京都）	ﾎｴｰﾙｳｫｯﾁﾝｸﾞ
屋久島（鹿児島県）	ﾄﾚｯｷﾝｸﾞ、自然史学習
西表島（沖縄県）	ﾄﾚｯｷﾝｸﾞ、ｶﾔｯｷﾝｸﾞ、野生生物観察

また、新たに国立公園の指定を検討している沖縄県のやんばる地域においても、エコツーリズムと保護地域の指定を一体化することにより、地域振興と自然保護の両立を図ることを考えているところである。

《セッション４》

NEACのこれまでと将来

中華人民共和国
国家環境保護総局上級ﾌﾟﾛｸﾞﾗﾑ・ﾏﾈｰｼﾞｬｰ
Mr. Jing Guo

NEACの第１回会議が９年前に日本で開催されてから、今回で早くも９回目を数えることとなった。この９年間で、柔軟なテーマとあまり堅苦しくない討議の形式のために、NEACは参加国の間でも歓迎される会議となっている。参加各国の環境に関する新たな進展についての情報を交換するためにもNEACは必要な存在であろう。

これまでの会議から、NEACは次の通り確実に成果を挙げてきた：

- 参加国並びに参加組織にとって環境分野のほとんどの面で幅広い問題を話し合うためのフォーラムとして成功している。
- 参加メンバーが各国の環境に関する経験や進歩をやり取りする良い機会を提供する。中国は、こうした他の参加メンバーとの交流から多くの事を学んで来ており、他の国々の経験は、様々な形で中国国内の環境施策に役立って来た。
- NEACは、北東アジアの環境機関にとって最初の地域対話フォーラムであり、各国が実施する環境政策の理解を非常に深めた。
- NEACが果しているもう一つの非常に重要な役割は、新たな考えの導入と新しい方策を促進する触媒のような働きであり、私の認識では、日本、韓国、中国の担当者が三ケ国環境大臣会合の話し合いを行ったのは、NEACにおける非常に早い段階である。今年は、北京で第２回三ケ国環境大臣会合が開催された。この様に、今後もさらなる考えが実現されるであろう。
- NEACのもう一つの特徴は、国の機関だけでなく地方の環境機関からもこの会議に参加し、共に環境問題を話し合うことである。このため、会議は地方自治体の行政官にとってもお互いの経験を分かち合う良い機会となっており、プロセスに関わる様々な組織から更に多くの人が参加されることを望いんでる。

NEAC会議の展望

次に、今後のNEACに対する期待を述べたい。

まず、中国はNEACが現在果している参加国間での政策対話機能を引き続き維持して頂きたいと思う。各国はこうした対話から得ることが多く、明らかに正しい方向と思われる。

第二に、NEACは優先政策分野を明らかにするべき時期に来ている。次回のNEAC会議で１つあるいは２つの優先政策分野を確定するよう努め、次回以降の会議の場でそうした政策を引き続き議論することを提案したい。これにより、各国における様々な政策の影響を比較することが可能となり、NEACをより一層効果的にできるだろう。

第三に、NEACには政策研究者、産業や民間企業、また、非営利あるいは非政府組織等、様々な分野の人に、更に関わって頂きたいと思う。

第四に、参加国や参加組織がNEACの活動や成果を広める為に、インターネットの活用を考えてはどうか。北東アジアの環境に関する協力は、地域の住民に利益をもたらすもので、大切なことである。我々がこの会議で何をしているのか、また今後何をするのかといったことを普及することは有意義なことであろう。

ご清聴ありがとうございました。

《セッション4》

北東アジア環境協力のレビューと将来像

大韓民国環境部
国際協力課課長代理
LEE Chang Heum

最初に、皆様にこのような重要な問題でお話しする機会を得ましたことに感謝を申し上げたい。北東アジアにおける環境協力の状況の概略を話し、今後の展開、特に環日本海環境協力会議について簡潔に分析したい。

前回の環日本海環境協力会議(NEAC)及び北東アジア地域環境協力プログラム(NEASPEC)会議では、環境協力イニシャティブの結びつき強化が強調された。しかし、私の認識では、具体的な対策は取られてはおらず、現時点では、NEAC はその特徴である政策フォーラムとしての結びつきを高める指導的役割を演じることに注目したいと思う。

こうした条件の下で、現在の北東アジアにおける環境協力のメカニズムと戦略について説明し、最後に NEAC の目的と役割を提案する。

1．北東アジアにおける環境協力メカニズムの概観

1992 年以来、日本と韓国政府、また国連環境計画(UNEP)、国連アジア太平洋経済社会委員会(ESCAP)といった国際組織は、いくつかの多国間プログラムや会議を創設してきた。最初の環日本海環境協力会議(NEAC)は、1992 年に新潟で開催され、政策や情報を交換する政策対話フォーラムとしての役割を果たし、北東アジアの行政官、専門家間での環境問題に関する見解を分かち合った。

第1回の北東アジア環境協力高級事務レベル会議(SOM)は、1993年にソウルで開催され、1994 年の第 2 回会議では、参加国が次の 3 つの優先分野を確認した。すなわち；エネルギーと大気汚染、生態系管理、人材育成である。ソウルで開催された第 6 回会議では、北東アジアの環境協力に関する展望の声明を採択し、中核基金の設立で合意している。また、北東アジア環境データ・トレーニング・センターの設立も確認された。

最近、中国・日本・韓国三ヶ国環境大臣会合(TEMM)のイニシャティブは、環境協力において顕著な進展を見せている。今年北京で開催された第 2 回会合で、三大臣は、TEMM が地域の環境協力及び持続可能な開発を促進するための重要なフォーラムであると再確認しており、また、三ヶ国間において、実際にプロジェクト型協力の実施の意向を表明し、具体的に 9 プロジェクトで合意した。

中国、日本、韓国における大気汚染物質長距離移動に関する共同研究プロジェクト(LTP)及び東アジア酸性雨モニタリング・ネットワーク(EANET)は、大気汚染のモデリングとモニタリングを実施している。韓国の仁川で開催された北西太平洋地域海行動計画(NOWPAP)の第 5 回会議では、事務局の設置と、NOWPAP の将来について議論がなされた。

2．北東アジアにおける環境協力の限界

恐らく最大の問題は、環境協力に関する地域的なコンセンサスが、北東アジア諸国間で形成されていないことであろう。北東アジアにおける環境協力は、戦略的アプローチに重点が置かれている。北東アジアにおける環境協力に対する一定の枠組みと展望の表明がプログラムの一部として採択されたものの、全参加国と、特にその環境省庁が北東アジアにおける環境協力に対するこうした原則とビジョンに関して実際に共通のコンセンサスを築いてきたようには思えない。

第二の問題は、各プログラム間の政策的結びつきが十分ではないということである。現

在この地域では、TEMM、NEASPEC、NOWPAP、NEAC といった複数の枠組みが個別に運営されており、こうした協力間のでインプットや結びつきのための仕組みは見当たらない。

第三に、これまでに予算や具体的なプロジェクトを確保するための特別な処置は取られていない。TEMM 及び NEASPEC の枠組みにおける最近の成果は、初期段階に過ぎない。

第四に、北東アジアにおける多くの協力活動間の相乗効果を統合し、高める管理組織が存在しない。

3．環境協力展開のための戦略

この地域における環境協力の展開についての私の考えは、第一段階は、環境協力の原則を打ち立てることであろう。相互理解と原則構築プロセスには、行政官だけでなく、専門家、市民、環境運動家といった様々な利害関係者が共に加わるべきである。このためには、NEAC が政策フォーラムとしての役割を維持し、さらに強化する必要があるだろう。

第二段階としては、各プログラムの役割や機能を発展、強化させることである。たとえ TEMM が現在の構成国である三カ国に焦点を合わせているにせよ、将来、他の国々の参加により最高組織として機能させることは可能である。NEASPEC は、政府間レベルで組織及び財政問題を取り扱う高級事務官の政策対話の場としての現在の役割を継続させ、NEAC は、各国の政策及び情報交換、普及啓蒙、NGO、地方自治体、環境省庁間の協力を促進させる政策フォーラムとして機能させる。

第三に、各プログラム間の結びつきを強めるために、NEAC は TEMM、NEASPEC といった他の会議の暫定的なレビュー会合としての役割を演じることが可能であろう。また、NEAC の枠組み内において、専門家グループ会議を開催することを提言したい。

4．NEAC の目的と役割に関する提言

A．目的

(1) 地域全体に渡り急速に環境が悪化し、抜本的な解決には地方自治体、民間、市民の関わりがより多く求められるようになっているのは明白なため、NEAC の主要目的は、自由な論議と政策交換の促進、さらにあらゆるレベルでの有益かつ正確な情報へのアクセスを可能にさせる。

(2) こうした活動を通して、NEAC は大気汚染、自然保全、水質及び廃棄物管理といった国内、地域内および地球規模の環境問題への効果的対処、また最終的には、北東アジア全体での汚染低減に貢献する。

B．役割

(3) NEAC は、いくつかの役割を果たすべきである。NEAC のメカニズムを通して、様々な利害関係者の参加を促進することができる。こうした関係者には、関係する政府省庁だけでなく、環境機関、地方自治体、NGO も含まれる。

(4) NEAC は主に、オープンな政策対話を維持するフォーラムであるため、他の環境プログラムに対する基盤として機能する。そのため、TEMM や NEASPEC といった他の会議やプログラムへの結びつきは、強化されるべきである。こうした目的のため、主催国はその後の TEMM や NEASPEC 会議で NEAC を通じて生み出された成果及び情報を発表する。主催国はプレゼンテーション文書や合意結果を文書化し報告するといった NEAC の成果を分かち合うための作業を行う。

(5) 類似したプログラムの会議開催の時期を考慮しつつ、NEAC の枠組みの中で越境大気汚染、自然保護、生物多様性といった特定の分野に関しての暫定的なレビュー会合や

専門家グループ会議を開催する機会を TEMM や NEASPEC に提供するために、様々な対策を取ることが可能である。

C．参加国及び主催国

(6) 北東アジア 6 ヶ国、すなわち、中国、北朝鮮、日本、モンゴル、韓国、ロシアは、参加国としてこの会議に出席する。

(7) 参加国は持ち回りで NEAC 会議を主催する。ただし特別な状況下では、開催地は他の会議参加国へ変更することができる。

(8) 主催国は各参加国の中からそれぞれ 2 名分の費用を負担する。

D．議題及び活動

(9) レビューの活動は、前回の会議の結果に従った国内及び地域内の対策の進展状況を検証するために非常に重要であると考えられる。

(10) 会議は 4 つの分科会で構成されます。各分科会の議題には、前回の会議で採択された北東アジアの様々な環境問題が含まれるものとする。他の環境プログラムに政策ベースを提供するために、NEAC 会議の議題選択過程において、他の環境メカニズムにおける承認項目並びに進行中のプロジェクトを考慮する。

(11) 地方自治体や民間組織と協力して、主催国は公開シンポジウムや展示会のような特別な催しを実施することができる。

NEACの目的と役割に関する枠組み

A．目的

(1) 地域全体に渡り急速に環境が悪化し、抜本的な解決には地方自治体、民間、市民の関わりがより多く求められるようになっているのは明白なため、NEAC の主要目的は、自由な論議と政策交換の促進、さらにあらゆるレベルでの有益かつ正確な情報へのアクセスを可能にさせる。

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C．参加国並びに主催国

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(8) 主催国は参加国の中からそれぞれ2 名分の費用を負担する。

D．議題並びに活動

(9) レビューの活動は、前回の会議の結果に従って国内及び地域内の対策の進展状況を検証するために非常に重要であると考えられる。

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《セッション４》

第９回環日本海環境協力会議

NEAC－その着実な歩みと将来像－

環境庁地球環境部環境協力室
岩谷　智子

１　はじめに

来年は、NEAC 開催１０回目という大きな区切りの年にあたる。今回、この第９回会合において、各国政府、地方政府、国際機関、研究機関の方々から成る多様な参加者の間で、NEAC の１０年間の成果を振り返り、現在置かれている位置を確認し、次の１０年に向けて将来像を議論することは非常に意義深いことである。

２　北東アジア地域における主な環境協力の枠組み

２．１．協力枠組み形成の歴史

環境問題は、問題の発生する地域に特有のものばかりではなく、国境・地域を越えて人々の生活に影響を及ぼすものである。そのため、各国・各地域が協調して問題の解決に当たることは不可欠である。冷戦終結後、政策対話が活発に行われるようになったことで、国際環境協力も一層促進されることとなった。

それでは、アジア・太平洋地域、とりわけ北東アジア地域における国際環境協力について、概観しておきたい。

〈ESCAP 環境大臣会議〉

端緒となったのは、１９８５年にタイ・バンコクで開催された「アジア・太平洋環境と開発に関する閣僚会議(ESCAP 環境大臣会議)」である。同会議は以後５年毎に開催され、各国閣僚レベルでの環境政策対話の促進に貢献してきた。

〈エコ・アジア〉

１９９１年には、最初の「アジア・太平洋環境会議（エコ・アジア)」が東京で開催され、１９９２年の国連環境開発会議（UNCED）に対して、アジア・太平洋地域における環境保全戦略を提案した。エコ・アジアは、ほぼ毎年開催され、参加国の環境大臣や国際機関代表者の出席を得ている。エコ・アジアもまた、環境政策対話を推し進めてきた。

〈ＮＥＡＣ〉

１９９２年には、環境専門家が意見交換・政策対話を行う場として、日本・新潟で「第１回環日本海環境協力会議（NEAC)」が開催された。NEAC には、各国・地方政府、国際諸機関の行政官、研究者、NGO の環境専門家等、様々な層から参加を得ている。NEAC の前身は、１９８８年に始まった「日韓環境シンポジウム」である。その後、この会議に UNEP の協力を得て中国が加わり、ソ連(当時)とモンゴルがオブザーバーとして出席し、

NEACに発展した。

〈ＮＥＡＳＰＥＣ〉

１９９３年には、北東アジア地域の各国政府高官が初めて集い、「北東アジア環境協力プログラム(NEASPEC)」が開始された。この高級事務レベル会議は、毎年開催され、主に大気汚染対策のプロジェクトの承認を通じてNEASPECプログラムを進め、韓国での地域環境情報センター設置準備を促進した。

〈ＮＯＷＰＡＰ〉

１９９４年には、UNEP主導の北西太平洋における地域海計画と海洋・沿岸環境保全を推進するため、４カ国によって、「北西太平洋地域海行動計画（NOWPAP)」が採択された。

〈ＥＡＮＥＴ〉

１９９８年には、東アジアの１０カ国の参加により、「東アジア酸性雨モニタリングネットワーク（EANET)」の試行稼働がスタートした。このネットワークの目的は、各国共通の手法で酸性降下物のモニタリングを行い、その現状について各国の共通認識を醸成することである。今後、2000年半ばに試行稼働の結果を評価し、ネットワークの正式稼働について話し合いが行われる予定である。

〈ＴＥＭＭ〉

１９９９年、中国、日本、韓国による「第１回日中韓三カ国環境大臣会合（TEMM)」が韓国・ソウルで開催された。第２回TEMMは、本年２月に北京で開催され、具体的なプロジェクト形式の協力体制を構築するとともに、特に、環境共同体意識の向上、淡水（湖沼）汚染防止、陸上起因の海洋汚染防止、環境産業分野における協力に関するプロジェクトを発展させることを発表した。

以上の経緯は、北東アジア地域における環境協力枠組みを網羅するものではないが、同地域における環境協力が着実に進展してきたことが分かる。

２．２．枠組みの分類とＮＥＡＣの位置

次に、それぞれの協力枠組みを機能によって分類し、NEACを位置づけてみようと思う。

〈政府間フレームワーク〉

第一のカテゴリーは、共通の環境問題について地域協力を強化するための政府間フレームワークである。EANET、NEASPEC、NOWPAPなどがこれにあたる。

〈地域協力プロジェクト〉

第二のカテゴリーは、共通の環境問題について共同プロジェクトを形成し、推進していくものである。NEASPECはこの典型例であり、TEMMは第１回会合の政策対話枠組みから、第２回会合では、プロジェクト指向のフレームワークへと進展を見せている。

〈政策対話〉

第三のカテゴリーは、認識を共有し、他の枠組みへの貢献を目的に、政策対話を促進するものである。ESCAP環境大臣会議、エコ・アジア、TEMMが、閣僚レベルでの政策対話を促進する好例である。

〈ＮＥＡＣの位置〉

では、NEAC は何に分類できるであろう。NEAC は、基本的に、中央政府のみならず地方政府、NGO などまで対話の層を拡大している点で、政策対話を推進する場である。このことは、前回の会議で、参加国の地方自治体による環境協力の取り組みが議論されたことにも表れている。

3　NEAC の成果の評価

では、過去１０年間に NEAC がどのような成果を挙げてきたのかについて述べる。

〈政策対話のパイオニア〉

第一に、NEAC は、北東アジア地域における環境政策対話の先がけであったことである。１９９２年に NEAC の初会合が開催されるまで、この地域における多国間対話の場はこれといって無く、NEAC は北東アジア地域の環境協力の枠組みづくりの端緒となる出来事として画期的な意味を有していた。

〈多様な主体間の対話の促進〉

第二に、NEAC は、多様な主体間の政策対話を促進してきたということである。これまで NEAC は、各国政府のみならず、地方政府、国際機関、研究機関、NGO の参加を促し、「アジェンダ２１の実施を支援するための地方自治体や NGO の役割」(第４回会合)、「環境保全に関する国と地方公共団体の取組と環境協力への反映」(第８回会合)などの適切な議題について議論する機会を提供してきた。このような役割を果たして来たのは NEAC のみであり、北東アジア地域の様々な主体が認識を共有し、相互理解を深めるのに貢献してきた。

〈多様で先見的なテーマに関する対話の促進〉

第三に、NEAC は環境に関する多様かつ先見的なテーマについて政策対話を促進してきた。これまで NEAC が採り上げたテーマを以下に例示してみる。

- 特定の共通課題：「大気汚染の防止」('92)、「地下水の保全と管理」('98)、「渡り鳥とその生息地の保全協力」('98)、「固体廃棄物の管理と廃棄物の違法越境移動の防止」('96)
- 地球環境問題：「気候変動枠組条約に関する各国の見解及び方策」('95)
- 環境政策の手段：「市場原理に基づいた環境マネジメントのための政策手段」('93)
- 情報技術：「環境協力におけるインターネットの活用」('99)

このように、NEAC は、アジェンダ・セッティングのなかでタイムリーな「種」を蒔き、先見的なテーマに関する討議を通じて「果実」を実らせている。

4　NEAC のあるべき将来像へ向けての提言

最後に、次の１０年間における NEAC の将来像に向けて、ふたつの提言を行いたいと思う。問題は、これまでの成果のうえに、今後、北東アジア地域においてどのようにその役割を発展させて行くべきか、ということである。

〈様々な主体間のパートナーシップの促進〉

第一に、NEAC は、現在の政策対話を拡大・活性化させることにより、中央政府、地方

政府、研究機関、NGO など様々な主体間における地域のパートナーシップを確立・強化する役割を担うべきだ。

例えば、地方政府は、空間利用計画やモニタリングなどの地域に即した方策について多くの経験を有している。NGO は、植林や環境教育などの草の根活動に取り組んでいる。北東アジアの地方政府や NGO が、経験を共有し、ともに共通の問題を提起することは重要である。このようななかで、NEAC は、地方政府間あるいは NGO 間、またはこれら相互のパートナーシップの媒介となり得る。例えば、地方政府や NGO とともに、ワークショップやシンポジウムなどのサイド・イベントを開催するなどが考えられよう。

〈他の枠組みへの NEAC の成果の反映〉

第二に、NEAC は、北東アジア地域の他の国際環境協力枠組みの活動へ、その成果を積極的に投入するべきだ。前述のように、NEAC はこれまで、適切なアジェンダ・セッティングのもと、専門的政策対話で成果を上げてきた。いまや、これらの成果を、より具体的なプロジェクト形成やより拘束力のある合意形成のために活用する時期であろう。

一つの方法は、NEAC 自身がプロジェクト志向の枠組みへと転換することである。だが、これでは同じ機能を持つ枠組みが重複してしまうことになる。よって、最も適切で現実的な道は、NEAC が、NEASPEC のようなプロジェクト志向の枠組みと連携関係を取り結ぶことであろう。ここで、私は NEASPEC を連携先として焦点を当てたい。

さて、次の問題は、NEAC と NEASPEC の連携関係をどのように実現するか、そして、NEAC から NEASPEC への成果反映をどのように制度化するか、ということである。連携方法はいくつかあろう。私はここで、議論のために、２つの方策を示してみたい。

一つは、NEAC を、NEASPEC の機構なかで、専門会合の場として位置づけることである。これは、NEAC が NEASPEC に統合される点でダイレクト（直接的）な連携関係の例である。

他の一つは、NEAC と NEASPEC を同時開催することである。これは、それぞれの組織の独自性を保つという点で間接的な連携関係の例である。

どのような方策を採るかについては、成果反映の効果、枠組みの独自性、構成員の一貫性等の点につき、幅広い視点からの熟慮・検討が必要だ。

以上、NEAC の成果を概観し、その将来像を描いてみた。この重要な問題については、来るべき１０年間に NEAC がより発展するために、さらなる検討と議論を待ちたい。

《セッション4》

北東アジアの環境協力のレビューと将来像

第9回環日本海環境協力会議
2000年7月26～28日
モンゴル、ウランバートル

自然環境省国際協力局上級オフィサー
Eldev-Ochiryn ERDENEBAT

Ⅰ．始めに

環日本海環境協力会議(NEAC)はこれまでに8回開催され、舞鶴市における前回の会議では、モンゴルのウランバートルで開催される次回会議において、参加国は NEAC の活動を検証し、将来の方向を考える必要があることが示唆された。

II．北東アジアにおける環境協力のレビュー

21 世紀において持続可能な発展の目標を達成するためには、既存の環境協力ネットワークを強化し、環境保護分野における新たな共同活動を実施することにより、地域協力を強化する必要がある。

表1に北東アジア環境協力に関する組織展開を示す。

表1　北東アジア環境協力に関する組織展開

政府間	省庁間	非政府
北東アジア環境協力高級事務レベル会議 －第1回： ソウル、1993年2月 －第2回： 北京、1994年11月 －第3回： ウランバートル、1996年9月 －第4回： モスクワ、1998年1月 －第5回： 神戸、1999年2月	環日本海環境協力会議 －第1回： 日本、新潟、1992年10月 －第2回： 韓国、ソウル、1993年9月 －第3回： 日本、兵庫、1994年10月 －第4回： 韓国、プサン、1995年9月 －第5回： 中国、北京、1996年10月 －第6回： 日本、新潟、1997年10月 －第7回： 韓国、済州、1998年10月 －第8回： 日本、舞鶴、1999年10月 －第9回： モンゴル、ウランバートル 2000年7月	－ソウル・シンポジウム： UNCED 及び21世紀の環境体系に関する展望 ソウル、1992年9月 －北東アジアの環境協力に関するシンポジウム イルクーツク、1993年8月 北東アジア・北太平洋環境フォーラム －米国、アラスカ、フェアバンクス、1994年 －日本、釧路 1995年 －ロシア、ハバロフスク、1997年
北西太平洋地域海行動計画 (NOWPAP) －第1回専門家会合： ウラジオストク、1991年10月 －第2回専門家会合： 北京、1992年10月 －第3回専門家会合： バンコク、1993年11月 －第1回政府間会合： ソウル、1994年9月 －第2回政府間会合： 東京、1996年11月	アジア・太平洋環境会議 (Eco-Asia)	

－第3回政府間会合： ウラジオストク、1998年4月 －第4回政府間会合： 北京、1999年4月		
東アジア酸性雨モニタリング・ネットワーク －横浜、1998年3月		

この表からは、1990年代以降に設立し環境協力フォーラムとして機能してきた多国間環境協力が見て取れる。さらに二国間協力もある：

中韓環境協力協定
日韓環境保護協力協定
日中環境保護協力協定
韓露環境協力協定
モンゴル-中国環境協力協定
モンゴル-ロシア環境協力協定
日露環境保護協力協定

III．NEAC

この地域では、協力の枠組み内で環境問題に関する国際的なシンポジウムや会議が開催されてきた。その中でも、環日本海環境協力会議は、域内の国々の間で環境政策と管理に関する情報や経験を交換するという重要な役割を演じている。1992年の発足以来、この会議は域内の異なる国の主催により毎年開催されており、今年は初めてモンゴルが第9回環日本海環境協力会議を日本政府の財政支援を受けて主催している。

表2には、NEACの歴史と議論されたテーマ及び主な成果を示した。

NEACの主要な成果の1つは、協力して地域内の環境問題を考えるために、中央及び地方政府、研究機関、NGO、民間、国際組織の関わりを容易にしたことである。また、最新の環境政策に関する進展を、お互いに時宜を得て知らせ合う機会を提供している。

IV．NEACの今後

NEACの将来についていくつかの提案をしたい。

－ NEACの現在の政策及び機能をそのまま維持して頂きたい。
－ NEACの優先分野を明らかにする必要がある。例えば、モンゴルの場合には、大都市における大気汚染、砂漠化といった急を要する問題を抱えている。
－ NEACは、参加国が毎年会議を開き、自由に意見交換し環境活動に関する最新情報を得る機会を提供しており、これは非常に重要なことで、一層強化すべきである。
－ 前にも触れたが、この地域では、北東アジア地域環境協力プログラム(NEASPEC)、豆満江開発プログラム、東アジア酸性雨モニタリング・ネットワーク、アジア・太平洋環境会議(ECO ASIA)等の多くの活動が進行中だが、それらの間には連携が一切ない。そのため、NEACがそうした役割を果たすことができれば良い。
－ 新潟の第1回会議では、環日本海環境協力会議が定期的に、原則として毎年開催され、望ましくは、毎回本地域内の異なる国により主催されることが合意された。これまでの活動は、モンゴルのような国は財政事情によりこうした会議を開催し、費用を負担することはできないことを示していた。今日の会議は協力の良い例と言えるであろう。

- 舞鶴の前回の会議では、NEAC-9の準備作業にインターネット活用の提案があった。それは成功裏に実行され、我々と日本との間の連絡は非常に良く、一切の文書はEメールで受け取った。今後さらに活用されるべきであろう。

表2　環日本海環境協力会議

開催年/開催地	参加国	議題	成果
第1回： 1992年10月 日本、新潟	中国、韓国、日本、モンゴル、ロシア 国連組織：UNEP、UNDP、ESCAP	- 大気汚染 - 水質汚濁 - 廃棄物管理 - 自然保護	情報交換ネットワークの早期構築、酸性雨、沿岸域及び内陸水域の汚染、生物多様性等に関する共同調査及びモニタリングの実施、特定分野における共同研究、共同訓練の実施。
第2回： 1993年9月 韓国、ソウル	中国、韓国、日本、モンゴル、ロシア 国連組織：UNEP、UNDP、ESCAP、国連大学(UNU)	- 市場原理に基づいた環境マネジメントのための政策手段について - 環境汚染の測定法-基準と単位、測定法間の比較のための校正法等を含む- - 共同研究テーマと実践方法について - 有害廃棄物の分類について - 環日本海環境協力会議における地方政府の経験と役割について	参加者は、地域環境の改善に貢献するうえで、各国間の相互理解を深めるために、環境分野における人材、情報、経験、技術などについて、多様な交流を拡大することの必要性を表明。
第3回： 1994年9月 日本、兵庫	中国、韓国、日本、モンゴル、ロシア 国連組織：ESCAP	- 持続可能な都市 - 生物多様性の保全 - 協力の強化	各国の環境保護政策の策定と実施及び域内の持続可能な開発の推進が議論された。会議では、持続可能な開発を達成するためには国家戦略とともに総合的な地域戦略が必要であることが認められた。 本会議で2つの協力活動が提案された： * 国連等の国際機関との緊密な協力により、北東アジア地域の都市の持続可能性に関する報告書の作成。 * この地域の環境分野で活動している中央政府、研究所及び関係機関の連絡先名簿の作成。
第4回： 1995年9月 韓国、プサン	中国、韓国、日本、モンゴル、ロシア 国連組織：UNEP、UNDP、ESCAP	- 地方自治体及びNGOの役割 - 汚染物質の越境移動に関する協力方策 - 気候変動枠組条約に関する見解及び方策 - 有害化学物質の管理に関する経験と方策 - 都市環境問題	参加者は、共通の課題に関する地域協力のための具体的な方策が必要であるとの結論に達した。特に、年次報告書、環境法、統計等を相互に交換する行動計画を本会議として策定するメリットを認識した。
第5回： 1996年10月 中国、北京	中国、韓国、日本、モンゴル、ロシア 国連組織：UNDP、WHO、WB	- 各国における持続可能な開発を進めるための環境に関する政策、法律、管理等の最近の動き - 固体廃棄物の管理と廃棄物の違法越境移動の防止 - クリーナー・プロダクションと総合的な汚染対策	- 韓国代表団は、北東アジア気候研究センターの設置を提案。 - ロシアの代表団は、地域プログラム及び論議された項目に関するプロジェクト創設の可能性を発展させること

		- 地球環境問題：気候変動、生物多様性	を提案。
第6回： 1997年10月 日本、新潟	中国、韓国、日本、モンゴル 国連組織：UNEP、UNDP、ESCAP	- 酸性雨 - 広域水質汚濁防止 - 生物多様性保全 - クリーナー・プロダクション	地域協力を促進する活動のうち、日本により提唱された「東アジア酸性雨モニタリングネットワーク」及び韓国により組織された「北東アジアの長距離越境大気汚染物質に関する専門家会議」の2つのプログラムが域内の既存の活動を調整するための効果的な努力として認識された。
第7回： 1998年10月 韓国、済州		- 渡り鳥生息地の保護 - 地下水の保全と管理 - 持続可能な開発指数の開発と利用 - 有害大気汚染物質の管理	渡り鳥とその生息地の保全協力に関するセッションでは、最近の越境地域保護の成功や将来的に同様のプロジェクトの必要性が特に言及された。参加国は、渡り鳥と生息地の保全に関する地域同意の展開を含む渡り鳥保全、及び、このための委員会の設置に対する国際協力促進という韓国の提案の重要性を認識した。
第8回： 1999年10月 日本、舞鶴		- 地方自治体おける環境保全への取組 - 環境協力における地方自治体の取組 - 気候変動問への対策に関する国内施策及び環境行政機関の事業者・消費者としての対策 - 環境協力におけるインターネットの活用	参加者は、ウランバートルにおける次回の会議で「北東アジア環境協力のレビューと将来像」を論議することに合意。

《セッション4》

第9回環日本海環境協力会議
2000年7月26～28日
モンゴル、ウランバートル

ロシア連邦環境天然資源保護省
ロシア連邦自然保護研究所
Dr. Peshkov

北東アジア環境協力のレビューと将来像

基調演説で述べた原則的立場、すなわち環日本海環境協力会議がその開始から現在に至るまで、環境保護分野における我々の努力を強化し、本地域内で持続可能な発展を促進するという少なからぬ役割を演じて来たことに再度触れたい。

新しい千年紀の始めに、また第10回環境協力会議の開催という節目に、過去を振り返り、今後の優先事項に目を向けてみたいと思う。

我々の仕事の主な方向付けを行うために、まず、情報交換の重要性を強調する必要がある。配付した資料には様々な国の経験を記載したので、成功事例を見つけ、将来の可能性を構築するためにお役立ていただきたい。最良の解決策がどういうものかは誰にも分からないが、大抵の場合、異なる見解や伝統を持つ、異なる国の人々からなる会合や会議の場で、興味深く有益な解決策が見つかるということを申し上げたい。

また、開催場所を変えて会議を開催するという考えは、非常に有意義と思われる。それにより、より良い理解のための基盤が形成され、環境保護のための地元の活動や方策に良い教訓を提供できる。しかしながら、ロシア領土は軽視されており、近い将来に改善の必要があることを指摘すべきであろう。

ほとんどの環境問題は国境を超えて広がり、国際的な性質のものであることはよく知られており、達成結果にとって、環境保護分野における国際的な努力とイニシャティブは非常に重要な場合が多いものである。北東アジアの国々の間で財政と技術資源を貯えることは、共通の環境問題に対処する手段を求める上で非常に効果的といえるであろう。

地域内における持続可能性構築のための協力の必要性は、この会議で取り扱うほとんどの課題について検討する毎に強調されていると言える。主な傾向としては、環境法を含む様々な環境保護分野における情報交換、クリーン・プロダクションの創出、大気汚染防止、水質汚濁防止と水の供給、大気汚染物質の管理、生物多様性保全等が挙げられる。各テーマ毎に様々な考えや具体的な協力方法が示された。また、特別セッションが開催され、例えば地方自治体の環境協力イニシャティブ、アジア北部における渡り鳥及びその生息地の保護協力といった協力イニシャティブに重点が置かれた。

会議では協力に対し数多くの提案や方法が論議されたにもかかわらず、実際に実行されたものはあまりない。協力の成功例の一部は生息地保護の分野である。生息地保護のために現在世界で主に利用されている方法は、保護区のネットワーク展開で、これは、広大な生息地を必要とする種の保全、渡り鳥の保護、広範に分散する多様な希少種を守るためのユニークな方法の1つである。

そうしたことを考慮し、ロシアは北東アジアにおける生物多様性保護のための生息地ネットワークを展開している。今日、こうした分野はラムサール・リストや移

動性の種のためのラムサール・ネットワークに含まれており、また国際湿地保全連合アジア太平洋支部の下で特別プログラムが進行中で、移動性の種の保護分野では国際協力が始まっていることを意味する。しかし、ネットワーク構築分野において成功したプロジェクトの例は、まだ本地域内の持続可能な生態系を維持するには、また希少種や絶滅危惧種を保護するためには十分ではない。

「特別保護区ネットワークの拡大と人材養成」のセッションで、いくつかの越境保護区プロジェクトに触れているが、こうしたプロジェクトは、別のプロジェクトを展開するためのモデルとすることが可能なものである。生息地の保全が希少種や絶滅危惧種を保護するには最も適した方法であることを考慮に入れ、シベリア・トラ、ファーカスタン・ヒョウ、雪ヒョウの保護には国際協力が非常に必要とされていることに再度触れたいと思う。特に、保護区確立の分野においては、ファーカスタン・ヒョウの保護に早急な協力処置が必要とされている。

国境周辺地域における生物多様性保全のために将来有望な新たなプロジェクトは、中国、モンゴル、ロシアの隣接する三カ国の参加を含めた国際的な zapovednik (最重要保護区)である「Dauriya」の設立である。これは、この地域における希少種並びに絶滅危惧種の保護及び持続可能な生態系を支える努力強化に役立つものである。

地球規模の問題を離れると、本地域内の自然保護に関しては、地方に顕著な問題が多く、そうした問題は、共通の利益のもとで隣国との二国間における合意の枠組みによって解決されるべきものである。

例えば、ロシアの Primorsky 地方や Khabarovsky Kray における自然保護は、中国の積極的な参加がなければ不可能である。我々には、中露協力の良い手本があり、またロシアの技術を中国南部の省で利用している。

中露協力の分野における優先事項として次のような方向が決定されている：中露の共通利益として、厳格に保護された自然の生息地の組織、研究、維持；Przevalski 馬の保護、回復、自然への導入に関する共同プログラムの展開及び実現；経験と技術の交換によるエネルギー源利用効果の増大；分水界アプローチに基づく越境水流及び国際的な湖を含めた表層水の汚染モニタリングと規制；人類学的環境影響評価の生物試験並びに生物調査；地域の生態系問題の調査・解決のための空間手法の応用；放射能汚染の抑制；環境影響評価、生態系専門知識、規範開発の分野における技術協力；自然保護における生態系に配慮したプロジェクトの提供。これらの一部は、実際、成功裏に実施されており、また策定中のものもあり、まだ全く実現化されていないものもある。

SEPA 南京環境科学研究院(中国)とロシア連邦自然保護研究所(ロシア)間の合意の枠組み内に則った協力からも多大な成果が得られることを期待している。この合意には、自然保護と生物多様性、農薬の環境影響評価と管理、農業廃棄物の処分と総合的活用、生態系モニタリング、蔵書の交換、廃棄物処理技術に関する幅広い意見交換、廃棄物処理技術の試験、２つの研究所の間での研究者の交換と訪問の強化等が含まれる。

北東アジア諸国間の協力の増大は我々の利益に役立つものと思われる。環境保護分野におけるより強固で密接な協力は、地域内の一層の持続可能な成長を支えるであろう。

NEAC は、地域内の環境協力の促進に多くの貢献を行ってきた。会議では、環境保護における様々な分野の優先事項が挙げられてきた。実際に会議の勧告の一部は成功裏に実施されたが、分野によっては適切な協力例があまり見られない場合もあ

る。そのため、我々の努力を強化し、提案をより効率的に行う方法を模索する必要がある。効果的に作業を行う方法の１つは、前回の会議で検討されたテーマに着目し、その展開と実施に対し特別なレビューを実施することである。

我々の努力を強化するための他の主要な要素は、ドナー組織とのパートナーシップの機会をもっと積極的に強めることである。残念ながら、現在、実際の国際的な支援組織の業務では、十分調整がなされておらす、複数の活動が平行して行われている。こうした組織の業務を国レベルでまた国際レベルで調整し、並行した資金の投入を止めることはスタートとして非常に有意義と言える。

最後に、会議が地方レベルで、また地域レベルで合同環境プロジェクトの開始推進力となっていることは明らかであることを申し上げたい。現状では、当会議は、将来影響力を増すという非常に明るい展望を得ている。

《セッション4》

NEACの将来
北東アジアにおける環境協力の過去、現在、未来の概観

第9回環日本海環境協力会議(NEAC)
モンゴル、ウランバートル
2000年7月26~28日

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過去のレビュー

- 環境問題、認識、政策対応の国際化が1972年のストックホルム会議(国連人間環境会議/UNCHE)で明確となる。国連環境計画(UNEP)が国連のシステム内に設立される。
- 地域協力の必要性がストックホルム会議を前に広く認識され、共通の関心事、特に国際共有下にある天然資源の保護と管理についての問題点を取り上げるようになる。

  例：国際水域、閉鎖性海域での漁業
  渡り鳥、移動性動物
- UNEPが奨励する地域的アプローチ

  例：UNEP内に地域事務所を設立
  アジア太平洋経済社会委員会(ESCAP)の地域海行動計画を含む国連地域経済委員会への組織的支援
- 「環境保護」から「持続可能な発展」へのパラダイム転換

  世界保全戦略(1980)
  環境と開発に関する世界委員会(WCED)の(Brundtland委員会)報告(1987)
- リオ地球サミット(国連環境開発会議 UNCED1992)

  アジェンダ21でグローバル・パートナーシップ、地域並びに小地域レベルでの協力強化を求める

アジア太平洋地域における地域環境プログラム

I．地域全体：ESSDのためのRAP

- 1985年に開催された環境と開発に関する第1回ESCAP大臣会合で、アジア太平洋の環境状況報告がなされる。
- 第2回大臣会合で、「ESSDの地域戦略」を採択。
- 第3回大臣会合で地域行動計画1996-2000を採択。
- 第4回アジア太平洋の環境・開発に関する大臣会合(MCED)(2000年9月初旬、北九州市で開催)で、RAP改訂版(環境上健全で持続可能な開発のための地域行動計画)2001-2005の採択が期待されている。一層の地域協力の推進と小地域レベルでの実施を求めるとともに、参加国によるオーナーシップを強調する。

II. 小地域環境プログラム

東南アジア
- ASEAN 小地域環境計画(ASEPI~III、1977~1992)、並びにその後の環境に関する戦略的行動計画。ASEAN 環境に関する上級事務レベル会合(ASOEN)並びに政府の様々なレベルにおける調整、ASEAN 事務局による情報提供。
- ASEAN 自然環境と天然資源保全に関する協定(1985、未発効)
- 越境大気汚染に関する協力計画(1995)、および地域ヘイズ行動計画(1997)
- 東アジア海域行動計画(1981~、1994 年に改訂)
- メコン川委員会(MRC)が復活、1996 年にメコン川流域の持続可能な発展のための協力合意に署名。

南太平洋
- 南太平洋地域環境計画(SPREP)、及び海洋環境に関する南太平洋行動計画を 1982 年に採択
- 天然資源と環境保全のためのヌメア会議(1986)
- 1992 年に国際組織として SPREP を設立決定(1995 年に発足)
- 改訂行動計画、新たな戦略文書を今年(2000 年)後半の採択に向けて準備中

南アジア
- 南アジア環境協力計画(SACEP)が 1981 年に設立
- 南アジア海域行動計画(1995)
- 大気汚染防止と越境汚染影響の可能性に関するマレ宣言(1998)

ヒンズークシ／ヒマラヤ
- 国際総合山岳開発センター(ICIMOD)が 1983 年に設立
- 第一期作業プログラムとそれに続く中核プログラム並びに地域協力プログラム

中央アジア
- アラル海国際基金(IFAS)

北東アジアにおける環境協力
- UNCED 後に急速に現れた二国間、また多国間プログラムおよびフォーラム
- 多様な関係者や参加者を伴う様々なレベルの国際的および国別管理
- 様々な地理的、主題的/問題対応
- 様々な組織合意(ある場合)

I. 小地域レベルでの協力

A. 政府間プログラムとフォーラム

北東アジア環境協力会議(NEAC)
- 1988 年以来開催されていた日韓環境シンポジウムの発展として、NEAC は 1992 年に日本により初めて計画、主催され、日本の環境庁(EAJ)の多額の資金援助により、その後毎年、参加国で開催されている。
- 現在では、各国政府並びに地方自治体の環境当局、その他専門家による、幅広い話題に関しての情報交換、政策対話のためのフォーラムとなっており、一般

公開のシンポジウムとともに開催されることが多い。

北東アジア地域環境協力プログラム(NEASPEC)

- NEASPECの設立は、1993年韓国のソウルで開催された、北東アジア環境協力に関する第1回上級事務レベル会議(SOM)で合意をみた。それ以後、毎年あるいは一年おきに、ESCAP事務局が便宜を図り、外交チャンネルを通して正式な会議が開催されている。
- 1996年モンゴルで開催された第3回SOMにおいて、NEASPECの枠組みが採択された。
- 3優先分野を決定し(エネルギーと大気汚染、生態系管理、能力構築)、アジア開発銀行(ADB)からの資金提供を受けて一連のプロジェクトが実施された。
- 中核資金の確立を伴う、より恒久的な組織作りを韓国が強力に推し進めている。

北西太平洋地域海行動計画(NOWPAP)

- UNEPの地域海プログラムへ最も新しく付け加えられたもので、まだ組織構造、特別行動計画並びにプロジェクトの形成段階にある。

三ヶ国環境大臣会合(TEMM)

- 中国、韓国、日本間の環境協力のため、既存の二国間合意の上に構築し、合意に至った協力プロジェクト実施の可能性と共に、1999年定期的(年次)な三ヶ国大臣会議へに発展させた。
- 優先分野：
  a)3ヶ国間で意識と「環境コミュニティー」意識を向上させる
  b)生物の多様性、気候変動といった地球規模の環境問題
  c)大気汚染、海洋環境；
  d)環境技術、産業、研究

豆満江地域開発プログラム(TRADP)

- 基本的には、UNDPが促進する、中国、南北朝鮮、モンゴル、ロシアの流域5ヶ国間の豆満江流域経済開発プログラム。
- 戦略的行動プログラム(SAP)並びに豆満江プログラム環境行動計画を2000年に2年間にわたってGEFから5百万ドルの資金提供を受けて展開し、国際的な水質汚染と生物の多様性喪失に対処する。

B．地方自治体協力ネットワーク

北東アジア地域政府連合

- 地域の参加5ヶ国の34の地方自治体が、調整組織と持ち回り事務局を主催自治体が提供する形で、1996年に設立。
- 環境委員会を1998年に設立。

C．NGOネットワーク及びフォーラム

北アジア北太平洋環境パートナーシップ(NAPEP、旧称NEANPEF)

東アジア大気行動ネットワーク(AANEA)

(特に渡り鳥や湿地といった単一問題に関して)その他多くのNGOネットワークが活動中

II．東アジア／アジア・太平洋地域に対する多国間協力

A．政府間

東アジア酸性雨モニタリング・ネットワーク(EANET)

● 1993年にEAJで準備が始まり、1998年に試験段階を開始し、2000年末から本格的に稼動予定。これまで、資金の大半と事務局業務は日本が提供しているが、何らかの形での費用分担を模索中。

アジア・太平洋環境会議(ECO ASIA)

● 1991年にEAJが開始したアジア・太平洋の環境大臣間の情報交換および政策対話のための非公式なフォーラムで、EAJ が資金、情報を提供して毎年開催される会議。

● その権限の下で、いくつかのプロジェクトを実施中：

例：ECO ASIA 長期プロジェクト(LTPP)

ECO ASIA 情報ネットワーク(ECO ASIA Net)

気候変動に関するアジア・太平洋地域セミナー

● 1991年にEAJが開始した、気候変動に関する情報、見解を交換する地域フォーラムで、地域の様々な場所で毎年開催される。今では、UNFCCC事務局やGEFを含めた数多くの関連する国際組織が参加し、UNFCCC／京都議定書プロセス内で組織化されている。しかし、引き続き多くの資金提供をEAJから受けている。

アジア・太平洋経済協力(APEC)

● 1989年に主に経済協力のための政策フォーラムとして設立されたが、環境問題対応への重要性が増大し、議題として取り上げられるようになっている：

例：1994年開催の第1回APEC環境大臣会議で、「APEC環境ビジョン」声明を発表。

3環境作業プログラム：

1）環境と発展の統合；

2）持続可能な都市、クリーン技術、海洋環境；及び

3）食料、エネルギー、環境、経済成長、人口に長期的重点を置く

アジア・太平洋地球変動研究ネットワーク(APN)

● 1995年に設立された、地球の気候、海洋、陸上のシステムにおける長期的変動の研究促進を目的とする政府間ネットワークで、本部は神戸。

B．政府間、NGO支援を伴う

アジア・太平洋地域渡り鳥保全戦略

● 1994年、第7回ラムサール条約CCPで組織化され、以下の設立に至る：

例：北東アジア・ツル生息地ネットワーク・センター(1997)

東アジア・オーストラレイジア ガン・カモ類ネットワーク・センター(1997)

C．NGOイニシャティブ

アジア・太平洋NGO環境会議(APNEC)

● 1991年にタイのバンコクで最初の会議を開き、以後、地域の国々のNGOや学

者が参加して毎年あるいは一年おきに開催されている。日本環境協議会(JEC)が主に促進、財政的便宜を図っており、1998年(日本語)と1999年(英語)に初めてのアジアNGO環境白書を発行。

その他、以下の様な多くのUNCED以前のものがある：
農地改革及び地方開発のためのアジアNGO連合(ANGOC)
アジア・太平洋住民環境ネットワーク(APPEN)

北東アジアにおける環境協力の主な特徴

- 他の地域に比べ、多くの地域環境プログラム、フォーラム、二国間合意が比較的最近(UNCED以後)見られるようになった
- こうしたものの中には、活動範囲、あるいは取り扱う問題が総合的なもの(NEAC、NEASPEC、TEMM、NAPEP、ECO ASIA等)、もしくは少なくともそのように意図されているものがあり、一方で単一の問題に焦点を合わせたものもある(EANET、ツル・ネットワーク)
- 多国間イニシャティブには、北東アジア地域を対象としたものがある。一方、東アジア全体、あるいはもっと広範にアジアや太平洋を対象としたものもある。
- イニシャティブは、様々なチャンネルを通して確立されている。その間にほとんど調整がなされないために、かなりの重複やギャップが見られる。
- 明確な長期目標がないものもある。
- しっかりした組織構造、(多額の資金を日本から提供される以外)確実な資金源を持たないものが多い。
- 明確な優先分野には、大気汚染(酸性雨)、内陸および沿岸の水質汚濁、生物多様性の喪失、森林伐採がある。
- 主催国/組織の国際的関係の影響を受け、関係国による参加の状況は各々のイニシャティブによって異なる。
- そうしたイニシャティブを容易にする上で、UN/ESCAP、UNEP、UNDP、ADB等の国際組織の支援および関わりが欠かせない。

将来に対する展望

- 特に本地域の複雑な地理的側面、及び、二国間での財政/技術に関して、日本が卓越した唯一最大の援助提供者であるという側面に困難な問題が残る。
- しかし、希望的兆しも見られる。韓国の経済は、「IMF ショック」から急速に回復し、最近の南北の緊張緩和(北朝鮮を取り巻く地域における新たな外交上の動き)とともに、韓国は多国間の環境協力促進において積極的にリーダーシップを発揮している。
- “百花争鳴でいくべきか？”　特に、北東アジア環境協力の初期形成期においては絶対に「Yes」である。
- しかし、現在、すべてのイニシャティブ間で組織立った関係を構築する必要があるのは明らかであり、環境協力のための構造的役割を明確にすることで、NEASPEC、NEAC、TEMM、NAPEPを含む様々なプログラムやフォーラム間での協力を強める相乗作用が生み出されるであろう。

概念上、これを有効に機能させるには2つの選択肢がある：

選択肢A：階層的モデル

- NEASPECは、自らがRAP2001-2005の枠組み内で、また枠組みを超えて、公式の政府間プログラムとして北東アジアにおける環境協力の総合的枠組みを提供する。その他既存の一切のプログラム、プロジェクト、フォーラムは、NEASPECの構成要素(あるいは部分的実行媒体)となる。
- NEASPECは、その目的、目標、戦略を明確に設定し、優先分野およびプロジェクトを明確にし、民間企業、非政府組織、科学／研究界との協力とパートナーシップを結び、強固な財政基盤の上に構築された組織構造によって支えられて、真の総合行動プログラムとして作用するよう立案される。

選択肢B：水平的／多層的リンク・モデル

- 例えば、プロジェクトの共同立案並びに実施、会議やワークショップの合同あるいは連続した開催、また相互をインターネットで結ぶなど、他のプログラムやフォーラムとの結びつきによりNEASPECを車輪の中心とする。

注：2つのモデルは、相互に排他的なものではなく、実際、バルト海地域の「モジュール式多国間共同政策」で例証されているように(高橋若菜による添付文書参照)、両要素を活用する必要がある。

二者択一的には、選択肢Bはより現状に近いため短期的に採用可能で、長期的には選択肢Aが採用可能である。

NEACの役割とは？

- NEACは、当初参加国の環境省庁間で情報交換や政策対話を行うフォーラムとして出発したが、年数を経るに従って、各国政府や地方自治体の環境当局のみならず、学界やNGOの専門家も交えたオープンで柔軟な対話や論議のための場へと発展している。
- NEACで取り上げる話題の範囲は、非常に広範かつ総合的なもので、現在起こりつつある問題を取り上げたり、他の政策領域、分野、規範に関係する問題を取り上げることも多い。

いずれの選択肢においても、NEACは、NEASPECのための議題や優先事項の設定に関する専門的見解を提供し、様々なプログラム、フォーラム、その他の利害関係者間のコミュニケーション・チャンネルとして、さらにプログラムやプロジェクト実施の触媒として働くことによって、重要な役割を演じることが出来る。

結論

個人的な観測及び提案

(1) 地域における二国間環境プログラム及びプロジェクトの広く行き渡った資金提供者並びに促進者としての日本(およびEAJ)の役割に重きを置かない。
(2) 同時に、日本の一層の支援を、地域、多国間プログラム及びメカニズムに対して向けるべきである。
(3) 北東アジアにおける環境協力に対して地域的／多国間的手法を取るに当たっ

て、韓国のリーダーシップ及び様々なイニシャティブ(TEMMのような)によってNEACは非常に刺激を受けており、またNEAC側からも強力に支援している。

(4) NEACは、環境当局(各国政府並びに地方自治体)、民間企業、市民社会組織(CSO)、研究／学術界間の協力とパートナーシップ促進のため、真にオープン、透明で、総合的なフォーラム／プロセスとなるべきである。

(5) しかし、**絶対**にプロジェクト・ベースあるいはプロジェクト実施機構となるべきではない。

《セッション4》

北東アジア環境協力のレビューと将来
：制度的観点から

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略語

AANEA	東アジア大気行動ネットワーク
ADB	アジア開発銀行
ALGAS	アジア最小コスト温暖化ガス削減戦略
AMM	ASEAN (外務)閣僚会議
AMME	ASEAN 環境閣僚会議
APEC	アジア太平洋経済協力会議
APN	アジア太平洋地球変動研究ネットワーク
ASEAN	東南アジア諸国連合
ASOEN	ASEAN 環境高級事務レベル会合
CBSS	環バルト海諸国評議会
CEC	欧州委員会
CLRTAP	長距離越境大気汚染条約
CO	一酸化炭素
CO_2	二酸化炭素
COMECOM	経済相互援助会議
EANET	東アジア酸性雨モニタリングネットワーク
EAS	東アジア地域海計画
ECO-ASIA	アジア太平洋環境会議(エコアジア)
EMEP	欧州監視評価計画
EC	欧州共同体
EU	欧州連合
GEF	地球環境基金
HELCOM	バルト海洋環境保護委員会
JICA	日本国際協力事業団
LTPP	エコ・アジア長期展望プロジェクト
KOICA	韓国国際協力団
MRC	メコン河委員会
NAPEP	北アジア太平洋環境パートナーシップ
NEAC	環日本海環境協力会議
NEANPEF	北東アジア北太平洋環境フォーラム(後に NAPEP と改名)
NEASPEC	北東アジア準地域環境協力プログラム
NGOs	非政府組織
NO_x	窒素酸化物
NOWPAP	北西太平洋地域海行動計画
ODA	政府開発援助
OECD	経済協力開発機構
SACEP	南アジア環境協力プログラム
SAP	戦略行動プログラム(図們江／豆満江地域開発計画)
SO_2	二酸化硫黄
SOM	(NEASPEC の)高級事務レベル会合
SPREP	南太平洋地域環境計画
TEMM	(日中韓)三カ国大臣会合
TRADP	図們江／豆満江地域開発計画
UNCSD	国連国連持続可能な開発委員会
UNCED	環境と開発のための国連会議(1992 年に開催されたリオサミットをさす)
UN/ECE	国連欧州経済委員会
UN/ESCAP	国連アジア太平洋経済社会委員会
UNDP	国連開発計画
UNEP/ROAP	国連環境計画 アジア太平洋地域オフィス

1. はじめに

北東アジアとは、ここでは、中国、韓国、日本、北朝鮮、モンゴル、ロシア極東部、台湾を含める地域を指すこととする。この小地域は、北極圏から亜熱帯地域まで、その気候と植生は多岐にわたる。人口密度は高く、天然資源の消費も多く、不適切な環境管理下での急激な経済成長・工業化によって、北東アジアは世界で最も汚染された小地域の一つとなった。今日北東アジアは、大気汚染(酸性雨問題を含む)、海洋・淡水汚染、土壌汚染、生物多様性喪失、砂漠化といった多くの環境問題に直面している。

この地域は、経済・政治体制が多様であることから、1980 年代後半までは、政治的・経済的・社会的な求心力が薄かった。それゆえ、一定の二国間援助を除いては、環境協力は殆ど行われていなかった。しかし冷戦が終結し中国が開放・改革路線に向かうと、この小地域内の経済交流は徐々に活発化し、二国間での環境援助は質量共に増大した。またリオサミットを契機に、NEAC(環日本海環境協力会議)、NEASPEC(北東アジア順地域環境協力プログラム)や、TEMM(日中韓三カ国大臣会合)、NOWPAP(北西太平洋地域海行動計画)など、様々なチャンネルを通じた多国間の環境協力もはじまった。

しかしながら、これまでのところ、北東アジアにおける環境協力は、制度的な面において、十分に進展してきたとは言い難い。まず、これら幾つかの多国間取組間の連携や役割分担は不十分であるし、また長期的な目標を欠いているものも有る。さらに、多国間取組の多くには、確固とした制度・資金的メカニズムが備わっていない。

このように考えていくと、現段階で北東アジアの環境協力枠組の進展をレビューし、今後の展開について検討することは、意義が有ると思われる。

本稿は、北東アジア環境協力の過去と将来に関する一考察である。本稿では、北東アジアや東アジア、あるいはより広域なアジア太平洋地域全体における環境協力プログラム・フォーラム・会議などの取組をただ単に記述するだけでなく、そういった環境協力に関する主体・プロセス・制度的枠組について注意を払う：すなわち、環境協力がどういった主体によって言及し促進されてきたか、各主体同士はどのように相互作用しているか、環境問題に対する北東アジアの小地域協力メカニズムはどのようであるか、北東アジアの経済・社会事情がこの小地域の環境協力メカニズムにどのような影響を与えてきたのかについて検証する。

これらの検証を通じて、本稿は、北東アジア環境協力メカニズムの弱みや問題点を明らかにし、将来の展望についても考察を行う。さらに最終章では、若干の将来への提案も試みる。

2. 北東アジア環境協力の概観

アジア太平洋地域は、地理的にも経済・政治体制も多様である。そのため、国連機関は、広域のアジア太平洋地域全体よりは、むしろ小地域レベルでの環境協力に重点を置いてきた。そのような例として、南アジア環境協力プログラム(SACEP)、ASEAN 下で発達した数々の環境協力計画やプログラム、メコン河委員会(MRC)や南太平洋地域環境計画(SPREP)等が挙げられる。

しかしながら、北東アジアは、冷戦期には東西陣営に分割されており、また国毎に経済・政治体制や発展段階も異なることから、元来小地域としての求心力が弱かった。そのため、小地域レベルでの環境協力も進展してこなかった。しかし、冷戦終焉を契機に、域内各国は多国間環境協力の必要性を認識するようになり、90 年代に入って幾つかの多国間プログラムやフォーラムが誕生した。本章では北東アジアで展開されてきた多国間、および二国間の環境協力の現状を概観する。

2.1. 北東アジア小地域内の環境協力

環日本海環境協力会議(NEAC)

北東アジアにおける多国間環境協力の兆しは、1988 年に開催された日韓環境シンポジウムにさかのぼる。この会議は、当初は日韓の環境省庁によって主催されたものであったが、UNEP が協力し、中国、モンゴル、ソ連(後にロシア)がオブザーバーとして参加するようになり、北東アジア 5 カ国が情報を交換し域内協力を模索するフォーラムへと発展することになった。

その直接的なきっかけを与えたのは、1992 年に開催されたリオサミットである。リオサミットは地域環境協力の必要性を喚起し、これを受けて日本の環境庁が同年、環日本海環境協力会議(NEAC)を開催した。

以来、NEAC は年 1 回開催され、北東アジア 5 カ国(日本、中国、韓国、モンゴル、ロシア)の環境関係省庁、および地方自治体の政策担当者、環境専門家、国連アジア太平洋経済社会委員会(UN/ESCAP)や国連環境計画(UNEP)等の国際機関などが、環境政策や協力などについて率直に意見・情報を交換し、政策対話を行う機会を提供している。1992 年に初めて新潟で NEAC が開催されるまでは、北東アジアには環境問題について話しあう多国間対話の場はなかったことを考えると、NEAC は北東アジアの多国間対話の先駆けとして評価することができよう。

北東アジア小地域環境協力プログラム(NEASPEC)

NEAC が環境関係省庁の担当官を中心に、地方自治体、専門家が集う自由率直な対話フォーラムとしての機能を果たしていたとするならば、北東アジア小地域環境協力プログラム(NEASPEC)は、外交ルートを通じた、北東アジア初の包括的な公式な環境協力プログラムと捉えることができる(Oversea Environmental Cooperation Center,1994)。

NEASPEC は 1993 年、韓国の提唱を受け、国連アジア太平洋経済社会委員会(UN/ESCAP)[1]が、域内 6 カ国[2]の外務省高級事務官が参加する高級事務レベル官会合の場で策定されたプログラムである。以来、SOM が、約 1 年に 1 度開催され、NEASPEC の重要な事柄について決定している。

NEASPEC では、①エネルギー・大気汚染関係、②エコシステム管理、③Capacity Building を優先分野として特定され、1996 年にモンゴルで開催された第 3 回 SOM では「NEASPEC の枠組」が採択された。それ以来、①分野では、ADB の資金供与も受けて具体的な協力プロジェクトの実施も始まった。

しかしこれらの資金はアドホックなものであり、恒常的な資金メカニズムや組織体制を整えることが当面の重要課題になっていた。そこで、2000 年 3 月に開催された SOM では、Core Fund を設立することが合意され、韓国が 10 万ドルの拠出を決めた。なお、組織面に関しては、UN/ESCAP はこれまで NEASPEC の暫定事務局を務めてきた。暫定事務局の任期が終わる 2002 年以降、UN/ESCAP は域内国が事務局の任を引き受けることを期待しているが、域内各国は UN/ESCAP が事務局の任を継続することを望んでいる。

NEASPEC は、北東アジア内で唯一プロジェクト実施を伴う包括的な政府間プログラムとして、今後、この小地域の多国間環境協力の中心的な役割を果たすことが期待されている。

北西太平洋地域海行動計画(NOWPAP)

北東アジアでは、特定の環境問題に依拠した多国間協力プログラムも進行している。日本海閉鎖水域では[3]、1994 年に北西太平洋地域海行動計画(NOWPAP)が設立されている。NOWPAP は NEASPEC や NEAC のように域内各国の自発的発意のもとに始まったのではなく、UNEP が推進してきた地域海行動プログラムの一つとして設立されたプログラムである。UNEP は、地中海地域行動計画の発展を皮切りに、南太平洋やカリブ海・黒海等、世界の 14 海域で地域海プログラムを推進している。

NOWPAP には日本・韓国・中国・ロシアの政府機関が参加している。

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[1] 現在 UN/ESCAP は NEASPEC の暫定事務局である。

[2] 6 カ国とは、日本、韓国、中国、北朝鮮、モンゴル、ロシアをさす。但し、NEASPEC の高級事務レベル会合(SOM)が日本、韓国で開催されたときは、北朝鮮は参加していない。

[3] 日本ではこの海域を「日本海」というが、韓国では「東海」という。会議の場では、この海域の名称をめぐって議論があり、結局経緯度を特定し「北西太平洋」の名称を用いることになった。

日中韓3カ国環境大臣会合(TEMM)

北東アジアではASEAN等とは異なり、環境大臣レベルの恒常的な会合を持たなかった。そこで、韓国の提唱で1999年より年1回、日中韓3カ国環境大臣会合(TEMM)が開催されるようになった。その背景として、この三カ国は、北東アジアの環境問題は今後ますます深刻なものになっていくことを受け止め、これらに対応していく為には三カ国がよりいっそう緊密に協力を行うことが不可欠であるとする共通認識を持ったことが指摘できよう。

TEMMは、a) 環境共同体意識の向上、b)生物多様性や地球温暖化などの地球規模の環境問題への協力強化、c) 大気汚染の防止と海洋環境の保全、d)環境技術、環境産業および環境研究における協力の促進 を優先的に取組む分野として指定した。2000年の第2回TEMMにおいては、今後淡水や海洋汚染・環境産業分野を中心にプロジェクトを実施していくことが決定された。

TEMMは1999年にソウルで開催され、第2回は2000年に北京で開催された。今後TEMMは年1回のペースで開催されることになっており、次回は2001年に日本で開催される予定である。

北東アジア北東太平洋環境フォーラム(NEANPEF、NAPEP)

NGO・専門家レベルでは北東アジア北東太平洋環境フォーラム(NEANPEF、改名後はNAPEP)が1992年に形成され、北東アジア6カ国及びアメリカのNGOや専門家、政府政策担当者、研究所、大学、企業等が参加して、主に生態系保全分野での情報交換等を行ってきている。

豆満江(図們江)経済開発地域(TRADP)

中国・韓国・北朝鮮・モンゴル・ロシアの5カ国間では、UNDPの支援を得て豆満江(図們江)経済開発地域(TRADP)の開発・貿易に関する小地域協力が進展しているが、これに伴って環境と開発の問題も議論され、1995年には「環境問題に関する覚書」が締結された。TRADPの主要な環境課題は、淡水・海洋汚染と生物多様性の喪失等であり、現在GEFの資金を受けて、これらの問題に対する戦略行動計画(SAP)の策定が進められている。

北東アジア地域ツル類重要生息地ネットワークセンター

生物多様性保全分野では、1996年には国際湿地保全連合のアジア太平洋支部が策定した「アジア・太平洋地域渡り性水鳥保全戦略」、及び同年開催されたラムサール条約第6回締約国会議における勧告(ブリズベン・イニシアチブ)に基づいて、「北東アジア地域ツル類重要生息地ネットワーク」(6カ国18生息地)が設立された。このネットワークは、それぞれの渡り鳥の渡りルートにある各国が、それぞれの国にある重要生息地を選定し、生息地間の情報交換、地域住民の啓発活動等を通じ、効果的な湿地の保全を図っていこうとするものである。このネットワークの実施に当たっては、NGOs、専門家、地方自治体、各国関係省庁に至るまで幅広い主体が参加している。

2.2 東アジア・アジア太平洋地域にまたがる環境協力

東アジア酸性雨モニタリングネットワーク(EANET)

1990年代、酸性雨問題が東アジア地域の政策問題としてクローズアップされてきたことをうけて、1993年日本の環境庁の提唱で、東アジアモニタリングネットワーク(EANET)に関する専門家会合が開始された[4]。10に及ぶ参加国のうち、北東アジアからは、日本に加えて、中国、韓国、モンゴル、ロシアも参加している。この専門家会合は1993年から1997年まで4回開催され、酸性雨の現状やその影響、さらには地域協力の方向性に関する議論を行い、「東アジア地域酸性雨モニタリングネットワークの設計」及びそのスケジュールが取りまとめ、酸性雨モニタリングの

[4] 専門家会合には、日中韓、マレーシア、モンゴル、ロシア、フィリピン、タイの9カ国および国際機関やアメリカからも参加があった。

ための技術マニュアルが採択した。

専門家会合の提言を受けて、1998年3月には初のEANET政府間会合が開催され、暫定的な「東アジア酸性雨モニタリングネットワークの設計」が取りまとめられ、同年4月からEANET試行稼動が始まった。さらに、2000年10月に開催された第2回政府間会合では、2001年1月より、約2年9ヶ月の試行稼動を終えて、本格稼動期に入ることが決定されている。

アジア太平洋経済協力会議 (APEC)

APECは、1989年に、アジア太平洋の18の「経済体」によって設立された緩やかな経済協力体であるが、このうち北東アジアからは、日本、中国、韓国、ロシアおよび台湾も加盟している。

APECでは環境と経済の統合が謳われており、1994年には、第1回環境閣僚会議が開催され、「APEC環境ビジョン宣言」が採択された。これをうけて、APECでは3つの環境ワークプログラムが策定されている[5](Dua et., 1997)。

アジア太平洋地球変動研究ネットワーク(APN)

APNの発案は、1992年に開催された日米首脳会談の場で合意された「日米グローバルパートナーシップ行動計画」に、米国の提案によって地球変動研究(Global Change Research)が盛り込まれたことにさかのぼる。この提案は、地球変動研究の為の地域ネットワーク／機関を、地球を3分割して設立することであった。このうちアジア太平洋地域については、日本が中心となって担当することが定められた(谷津、2000年)。

こうしてAPNは1995年に設立され、1996年に第1回政府間会合が開催された。それ以降APNは、地球環境に関する政策担当者と科学者の連携を強め、国際共同研究を推進する政府間機関として、専門家同士の交流を促進する事業を行うとともに、数々の国際共同研究プログラムに資金的支援を行ってきている。1999年には、神戸にAPNセンターが開設された。

現在北東アジアからは、日本をはじめ、中国、韓国、モンゴル、ロシアが、APNに参加している。

アジア太平洋環境会議 (エコアジア)

エコアジアは、リオサミットを契機に、日本の主導で1991年に発足された。エコアジアは、非公式な大臣会合として自由で率直な政策対話のフォーラムを提供することを当初の目的としていたが、その後、アジア太平洋の持続的発展に資するような長期的な環境政策を検討することを目的に、長期展望プロジェクトを開始している(薄木、2000)。

2.3. 二国間協力

北東アジアは、多国間に比べ二国間レベルで環境協力が大きく進展している点で、特徴的である。とりわけ域内唯一の超先進国であり世界でも有数の援助供与国である日本政府は、環境協力を経済協力の重点事項と位置づけ、環境面における開発援助として、二国間環境協力を推進してきた[6]。

このうち、最も盛んに行われているのは日中間協力であろう。79年の大平総理大臣(当時)訪中以来、日本政府は積極的に対中経済協力を推進してきているが、環境案件は当初上下水道整備のみに限られていた。しかしながら、1990年代に入ってからは、環境協力案件は質量ともに増加し、円借款を中心に無償協力・技術協力等の援助が、各関係省庁・援助機関によって実施されてきた[7]。但し、環境案件は経済開発に直接的に貢献しないため要請が出難い。また居住環境案件に比

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[5] 3つのプログラムは以下のとおりである: 1) integration of environmental and economic considerations in APEC's working groups; 2) attention to sustainable cities, clean technologies, and the marine environment; and 3) long-term focus on food, energy, environment, economic growth, and population.

[6] 平成4年に閣議決定された政府開発援助大綱は、「環境の保全」を基本理念として掲げ、援助原則の一つとして「開発と環境の両立」を取上げている。

[7] 東アジア地域への環境面における経済協力に関しては、次の文献によってよく分析されている: 藤倉良「アジア地域の環境保全に向けた我が国の経済協力の現状と課題」in (財)国際東アジア研究センター『東アジアへの視点』1998年3月、122-133頁。

(4)

べて、産業公害案件は相対的に少ないという問題点が有る。そのため通商産業省では、1992年より、産業公害分野及び省エネルギー分野に特化した「グリーン・エイド・プラン」事業も展開しており、中国は、インドネシアやフィリピン等と並んで重点国の一つとして位置づけられている。

一方で、二国間環境協力の担い手となるのは中央省庁ばかりではなく、北九州市や広島市を中心に地方公共団体間によるソフト面を中心とした協力も増大する傾向にある。また、公益法人による事業、助成・基金等による支援、学術的協力、民間企業の環境投資など、民間レベルでの環境協力も徐々に進展している[8]。

これらの活動の支える枠組も、整備されつつある。まず1994年3月には日中環境保護協力協定が締結された。この協定に基づいて日中合同委員会(各関係省庁が出席)が毎年開催され、協力の現状をレビューして新プロジェクトを検討するなど、全体を調整する役割を担っている。また96年5月、無償資金協力により設置された日中友好環境保全センター(北京)は、環境協力の窓口として、中心的な役割を果たしている。一方ODAだけでなく、自治体・民間レベルの協力を含めた二国間環境協力の全般のあり方を議論するものとして、政府機関、地方自治体・民間団体が参加する「日中環境協力総合フォーラム」も1996年より年1回のペースで開催され、関係者が一同に集い情報交換を行なう場として、一定の機能を果たしている[9]。更に、首脳レベルの対話においても、環境協力に対するイニシアティヴが表明されるようになってきた。例えば、97年9月日中首脳会談では「21世紀に向けた日中環境協力」が合意され、「環境開発モデル都市構想」[10]「環境情報ネットワーク」[11]を日中環境協力の2本柱とすることが決定された。また1998年、江沢民主席が訪日した際には、「21世紀に向けた環境協力に関する共同発表」が出され、東アジア酸性雨モニタリングネットワーク(EANET)への積極的な参加や、地球温暖化防止に向けた協力の実施も、主要なテーマとして掲げられた。

このように、日中間においては各主体による様々な環境協力が進行中である。但し、これらの連携は未だ必ずしも充分であるとは言えない。そこで1998年に環境庁が「日中環境協力構想」を打ち出すなど、各種の連携を図るための様々な努力が、現在も進行中である。また国際的にも、環境と開発の分野における中国と国際社会の協力促進を目的として、国際合同委員会(チャイナカウンシル)が92年に設立されている。そこで、日本もカウンシルへ委員を派遣したり作業部会へ貢献するなど、民間ベースを含めた積極的な参加を行っている。

一方日韓環境協力は、日中のそれと比較すると質量ともに小規模なものにとどまっている。この背景として、1983年の7年間における円借款以降、「韓国経済が既に援助からの卒業段階に達している」ため、対韓円借款供与・無性資金協力が行われなくなったことが挙げられる[12]。それ以降、環境保全を中心とするプロジェクト方式技術協力は行われるのみになっている。また自治体レベルにおいては環境研修や研究協力、環境技術交流事業等[13]が行われているものの、それほど活発ではない。

日韓協力を支える枠組みとしては、1993年6月に日韓環境保護協力協定が締結されている。又この協定に基づいて、日韓環境保護合同委員会が、毎年両国で開催され、協力プロジェクトの調整・実施を図っている[14]。首脳レベルでは、1998年10月に金大中韓国大統領が日本を訪問した際、「日韓共同宣言—21世紀に向けた新たな日韓パートナーシップ」が採択され、その中で地球環境問題に関し両国政府が緊密に協力していくことが謳われた。また宣言の付属書として行動計画も採択され、環境政策の対話続行・北東アジア地域における環境協力強化・環境ホルモンの共

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[8] これら日中環境協力事例に関する情報は、次の文献によって、よく網羅・整理されている:(社)海外環境協力センター『平成10年度環境庁委託 日中環境協力事例情報資料集』1999年3月。

[9] 環境庁資料参照。

[10] 日中間で環境対策の為のモデル都市を設定し、中国側における環境規制の強化等の努力と、日本側の支援を集中的に投入し、大気汚染、酸性雨など環境対策の成功例を作り、将来の普及への呼び水としようとするもの。現在、大連・重慶・貴陽の三都市で実施中。

[11] 全国100ヵ所に環境情報処理の為のコンピューターを設置し日中友好環境保全センター(北京)を中心とした全国的な環境情報ネットワークを完成しようというもの。

[12] 日本外務省『我が国の政府開発援助－1998年』、52頁。

[13] 環境庁資料参照。

[14] これまでに21件のプロジェクトが実施されており、うち環境庁案件は6件である。

同研究開始・環境産業分野における相互交流の可能性の検討が特記されている。

このように日韓環境協力は「援助」から「対等な協力関係」構築へと姿を変えながら、徐々に発展している。しかしこのような試みはまだ始まったばかりで、今後進展する余地が大いに有るといえよう。

一方、日蒙環境協力は、日本主導のもとに進展しつつある。モンゴルは 1991 年旧ソ連を中心とする COMECOM の援助停止にともなって経済危機に陥った為、同年ロンドンサミットでモンゴルへの緊急援助の必要性が喚起された。これをきっかけに日本は対蒙経済協力を大幅に増額し、モンゴルにとって最大のドナー国となった。このことから日蒙関係は冷戦期に比べ好転しており、環境面における二国間協力も概ね好調に進展する傾向に有る(海外環境協力センター、1997年)。具体的には、研修生の受け入れや専門家・調査団の派遣、森林管理や地下水開発、発電所改修などの分野における有償・無償資金協力プロジェクトが実施されている。両国はこのような環境協力を今後も推進させることで合意しており、1998 年 5 月バガバンディ大統領が訪日した際、両国の環境協力の推進が確認された。

他方、日露協力に関しては、1991 年 4 月に日ソ環境保護協力協定が締結されており、これに基づいて日露環境保護合同委員会が開催されている。この会議の場で「日本海の海洋環境の為の共同調査」が実施されるなど、研究を中心とした環境協力が進展している。

なお、日本と北朝鮮間には正常な国交が樹立されていないことも有り、環境協力は殆ど進展していない様子である。

北東アジアにおいては日本以外の国家間においても二国間環境協力は進展している。このうちもっとも協力関係が進んでいるのは韓中協力であろう。前述のように「韓国経済が既に援助からの卒業段階に達した」ことは、すなわち、韓国が被援助国から援助供与国へとシフトしていることを示唆するが、実際韓国は 87 年に対外経済協力基金(EDCF)、91 年に韓国国際協力団(KOICA)を設立し、1996 年には OECD に加盟するなど、着実に援助供与国としての体制を整備しており、これに伴って、環境面における対中 ODA も増大している。

しかしながら、韓中環境協力は、必ずしも ODA を軸とはしていないようである。1993 年 10 月に韓中環境協力協定が締結されているが、ここにおいて「平等と相互利益」の精神が歌われており、データ・情報交換や人的夷交流・研究協力を中心とした協力が推進されている。この協定に基づいて、韓中環境協力合同委員会が毎年相互に開催されているが、1999 年 9 月の時点では 12 の二国間環境協力プロジェクトが承認され、進行中である。そのうち主要なものの一つとして黄海生態系プロジェクト(Yellow Sea Large Marine Ecosystem Project： YSLAE)がある。このプロジェクトは越境原因分析(Transboundary Diagnostic Analysis： TDA)・戦略行動プログラムの実施から環境改善までを含む包括的なものであるが、このプロジェクトには UNDP も関与しており、プロジェクトにかかる経費は GEF から拠出されることになっている[15]。

このように、韓中環境協力は平等性と相互利益を基礎として、徐々に進展する傾向に有るが、近年では首脳レベルにおいても環境協力が言及されるようになっている。1999 年に中国で行われた韓中首脳会談では、韓中関係を、これまでの「善隣友好協力関係」から二十一世紀を目指した包括的な「パートナーシップ関係」に引き上げることが合意され、政治、安保、経済、文化、環境、人的交流などの各分野で協力を拡大することが「共同声明」によって明記されている。

その他、中蒙、韓露間においても、それぞれ環境協力協定が締結されている。

3. 北東アジアの環境協力メカニズム

3.1.主要な特徴

前章では、北東アジアの多国間・二国間環境協力の現状を概観した。その結果、北東アジア地

[15] 韓国通商外交部ホームページ参照：http://www.mofat.go.kr/main/etop.html

域環境協力のメカニズムの主要な特徴として、以下の点を挙げることができよう：

- 北東アジアでは、1990年代前半より、幾つかの環境協力プログラムや対話フォーラム、二国間協定等が誕生した。このうち TEMM、NEASPEC、NEAC、NAPEP、TRADP、エコアジアなど複数の問題を包括的に取り扱う枠組も有れば、NOWPAP や EANET、ツル類重要生息地ネットワークのように単一の問題領域を扱うものも有る。
- 北東アジアにおける地域的取組は、北東アジアを対象とするものと、東アジア・アジア太平洋を対象とするものが混在している。
- 各地域的取組への参加国は、主催国(機関)如何によって異なっている[16]。
- 地域協力は、環境大臣会合、高級事務官、環境省庁、NGO、専門家レベルなど異なる複数のルートを通じて展開されているが、(生物多様性の例を除き)これらの取組間、及び各主体間の連携は殆どない。その為同様の問題を扱う地域的取組間の連携・役割分担が図られていない場合がある。
- 長期的目標が明らかにされていない地域協力取組が有る。
- 地域的取組の多くは、その制度・資金的メカニズムを決定する時期にきているが、各国の見解が異なる為、これらを決定することは非常に難しくなっている。
- 環境問題別に見ると、大気汚染(酸性雨)、淡水・海洋汚染、生物多様性喪失、砂漠化等が地域で緊急で取組むべき主要課題となっている。このうち中国内陸部やロシア極東部の森林伐採等による砂漠化対策への地域協力の進展は殆どない(UNEP, 2000)[17]。
- 以上の問題点の背景として、東アジアでは ASEAN や EU のような求心力の有る地域機構が不在であることが指摘される。UN/ESCAP, UNEP, UNDP からの実質的な支援や、ADB、WB 等からの資金援助は地域協力の推進に大きな貢献をしているが、そのキャパシティには一定の限界がある。
- 一方地域環境協力枠組への直接的な資金供与ではないが[18]、日本の ODA 等を通じた資金援助は域内各国の環境対策推進に大きな役割を果たしている。
- 越境汚染問題は、現在というよりは将来の問題である為に、国内の環境問題に比べると緊急性や優先順位が低い傾向が有る。また、この分野では、各国の統一した科学的知見も殆ど存在しなかった。それゆえ、域内各国が越境汚染問題に取組むインセンティブは低かったが、最近この傾向には変化が見られる。

北東アジアの環境協力は、始まってからまだ 10 年も経たない。北東アジアでは、環境問題を議論するフォーラムを常設化し、地域協力で取り扱うべき問題を特定しようとしているところである。いくつかの取組では、その次の段階ー環境モニタリングを通じた科学的データの収集ーに進んでいるが、その進展の度合いは、30 年以上もの歴史を持つ欧州や、20 年以上の歴史を持つ ASEAN とは比較にならない。それゆえ、現段階で、北東アジアの環境協力メカニズムの是非や効率性について判断しようとするのは、時期尚早といえるかもしれない。

にもかかわらず、この小地域における環境協力の進行は、遅々としているという印象が有る。協力取組の幾つかは、制度的・資金的メカニズムを構築することに四苦八苦している。この地域の経済的政治的状況が、環境協力の進展を制約しているようで見受けられる。

そこで、次節では、環境協力を推進する上で重要だと思われる、地域機構、国際機関、各国政府、NGO、市民の４主体に焦点を当てて、北東アジア環境協力メカニズムを分析し、その弱点を

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[16] たとえば、北朝鮮は、国連加盟国であるため NEASPEC のメンバー国になっている(但し、NEASPEC-SOM へは中国・モンゴルでの開催時にオブザーバー参加したのみにとどまっている。また NEASPEC の地域プロジェクトは ADB からの資金拠出を受けているが、北朝鮮は ADB 非参加国であるため、これらの資金を受け取ることができないという制約が有る。)一方、台湾は国際法上の地位が非常に不安定であり、殆どの多国間プログラムに参加できなくなっている。但し、台湾は APEC には加盟しており、また ADB のメンバーでもある。

[17] 但し、砂漠化対策・森林保全に関しては、各国内では熱心に取組まれるようになってきており、二国間協力も、政府だけでなく企業や NGOs が参加する植林事業等は多く行われている。とりわけ中国は 1998 年夏の大洪水が森林破壊にあったことを認識しており、国務院は取組を強めている。

[18] 但し、NEASPEC のプロジェクトは ADB からの資金供与を受けているが、この ADB 資金の殆どは日本基金からのものである。

明らかにしていきたい。

3.2. 環境協力の主体

地域機関の不在

環境協力を推進する上で、地域機関の役割は極めて重要であるといえる。

例えばEC/EUでは、様々な経済活動と関連して、貿易や生産活動に関し共通環境基準を導入するなど、数々の共通環境政策が策定されてきた。

一方、長距離越境大気汚染条約(CLRTAP)に関しては、条約自体は国連欧州経済委員会(UN/ECE)が事務局として、条約推進や調整役を担ってきた。CLRTAPは一定の遵守規定を備えてはいるものの、非遵守国に遵守を強制するようなメカニズムは持っていない。にもかかわらず、CLRTAPはこれまで非常に高い遵守率を誇っている。

その背景としてEC/EUによる資金・技術メカニズムが、公的にも非公式にも、CLRTAPメンバー国の条約遵守を促進してきたことが指摘できよう。またEU自身が持つ数々の大気関連の指令は、法的拘束力をもつものであり、EC/EU加盟国の指令の遵守が、CRLTAPの各議定書の遵守にも繋がったとも考えられている(石井、2000年)。

一方、ASEANはUNEP等の国際機関の支援を得て、3つのASEAN環境プログラム(ASEP：1978年-1992年)、2つの環境戦略行動計画(1994年-)越境汚染行動計画(1995年-)、Regional Haze行動計画(1997年-)など、数々の環境協力計画やプログラムを策定してきた。

これらの計画やプログラムを策定し実施する為の制度的枠組も、ASEANでは徐々に整えられてきた。その中心的な役割を果たしているのが、1989年に専門家会合から高級事務官会合へと格上げされたASOEN(ASEAN環境高級事務レベル官会合)であり、その下には現在3つの作業グループ(自然保護と生物多様性、海洋環境、多国間環境協定)が設置されている。一方、近年深刻化した森林火災問題に対しては、1995年ASOEN Haze Technical Task Force(HTTF)が設置されている。ASEAN事務局は、EC/EUのような巨大な官僚組織を持たないが、事務局機能を提供し、加盟各国や他のドナー国／国際機関間の調整を行い、ASEAN環境政策全般の実施を円滑にするよう努力してきた(Tay, 2000)。一方、ASOENの上にはASEAN環境閣僚会議も恒常的に開催され、またASEAN外務閣僚会議、更にASEAN首脳会議とも連携されている。このような制度的枠組が整えられた結果、ASEANでは、プログラム間の重複が殆どなく、包括的・戦略的な環境協力を推進することが可能になった。

しかしながら、北東アジアには、EUあるいはASEANに値するような地域機構が存在しない。その結果、この小地域では数々の環境協力取組の調整役を担う主体が存在しない状況に陥っている。その帰結として、幾つかの地域的取組の機能や活動がオーバーラップしてしまう危険性が有る。例えば、NEASPECとNEACの役割は、最近では異なった方向を目指してはいるものの、当初は似通ったものとなっていたのである[19]。

こういった問題点を解決する為に、北東アジアでは、これら環境取組の連携を互いに強め、相乗効果が出るような全体的な枠組を考えるべきであることが、一部の専門家や政府担当者の間で指摘されている。

一方で、ASEANやECのような地域機関が不在であるということは、北東アジアの各協力取組が、制度的・資金的取決めについて、一から交渉を始めなければならないという難点をもつことも示唆している。

例えば、北東アジアには、欧州委員会やASEAN事務局のように、各協力取組の事務局、調整役を引き受ける主体が存在しない。そのため、この小地域では、協力取組如何によって事務局も異なっている。例えば、NEASPECの暫定事務局はUN/ESCAPが引き受けているし、EANET

[19] NEASPECは近年、大気汚染対策に関する小規模な技術支援プロジェクトを実施している。一方でNEACはプロジェクトは持たないが、各々の環境問題からインターネットの活用・地方自治体の役割など広範なテーマをとりあげ、政府機関だけでなく地方自治体や専門家NGOsを会議に招待するなど、多様な主体が自由率直に意見交換を行う場を提供することを目的としている。

の暫定事務局は提唱者である日本環境庁が引き受けてきた(但し、2000年10月に、本格稼動時はUNEP に事務局機能が移転することが決定済み)。一方、NEAC は開催国持回り、などとなっている。このうち NEASPEC の暫定事務局である UN/ESCAP は、他の小地域の例に準じて、NEASPEC の事務局も将来的にはいずれかの参加国の国内に設置されることを希望しているが、その見通しはまだたっていない。

一方で、資金的取決めについても、北東アジアには、EC/EU のような環境プログラム実施の為の資金メカニズムもなければ、ASEAN のように外部資金の調達・調整を行う機関もない。そのため、各取組は、個々バラバラに資金メカニズムを模索しなければならず、資金拠出に苦慮しているケースは少なくない。

例えば、NEASPEC は、会議開催等の資金は開催国か(途上国で開催する場合は)UNDP 等からの資金支援でまかなっており、プロジェクト実施には、ADB からの資金を受けてきた。しかしこれらの資金は恒常的ではないため、2000年に開催された SOM 6 では Core Fund が設立されることになった。しかし各国の拠出負担率は定まっておらず、現在のところ加盟国の自発的な任意によるものとなっている。一方、NOWPAP は、加盟4国が同率で(各々25%)運営費を負担することになっているが、すべての国がこの拠出分担率に合意したわけではなく、日本以外の国は全額支払っているわけではない。

資金面において、例外的にうまく回っているのは、EANET である。EANET の試行稼動中は、日本政府が会議費運営費を全て拠出してきたし、また各国が実際にモニタリングを実施するに当たっては、日本の ODA を通じた資金・技術供与が行われてきた[20]。しかし本格稼動に当たっては、日本政府はすべての国が、その国に見合った資金拠出を行うことを期待している。一方で、参加国の殆どは、EANET 本格稼動後も、日本が引き続き自発的に資金を供与することを望んでいる。

国連機関の役割の限界

北東アジアでは地域機関が不在である帰結として、この小地域では、環境協力を推進する上で国連機関が果たすべき役割が大きくなっている。

UN/ESCAP は、アジア太平洋地域全域において小地域環境協力の推進に力を注いでいるが、このうち北東アジアに関しては、NEASPEC の暫定事務局の任も引き受けるとともに、加盟各国を代表して ADB に NEASPEC プロジェクト実施の資金拠出を依頼・調整する役割なども引き受けてきた。他方 UN/ESCAP は、多くの地域取組会合に出席し、参加国／国際機関間のコミュニケーション促進に努めるなど、重要な役割を果たしてきた。

UNEP も、UN/ESCAP とともに、小地域環境協力を推進させる上で重要な主体であるといえよう。UNEP がこれまでに、数々の技術支援プロジェクトを実施してきた。しかし、この分野における UNEP の最大の貢献は、地域海行動計画の策定と実施であろう。UNEP は、他地域の地域海行動計画と並んで、NOWPAP 及び EAS(東アジア地域海行動計画:北東アジアからは、中国・韓国が加盟)の事務局を引き受け、両計画の推進役、加盟各国の調整役として極めて重要な役割を果たしている。更に2000年に入ってからは、EANET の事務局が UNEP に設置されることも、決定された。

他方、UNDP は、貧困の撲滅、途上国の開発など、持続的発展に関する途上地域支援をその主要目的として掲げているが、小地域環境協力の分野においても、途上国/地域への資金的・技術的支援を行っている。北東アジアでは、UNDP は TRADP を主導しているが、TRADP では、GEF の資金を受けて、淡水・海洋汚染と生物多様性喪失に関する戦略行動計画の策定が進行中である。

このようにして、国連機関は様々な立場から、北東アジアにおける地域協力を促進・調整する役割を果たしてきた。しかしながら、国連機関の役割には、一定の限界が有ることは、指摘しておく必要が有ろう。

というのも、UN/ESCAP や UNEP-ROAP は、限られた資金的・人的資源でもってアジア太平

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[20] 日本は1997年に橋本政権が提唱した「21世紀に向けた環境開発支援構想(略称 ISD)」のなかで、EANET 整備構想を「ODA を中心とした国際環境協力」の行動計画の柱の一つに据え、各国の実情を踏まえて、研修や専門家派遣、モニタリング関連機材共同の支援を ODA を通じて継続的に行ってきている。

洋全域をカバーしなければならず、北東アジアの環境協力のみに力を注ぐわけにはいかない事情が有る。

例えば、NEASPEC を立ち上げた UN/ESCAP は、北東アジア以外でも、SACEP、ASEAN 環境協力プログラム、SPREP などの設立に関与してきた。しかし各小地域環境協力プログラムが軌道に乗れば、UN/ESCAP はその運営を域内各国の自発的発展に任せるのが常であり、例えば SACEP の場合も、UN/ESCAP による暫定事務局の後に、SACEP 独自の事務局がスリランカ内に設置されることとなった。UN/ESCAP は NEASPEC についても、SACEP と同様、将来的には独自の事務局が設立されることを望んでいる。

域内各国のスタンス

北東アジア諸国は、環境協力に対し、必ずしも同一の見解やアプローチをとっているわけではない。このことは、この小地域の環境協力進展にとって、一つの大きな制約要因になっているのではないかと考えられる。

まず、中国は産業汚染、淡水・海洋汚染、また西部の砂漠化問題等、緊急な問題を抱えており、地域協力においてもこのような問題が取り扱われるべきであると考えている。一方で、中国は「越境」汚染という表現によって、中国が他国の環境問題を引き起こしているようなイメージが与えられることを良しとしない。

この地域の環境協力を進展させるに当たって、中国がもっとも強調することは、中国をはじめ域内国の多くは、技術も資金も人的資源も持ちあわせない発展途上国であるという点である。それゆえ中国は、多くの環境協力関連会議の場において、環境協力プログラムを策定・実施する上では、域内先進国から域内途上国への技術的・資金的支援が不可欠であることを強調してきた。

域内唯一の先進国である日本は、中国の要請に、主に二国間協力を通じて応え、多くの ODA を通じた環境支援プロジェクトを実施してきた。しかしながら、多国間取組は既存の二国間取組や多国間取組と重複する内容であってはならないとする点で、日本と中国の意見は異なる。日本が推進している多国間協力は、情報交換、モニタリング等の共同調査、あるいは越境汚染に特化した具体的プロジェクトのみに焦点を絞る傾向が有る。なお、地域で取り扱われる問題としては、海洋汚染・酸性雨等が二大問題であったようだが、近年日本は、気候変動問題も、地域にとって重要な政策課題の一つと捉えているように見受けられる。

また日本は、地域環境協力が新たな援助供与チャンネルとならないことを望んでいる。また、地域環境協力は、原則的に域内各国の自発的発意に基づいて生じるものであることから、日本は多国間環境協力枠組に対しては、域内全ての国がその能力に応じて(資金的)負担を追うべきであると考えている。

他方、韓国は、いずれの国よりも北東アジアの多国間環境協力推進に熱心であるように思われる。韓国は、中国が望むような技術支援的な協力と、日本が希望するような環境状態の共同調査等の環境管理プロジェクトの双方が、地域環境協力に盛り込まれるべきだと考えている(Valencia, 1998)。それゆえ韓国は、NEASPEC の優先順位の一つとして大気汚染を挙げ、Training 等のプロジェクトと環境モニタリング・データ収集のプロジェクトの双方を提案してきた。また韓国は、このような環境協力は、国際的な枠組のもとで推進されるべきだと考えており、数々の既存の多国間取組を推進・調整する役として、 UNDP、UNNEP、UN/ESCAP、ADB 等の国際機関の関与が重要であると考えている。

他方、ロシアおよびモンゴルは、域内先進国や国際機関からの、環境保全の為の資金的・技術的支援を必要としている。ロシアにとって優先順位が高いのは生態系管理や、具体的な協力計画の策定と実施である(Valencia, 1998)。一方で、モンゴルは、自然災害(干ばつ)、生物多様性保護、大気汚染等を優先順位の高い問題として捉えている。

北東アジアの環境協力に関する見解やアプローチが異なるのは、何も国家間においてのみではない。すなわち、各国とも、国内レベルにおいても、すべての関連主体が環境協力の在り方に関し、必ずしも同一の見解やアプローチをとっているわけではないことは、ここで指摘されるべきであろう。一国の政府内においても、環境協力政策の策定や実施には、環境省庁だけでなく、

通商、エネルギー、外務、水産、運輸、厚生等、多くの省庁が関与している。省庁間で、必ずしも同一の見解が取られているわけではなく、時には権限や利害をめぐって意見の衝突も見られる。このような国内レベルでの見解の相違や衝突が、多国間環境協力取組の状況を更に複雑化させているといえよう。

市民やNGOの参加

北東アジア環境協力に関しては、市民やNGOsの参加も徐々にはじまっている。NGOs間のネットワークとしては、NAPEP やアジア・太平洋環境会議(APNEC)などが、定期的に会合を開催し、多岐の問題について議論を行っている。また大気分野では、日中韓のほか、ロシア、モンゴル、及び台湾のNGOsのネットワークであるAANEA(東アジア大気行動ネットワーク)が設立され、酸性雨と気候変動双方の問題について取り扱っている。

しかしながら、こういったNGOsが、地域環境協力政策の策定過程に影響を及ぼしたり、あるいは実施過程に参加する例は多くない。そういった意味で、北東アジア地域ツル類重要生息地ネットワークは、専門家、地方自治体、各国関係省庁に至るまで幅広い主体者が参加し、情報交換、地域住民の啓発活動等を通じた効果的な湿地の保全を推進している点で、例外的な存在と言えよう。

3.3. 今後の展望

前節では、地域環境協力を推進する上で重要だと思われる4つの主体に焦点を当てて、北東アジア環境協力メカニズムの分析を試みた。その結果、地域機関の不在、国連機関の役割の限界、各国のスタンスの相違、限られた市民・NGOsの参加といった、北東アジア環境協力メカニズムの限界や弱点が明らかにされた。

にもかかわらず、北東アジアでは環境協力を推進させる必要性は有る。そこで本章は、まず、その必要性について明らかにする。そのうえで、他の地域／小地域の事例を検証し、北東アジアが効率的に環境協力を進めるにはどうすれば良いか、インプリケーションについて考察する。

小地域環境協力の必要性

まず、北東アジアにおける環境協力の必要性としては、以下の点が挙げられよう(Kato & Takahashi, 2000)。

a) 北東アジアでは、越境大気汚染(酸性雨)や海洋汚染、有害廃棄物の越境移動等の広域(越境)環境問題が、将来深刻になると予想されている。しかしながら、これらの問題に関する科学的知見は共有されていない。一方で、砂漠化や生物多様性喪失も、小地域全体にとって深刻な問題となってきている。これらに対処・防止するには、「全世界」あるいは「アジア太平洋全域」では広すぎるが「一国単位」では対処できないことから、「地域・小地域単位」での対応が合理的と考えられる。

b) 北東アジアでは1990年代に入るまでは小地域としての求心力が小さく、経済体制の違いから、地域経済統合への動きは見られなかった。しかし近年、この小地域の経済交流は進展しており、TRADPのような開発プログラムもスタートした。こういった経済交流の進展は、域内共通の環境基準の必要性など、共通の環境ガイドライン等の策定を促すと考えられる。

c) 北東アジアは冷戦期に東西陣営に分割されており、それ以前の世界大戦の記憶も、依然としてこの地域の国際関係に大きな影を落としている。また冷戦後になっても、北東アジア域内で、地域安全保障・平和の為のメカニズムが構築されたわけではない。2000年に入って北東アジアの国際関係は大きな変容を迎えつつあるが、北東アジア内では、今日に至っても、国交が樹立していない国も有れば、領土問題が解決していないケースも複数有る。こういった状況を考えると「環境」という政策分野での協力を推進することによって、それまで疎遠であった国家間関係を密にし相互信頼関係を醸成し、地域安全保障の礎の一つにしようと試み

ることは意義が有る。(Schreurs & Pirages eds., 1998; Matsushita et al., 2000; Yonemoto, 1998).

但し、こういった環境協力が自動的に地域の安定と平和に寄与する訳でないことは、留意すべきであろう。前述したように、北朝鮮は、NEASPEC のメンバー国となっているものの、NEASPEC-SOM へは中国・モンゴルでの開催時にオブザーバー参加しただけである。台湾は地域諸国との正常な外交関係を持っていないため、ほとんどの多国間プログラムに参加できなくなっている。それゆえ、地域の平和と安定に寄与するような環境協力を推進するためには、この小地域の国際関係をよく考慮して、戦略的に行う必要があると言えよう。

他地域／小地域からの教訓

北東アジアが小地域環境協力を進める上で、数々の制度的阻害要因が有ることは、前節で明らかにされた。にもかかわらず、この小地域では、依然として環境協力を推進していく必要性が有ることも指摘された。では今後、北東アジアはどのようにして環境協力を進めていけば良いのだろうか。この問題を考える上で、他地域の事例について学ぶことは、それなりに意味が有る。

ここでは、長距離越境大気汚染をめぐる欧州の地域協力と、バルト海小地域の環境協力の事例を取り上げて検証する。

まず、欧州における長距離越境大気汚染であるが、この事例は、世界でも最も成功を収めた環境協力の事例の一つとして捉えられている。リオサミットで採択された Agenda 21 は、「欧米における酸性雨への取組の経験は継続されるべきであり、世界のほかの地域にも分け与えられるべきである」ことを謳った。

欧州では、1972 年北欧諸国の要請を受けて OECD が国家間モニタリングプログラムが開始された。その後 1977 年にはヨーロッパ経済委員会(UN/ECE)がモニタリングを引き継ぎ、79 年には長距離越境大気汚染条約(CLRTAP)が採択された。この条約自身は何らかの汚染対策を加盟国に強要するものでなかったが、1985 年には、硫黄 30%削減、88 年には窒素酸化物凍結が議定書によって定められた。更に、90 年代に入ると排出・酸性沈着・排出削減の為の必要技術を計算するコンピューターモデルがそのまま条約に取り込まれ、オスロ議定書では、「限界負荷量」に基づいた硫黄排出削減が義務づけられるようになった。

このような欧州の地域的取組に習って、EANET では EMEP 専門家などを招聘し、EANET を構築する上での様々な知見や助言を得てきた。現在の東アジアの状況は、欧州で OECD のモニタリングプログラムが開始されたばかりの 1970 年代半ばの状況に段階に有るのではないかと考えられる。今後東アジアでは、欧州で既に開発されたように、大気汚染物質排出の目録作成や長距離越境モデル構築による越境輸送量の推計といった科学的事実の解明が焦眉になると思われる(Takahashi, 2000)

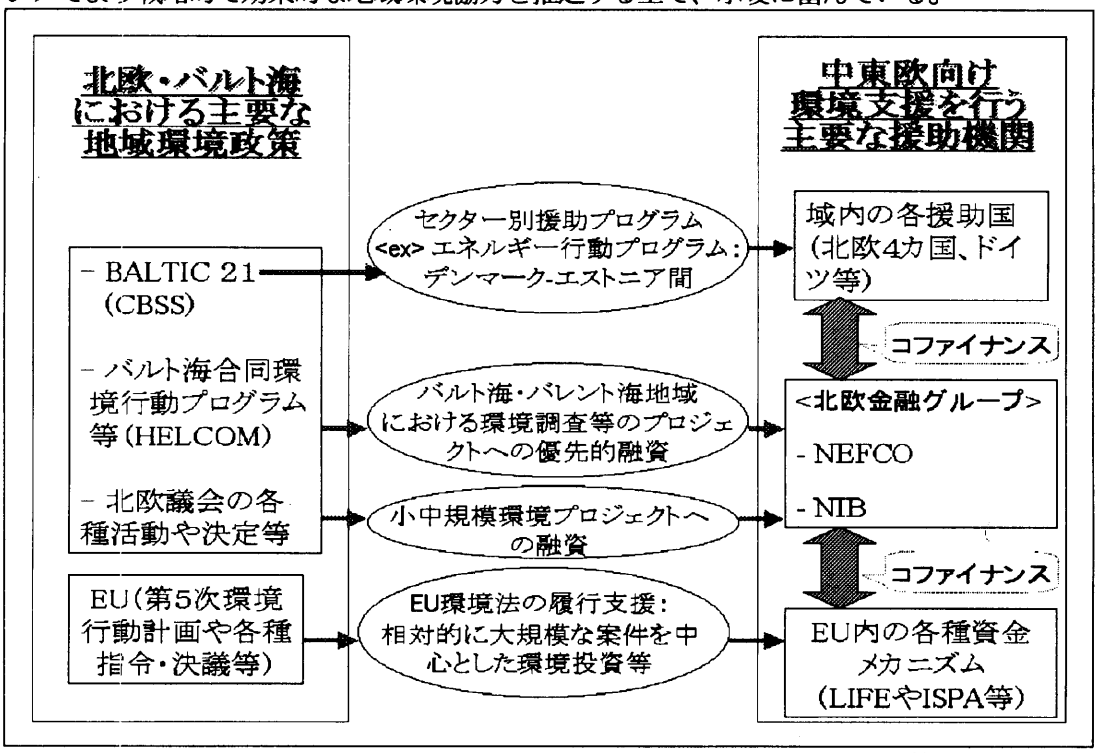
しかしながら、制度面に関しては、東アジアが、欧州と類似したプロセスを辿るかどうか、現時点で判断することは難しい。なぜならば、北東アジアはヨーロッパと違って、域内諸国の経済レベルや政治体制が大きく異なるため、足並みをそろえて均一的な地域政策を導入することは容易ではないからである。またヨーロッパでは、EC/EU という地域機関が、公式に非公式にも条約の進展を密接に支えてきたが、北東アジアには EC/EU に該当するような強力な地域機関がない。更に LRTAP の特殊事情として、冷戦期に東西陣営の架け橋として環境協力が推進されたことが、条約進展に大きな影響を与えたという特殊事情もある。このようなヨーロッパ独自の事情が、国際的な取組の進展を強く促し続けてきた。

このような相違点を考えると、北東アジアが、その協力スキームの不備を乗り越えてまで、欧州と同じプロセスや制度化を辿って、酸性雨を巡る地域協力条約を締結し、議定書交渉を進めるとは考えにくい。

しかしながら、制度面に関し、欧州から得られる教訓が全くないわけではない。欧州では LRTAP や EU Directives のような共通環境政策と援助政策がリンケージされ、全体的な地域協力スキームを形作っているが、このような特徴はバルト海小地域において、より顕著にみられる。

さらに、バルト海小地域は、先進国と移行経済国が同居している点で、北東アジアと類似点

を持つ。この小地域では、EU における「指令」に当たるような強い法的拘束力を持つ取決めはない。しかし、複数の多国間枠組が重層的に存在し、各種環境協力プログラムや行動計画などを策定している。これらの決定は北欧諸国による二国間援助や北欧ファイナンスグループによる環境援助に反映され、効果的な環境協力が進められている。このようなリンケージの考え方は、北東アジアでより戦略的で効果的な地域環境協力を推進する上で、示唆に富んでいる。



出典：筆者作成

図. バルト海地域の環境政策と各援助機関とのリンケージ

この小地域における環境協力の事例から考えられる北東アジアへのインプリケーションは、以下のとおりである。

- 地域協力と援助施策のリンケージ[21] ： 地域協力は、域内国の自発的協力に立脚するものであり、原則的には域内参加国の burden Sharing が望ましい。しかし、域内途上国が協力プログラムを自己資金のみで行うことは困難であり、先進国や国際機関の資金・技術支援が不可欠になる。
- 二国間援助と多国間援助のリンケージと役割分担：二国間 ODA は、元来、その二国間における外交関係の判断の下でなされるものであり、一つの地域を対象とするものではない。他方、多国間援助はより地域的な公共性の高いものに優先順位を置くことができる[22]。但し国際金融機関のみの資金には限りが有るため、二国間援助や民間投資等と協調して進めることも重要である。その際ソーシャルリターンや収益性等に応じて、ODA、他の資金メカニズム・民間投資等を使い分ける事も重要である。
- Innovative なアプローチ(複合効果アプローチ・セクター統合型アプローチ)の適用：例えば、地球温暖化防止に向けた二酸化炭素(CO_2)削減対策は、同時に二酸化硫黄(SO_2)、窒素酸化物(NO_x)、一酸化炭素(CO)の排出削減を伴うことが多いため、酸性化・オゾン層破壊・都市大気汚染問題の改善にも副次的な効果をもたらす。それゆえ、実質的な汚染削減につながるよう

[21] バルト海地域では、Baltic 21 という小地域行動プログラムの中で、それぞれ主導国が定められており、例えば大気汚染防止のエネルギー行動プログラムはデンマークが担当し、自国の ODA を用いてセクター別援助プログラムを展開している。

[22] なお、これまで北東アジアでは、多国間援助が相対的に少なかった。しかし、近年日本の環境援助プロジェクトの中には、米国や韓国と共同で関わるものも出てきている[22]。今後はこのような試みが拡大される事が期待される。

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なプログラムを考える際は、このような複合効果アプローチを検討することは、効率的な環境協力を進める上でも重要である。すなわち、域内の発展途上国の殆どは、先進国の関心が高い地球温暖化問題、或いは越境大気汚染(酸性雨)問題よりは、局地的な大気汚染や光化学スモッグ、CO_2よりはSO_2・NO_x問題に関心が深い。しかし、複合効果・複数汚染アプローチを用いれば、双方の関心に沿う形でより協力政策を行いやすくなる可能性がある。

なお、この小地域では、目的に応じて様々な多国間枠組：CBSS や北欧議会・HELCOM 等があるが、このように「域内全ての当事国が同時に参加する」のではなく「域内の部分的な協力が域内全体にとっても有益であるという観点、及び部分的な協力を拡大していく」考え方を、「モジュール多国間主義」(Ivanov, 1999)と呼ぶ。この考え方は、域内全ての当事国が同時に参加できる多国間取組をもたない北東アジアにも通用する考え方ではないかと思われる。

4. 結びに変えて：将来への提言

北東アジアと他地域の環境協力スキームの相違点を指摘するのは比較的たやすい。しかし、経済・社会・政治的な要素の違いを念頭に置きつつ、欧州の事例から北東アジアへ通用する建設的な教訓を導き出すのは難しい。北東アジアは政治的にも経済的にも非常にユニークな地域であり、他の地域環境協力の事例からノウハウを拝借するだけでは、この小地域の将来像は描けない。ここでは幾つかの将来への提言を試みたい。

第一に、北東アジアの国レベル、および地域全体にとって非常に重要な課題に関する包括的なリストを、協力して作成する必要が有る。その包括的なリストの中で、どの部分が国内レベルで、二国間協力で、多国間協力で、あるいは産業主導、NGOs によって行われており、また何が行われていない(手付かずである)のか、明らかにする必要が有る。これを行うには、北東アジアでは小地域全体をカバーするような包括的な枠組は必要としないが、各主体の積極的な参加が求められる。

更に、そういったリストを念頭に、先述の「モジュール多国間主義」に基づいて、特定された課題における関連する複数国間の環境協力を引き続き促進し、該当するものがない場合は既存のものを活用するか、あるいは新たに創設する必要が有る。北東アジアの多国間取組の枠組は、北東アジアに限定したもの、東アジアを対象としたもの、アジア・太平洋全域などが多層的に存在する。また取組の主催者如何で、北朝鮮、台湾、日本が入らないなど参加国にも幅が有る。一般的には、地域協力は地域内全ての当事国が同時に参加するといった考え方を取りがちだが、北東アジアでこのような枠組を構築するには長い年月がかかると思われる。そこで、個々の課題別に融通性を持たせて、参加国の構成に自由度を持たせるべきである。

しかし、こういった部分的な協力を全体に拡大していくよう努力を続けることは重要である。この点で、EANET がその門戸を東アジアの非加盟国にも常時開いており、ラオス等の加盟国が増加していることは望ましいことである。一方で NEAC が環境省庁から地方自治体、NGOs まで広い参加を得て実直な政策対話を促進させていることも大事なことである。

また、類似したテーマを扱う地域的取組間には、公式／非公式な方法で、何らかの有機的な連携を持たせ、役割分担を明確にしていく必要が有る。こういったことを可能にするためには、各協力取組は、情報を公開し開かれた仕組みを持つ必要が有る。その出発点として、最近、幾つかの地域的協力枠組はインターネットを通じて情報公開を始めているが、これは更に促進されるべきである。

また、これらの取組は、いずれも資金面で困難を抱えている。地域協力は、域内国の自発的協力に立脚するものである以上、参加各国の応分の資金負担は必要である。但し、各国が自発的に資金負担を行うか否かは、各国のやる気と能力次第である。とはいえ、域内途上国が協力プログラムを自己資金のみで行うことは困難であり、先進国や国際機関の資金・技術支援が不可欠となる。それゆえ、バルト海諸国のように、地域協力施策と援助施策をリンケージさせるよう考案することが重要になる。

一方で、中・長期目標としては、総括的な北東アジアの環境行動計画を描くことを提言したい。総括的な環境行動計画は、EU やバルト海地域(Baltic 21)、ASEAN 等でも既に策定されている。このような計画の立案には、前述の複合効果アプローチの考え方が反映されるべきであろう。更に計画では、個々の環境問題に個別的に取組むよりは、寧ろエネルギーセクターのような主要経済セクターの相互作用を促進させるような統合されたアプローチが展開されるべきであろう。また EU 第 5 次行動計画のように、各セクターにおける主要な施策とその手段・達成時期や取組むべき主体者、資金メカニズムまでを特定できれば尚良い。このような行動計画を描く上では、日中韓三カ国大臣会合、ESCAP 大臣会合やリオ+10 などのハイレベルな会議は、大事な契機となる。

更に、長期的には、やはり地域全体が参加できる枠組を創ることが肝要になってくる。北東アジア小地域の不安定な国際関係を考慮すると、この目的を達成することは非常に難しい。にもかかわらず、韓国と北朝鮮は歴史的な首脳対談、北朝鮮の ARF 加盟など、幾つかの明るい兆しは有る。

ここでポイントとなるのは、国際機関および NGO の媒体としての役割である。UN/ESCAP や UNDP、UNEP の果たすべき役割の重要性は勿論のこと、ADB が各国の媒体として大きな役割を果たすことが期待される。特に、台湾は国際法上の地位が不安定で、国連機関には加盟していないが、ADB や APEC には Chinese Taipei として参加している。もし域内で非加盟国であるロシアや北朝鮮が将来 ADB に加盟することがあれば、ADB は各国をつなぐ媒体となり得る。

一方で、NGO は生態系保全分野で、地域協力に大きな役割を果たしている。北東アジアの重要生息地ネットワークには北朝鮮を含む北東アジアの 6 カ国が参加している。また大気に関する NGO ネットワークである AANEA には台湾からも参加がある。現時点で、北東アジアのすべての国・経済体をつなぐことができるのは NGOs に他ならないことは留意されるべきである。

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V　テーマ別セッション討議概要

テーマ別討議概要

第1セッション「森林保護及び植林」

セッション議長：Mr.Hong Yong(中国)

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日本(田口)：中国に対し2つの質問ある。① 洪水や不作、飢饉などの重大な問題への対策として住民には何年間資金的な補償をするのか？ ② 森林減少により作物収穫が減少しているということだが、植林をすると却って水不足となると聞いているが、そのメカニズムはなにか？ 水と森林の関係について、蒸発などによる影響とこれに対する特別の考え方があればそれを聞きたい。

中国：{一部聞き取り不能}

日本の第2の質問について、水源がどこであるかが重要である。水資源の保全、低地では排水が問題となっている。エコプロジェクトにより、草地と森林を分けている。60の保護地区があり、対策は地域によって異なる。

モンゴル：中国の食物の輸出政策について伺いたい。

中国：中国は、食料輸出国から輸入国に転じた。食物の話は、貿易問題である。

ロシア(Peshkov)：国際的な砂漠化対策が進められており、アジアでは、中国、インド、パキスタンなどで協力のネットワーク活動があると思うがどうか。

日本(加藤)：国際砂漠化防止についてのいくつかのネットワークがある。アジアの砂漠についてもフォーカルポイントがあり、砂漠化防止対策としての森林保護および植林活動が行われている。

韓国(Kim Choony)：森林火災のリカバーは、エコロジストの言うように自然的回復を待つのがよいのか、住民や学者の意見のように人工的に回復させたらよいのか？

福田：土壌によって異なる対策を取るべきである。タイガでは200年サイクルで山火事などが繰り返されている。自然に起る火事は、それによりミネラルが補給されるので何もしないほうが良いだろう。しかし、頻繁な火事には対策をとる必要がある。200年を超えると森林はCO_2の吸収源とはなりえない。火事がシビアな場合は、土壌や湿度が変わるので早急な対策が必要となる(土壌は10-20年で回復する)。タイガでは、火事が200年サイクルで起こり、CO_2が排出され、ミネラルが補給され、次に新しい木が生えてくる。現在ロシアの火災の90%は人為的な火事であり、サイクルが20年程度になっている。我々は被害の程度によって対策をたてるべきである。

第２セッション「水質汚濁と浄化」

セッション議長：加藤 久和

【発表者】

中　国	国家環境保護総局水環境管理課長	Ms. Hongzhi Liu
韓　国	国立環境研究院主任研究官	Dr. Han Gee Bong
日　本	国立環境研究所地域環境研究グループ総合研究官	稲森 悠平
ロシア	ロシア連邦自然保護研究所所長	Dr. Andrei S. Peshkov
モンゴル	自然環境省政策調整執行部オフィサー	Mr. D. Batbayar

ロシア(Peshkov)：プレゼンテーションに対し、次の通り追加する。

① 水の情報が不足している。水汚染の情報交換、国際機関の協力が必要。

② ロシア、モンゴル、中国、韓国と続く森林の回廊保護地区設定を提案する。

③ 日本を除いた、ロシア、モンゴル、中国、韓国の河川の水汚染問題を共同で対処する必要がある。

韓国(Kim)：国境を超えた問題の対処について(日本を除く、ロシア、モンゴル、中国、韓国)は共通の水資源を利用しているので協力して行う必要がある。各地域の水に関する情報センターの設立を提言する。中国では、10年前には規制はゆるやかだったが、SEPAは西部の水質規制をどのようにしているのか。

中国(Jing Guo)：1996年から、地方政府が水質規制を強化し、排水する会社の規制をはじめた。

UNEP(名執)：UNEPが支援している。GIWA(Global International Water Assessment)は、4年間のプロジェクトで、水質、水量の情報収集を行い政策立案者に水資源保全のための情報提供を目的としている。現在、66のsubregionにfocal pointがあり、9つのmega regionのうちのひとつをアジアのUNEP事務所で支援している。ペシコフ氏の提案した、水質の国際ネットワークについてGIWAは協力したい。

日本(田口)：新潟県の水質汚染規制担当の小柳さんを紹介する。日本の地方自治体の情報が知りたい場合は、彼と直接コンタクトしてほしい。

第３セッション「特別保護区ネットワークの拡大と保護区管理の改善」

セッション議長：Dr. Andrei Peshkov

【発表者】

中　国	内モンゴル自治区環境保護局課長代理	Mr. Hong Yong
韓　国	韓国消費者保護市民同盟ｴｸﾞｾﾞｸﾃｨﾌﾞ･ﾀﾞｲﾚｸﾀｰ	Ms. Kim Jai Ok
日　本	環境庁自然保護局国立公園課計画係長	番匠　克二
ロシア	ロシア連邦自然保護研究所所長	Dr. Andrei S. Peshkov
モンゴル	自然環境省環境保護庁保護地域局課長	Mr. D. Myagmarsuren

議長(Peshkov)：第三セッションは、天然資源のネットワークの拡大と人材養成について

の質疑応答をする。自然保護事業は、どのようなセクションで行っているのか。

中国：中国では、持続的な発展ができるような自然保護事業は、地方行政が行っている。

議長：NEAC の提案を実施するためには、資金が必要なので、次回は UN の財政担当者を呼ぼう。

韓国(Kim)：今年 6 月、ESCAP と UNEP 後援のワークショップがソウルで行われ、有用な情報がもたらされた。11 のプロジェクトがあり、人工衛星のデータ解析、種の保存のためのモニタリング、開発と協力、情報の共有、研究など各国のレビューが行われた。

中国：中国では、旅行者による自然保護地区の被害が深刻な問題になっている。ツーリズムと産業は重要であるが、ツーリズムと保護の関係についての経験に関しての議論と意見交換を提案する。

議長：次回のワークショップの課題として、生物多様性保護とエコツーリズムの問題を提案する。自然公園を訪れる人の多くは都市の住民である。

韓国(Kim)：今年 6 月に、北朝鮮と自然保護の会議を行ったが、NEAC に北朝鮮を入れてほしい。

日本(田口)：このセッションを超える問題なので別のところで議論すべきであろう。

モンゴル(Suren)：ロシア、中国、モンゴルの移動性の動物の越境問題については、1997 年以後調査が進んでおり、①トランスバウンダリーな問題に対する相互協力による保護が必要。② ロシアの Dauriya ネットワークのサポート及び国際協力が必要である。

モンゴル(Tugubaataa)：保護に関しては、全てのドナー国による人材養成プログラムが必要である。

UNEP(名執)：湿地と渡り鳥の保護については、UNEP がサポートする Anatidae ネットワーク(東アジア地域ガンカモ類重要生息地ネットワーク)があり、北海道でワークショップが開かれた。

韓国(Kim)：モンゴルから要請があれば協力できる国際機関はあるだろう。日本と韓国は保護地区についての協力は行う。

モンゴル：渡り鳥の保護は、モンゴルのみでなく全ての国の問題であろう。

議長：プロポーザルはドラフティング ミーティングにまわす。

韓国(Kim Jai Ok)：中国のツーリズムに協力する。政策、法規制などの整備が必要と思う。エコツーリズムは NGO と政府の戦略が異なるので問題を詳細に議論する必要がある。

議長：現在でも環境に対する負荷はおおきくなっている。政府主体のネットワークはあるが、どのようにこのネットワークを使うか、NGO を加えるかが問題である。今日の参加者もほとんど政府の代表である。

日本(加藤)：私は個人で参加しているつもりである。水鳥ネットワークは 3 つあり、北東アジアクリーンネットセンター、名執氏の説明した現在実施中の渡り鳥に関する Anatidae ネットワーク、これから実施するネットワークセンターである。エコシステムマネージメントと Capacity Building は NGO と政府の緊密な関係が必要であり、NGO の協力なしにはできない。NGO を会議に招待するだけでなくプロジェクトに

参加してもらうのがよい。

韓国(Kim Choony)：種の保護については、エイリアン種と在来種についての情報が必要。

UNEP(名執)：UNEPには、今の所、エイリアン種に関する情報はない。次回のNEACの会議で生物多様性保護とエイリアン種に関するテーマをとりあげるなら情報を提供する。

第4セッション「北東アジアの環境協力のレビューと将来像」

セッション議長：Han Gee Bong

【発表者】

中　国	国家環境保護総局上級ﾌﾟﾛｸﾞﾗﾑ・ﾏﾈｰｼﾞｬｰ	Mr. Jing Guo
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日　本	名古屋大学法学部大学院国際開発研究科教授	加藤 久和

ロシア(Peshkov)：① 中国、モンゴル、ロシア、韓国4国の国境を超えた保護地区の設定、② 水質汚濁のモニタリングネットワークの確立を提案する。我々は、既に9年も共通の仕事をしているのでフレームワークをつくるべきである。

韓国(Han Gee Bong)：北朝鮮とNGOがNEACに参加する問題について検討されたい。

中国：韓国提案のガイドライン、NEACの役割、フレームワークに賛成である。新たな国の参加、技術に関する交流の提案については、コンセンサスが必要だ。

ロシア(Peshkov)：議長サマリーに、① 水質汚濁モニタリングネットワーク及び② 保護地区ベルトを追加してほしい。

議長：ロシアの2つの提案を議長サマリーに入れることにする。

モンゴル：NEACを評価すべき時期であろう。NEACの役割に対する地域内での認識の違いがある。次の会議までにNEACの目的についてドラフトを作成し、10年目の会議でまとめてはどうか。

議長：つぎのミーティングまでにフレームワークを作る。

韓国(Kim)：それはモンゴル政府及び韓国政府のどちらが行うのか。

モンゴル：作業については、①モンゴルが作成する。②韓国が作成する。③モンゴルと韓国2国共同で作成するという、3通りの方法があるだろう。

議長：韓国側がモンゴルとコンタクトしながら最終案を作成することでどうか。

ロシア(Peshkov)：必要に応じインターネットを活用し、ファイナルレポートとフレームワークは、ドラフトを韓国とモンゴルで作成し、各国に提出することでよいだろう。

中国(Jing Guo)：韓国の提案に中国は協力する。

日本(田口)：フォーカルポイントはどこにするのか、意見や考えをどちらに提出すればよいか。

議長：両方に提出するようにし、韓国にモンゴルが協力して取りまとめる。

韓国(Kim Choony)：NEACはオープンで、NGO、研究者、自治体が参加し、経験を共有することが必要である。我々NGOは、10年にわたりこのような活動をしてきた。

UNEP：政府間会合であるNEASPECに比べ、NEACは、オープンな国際的会合で、テーマもフレキシブルで、NGO、研究者、自治体が参加している。

議長：その他の意見はないか。

日本：韓国の提案する"Framework of NEAC"を議長サマリーのアネックスとする。韓国の提案について、次のNEACで討議の機会があり、ファイナライズできるだろう。

ロシア：フレームワークについては、公式なものとなるものであり、さらに討議されるべきである。フォーカルポイントは、国内での連絡を行う義務がある。第4セッションで論議されたのは、NEACの枠組みである。次に開かれるNEACが10周年となるので、ここでNEACの役割と枠組みを明確にするチャンスである。

議長：次回の議題は、今後詳細をつめることとする。

モンゴル：基本的に韓国に賛成である。

Ⅵ　会議資料(原文)

Chairperson's Summary

Chairperson's summary

The 9th Northeast Asian Conference on Environmental Cooperation 26-28 July 2000

1. The 9th Northeast Asian Conference on Environmental Cooperation (NEAC) was held from 26 to 28 July 2000 in Ulaanbaatar, Mongolia. The Ministry of Nature and Environment of Mongolia organized the conference with support from the Government of Japan. The delegates from the People's Republic of China, Republic of Korea, Japan, Mongolia and the Russian Federation attended the conference. The participants included senior officials and experts from central and local governments, research institutions, and NGOs. In addition, representatives from UN/ESCAP, UNEP and UNDP attended the conference.

2. The Conference was opened with a welcome speech made by Mr. Banzragch, State Secretary of the Ministry of Nature and Environment of Mongolia. Following his remark, representatives of each participating country, UNESCAP and UNEP made their keynote speeches.

3. The subjects discussed at the 9th NEAC were as follows:
   a. Forest Protection and Afforestation;
   b. Water contamination and Purification;
   c. Extension of Network of Special Protected Areas and Capacity Building;
   d. Review and Future of the Northeast Asian Environmental Cooperation.

4. For the first session on Forest Protection and Afforestation, the representatives from each country made presentations on the topic. Various issues related to the topic were addressed during the presentation and discussion, including national strategy and actions on forest protection and afforestation; responsibility of government and NGOs to protect forests in Asia; research on the impact of forest fire and regeneration of forest; re-forestation activities; and problems, positive trends and priority areas on forest protection and afforestation. The participants noted that each country attached great importance to forest protection and afforestation and is making great efforts to take further actions. Taking into consideration the global and regional dimension of the problems, it was emphasized greater attention and efforts should be paid to combat deforestation and desertification in the Northeast Asian region. Many participants emphasized that problems of ecosystem should be tackled in an integrated and long-term prospective in cooperation with international organizations such as UNEP, UN/ESCAP, UNDP, ADB and World Bank.

5. During the second session on "Water Contamination and Purification," each participating country presented a report on the current water environment situation, policy and prospects in their country. The reports included measures to enhance water pollution control through administrative approach, water quality improvement system in cities, water environment restoration system using bio-ecoengineering and international cooperation for water purification. In addition, suggestion, in order to share relevant policies and information, was made to establish an expert network for water pollution control and expertise among the participating countries, which may

supplement the ongoing activities, such as NEASPEC project on air-monitoring data and training; NOWPAP. The representative of UNEP informed the participants of UNEP's ongoing project "Global International Water Assessment (GIWA)" and requested NEAC countries' cooperation.

6. The third session was on the "Extension of Network of Special Protected Areas and Capacity Building" and the delegates from each country made presentations on the topic. The conference exchanged views on the topic including the necessity of regional level cooperation, in particular for capacity building in this area, the possible creation of trans-boundary protected areas and among the relevant participating countries, and the organizing of expert group meetings to deepen discussions on this topic.

7. Session 4 was on the "Review and Future of the Northeast Asian Environmental Cooperation." Based on the presentations made by each country representatives, the Conference exchanged views on the NEAC's achievements, roles and objectives, and future prospects. Its main achievements include pioneering policy dialogue in the sub-region, promoting dialogues among a variety of entities, exchanging of information in a wide range of environmental issues, including new emerging issues, and functioning as catalyst to promote new cooperative initiatives in different formalities.

8. The Conference agreed to develop new directions/principles of NEAC, taking into consideration a necessity to forge a mutually beneficial linkage with ongoing environmental cooperation initiatives in the Northeast Asian region. The Conference noted with appreciation the submission by the Ministry of Environment of Republic of Korea, for their draft "Framework of NEAC", which is annexed to this Chairperson's Summary for further elaboration. The NEAC focal point in each participating country is requested to continue coordination, *inter alia* via Internet, to review the present document, for possible adoption on the consensus basis at the next NEAC meeting. The Ministry of Environment of Republic of Korea and the Ministry of Environment and Nature of Mongolia will jointly serve as secretariat for this process.

9. The Participants shared the view that NEAC should continue its present function as a free and open policy forum with wider participation of various stakeholders, such as local governments, NGOs, and research institutes.

10. The participants expressed their deep appreciation to the Ministry of Nature and Environment of Mongolia for its warm hospitality and successful organization of the 9th NEAC.

11. The participants welcomed the offer by the Korean delegation to host the 10th NEAC in October 2001 in Inchon City of Republic of Korea. The date, duration, and agenda of conference would be decided by the hosting country in collaboration with other participating countries at least three months prior to the meeting.

Framework of NEAC

A. Objective

(1) As environmental degradation accelerates throughout the region, and as it becomes clear that lasting solutions require increased involvement from local governments, the private sector and the public, the main objective of NEAC should be to promote free discussion and policy exchange, and to enable access to useful, accurate information at all levels.

(2) Through these activities, NEAC is aimed at contributing to effectively cope with domestic and regional and global environmental problems, such as air pollution, nature conservation, and water and waste management, and to ultimately lower pollution throughout North-east Asia.

B. Roles

(3) The NEAC should play several roles. Through the NEAC Mechanism the participation of various stakeholders can be enhanced. These include environmental institutions, local governments, and NGOs as well as relevant government ministries and agencies.

(4) Since it is largely a forum for maintaining an open policy dialogue, it serves as a basic foundation for other environmental programs. Its ties to other conferences and programs such as TEMM and NEASPEC should therefore be strengthened. To this end, host countries will present information and results generated through NEAC at the following TEMM and NEASPEC meetings. The host country will take measures to share NEAC's outcomes, such as publishing and reporting the presentation documents and agreed results.

(5) Considering the timing of conferences of similar programs, it is possible to promote various measures for providing TEMM and NEASPEC chances for holding interim reviews and expert group meetings in specific areas, such as transboundary air pollution, nature conservation and bio-diversity, within NEAC's framework.

C. Participating and Hosting Countries

(6) Six Northeast Asian Countries--China, D.P.R. of Korea, Japan, Mongolia, the Republic of Korea, and Russia--will join this conference as member countries.

(7) Member countries would host NEAC meetings in turns. However, in case of special circumstances the venue can be changed by the conference participants.

(8) The host country would cover the expenses of two participants from each member country.

D. Agenda and Activities

(9) It is recognized that review activities are very important to examine the progress of domestic and regional measures according to outcomes of previous meeting.

(10) The conference consists of four sessions. Each session's agenda will include various environmental issues in Northeast Asia, and would be adopted in the previous meeting. In order to provide a policy basis for other environmental programs, approval items and ongoing projects of other environmental mechanisms can be considered in the process of selecting the agenda of NEAC meetings.

(11) In collaboration with local governments and private organizations, host countries can organize special activities, such as public symposia and exhibitions.

Keynote Speeches

Keynote Speech

Environmental Protection in China in 2000

Mr. Guotai Zhuang
Deputy Director General, Natural Conservation Department,
State Environmental Protection Administration, China

Chairperson, Ladies and Gentlemen,

I am very glad to have the chance to discuss the issue of environmental protection in the Northeast Asia region. On behalf of Chinese delegation, I would like to brief you the targets and tasks of environmental protection in the coming two years and five years in China.

I. Environmental Protection in China in 2000

A. Environmental Protection in China in 1999

While the national economy kept on developing in a stable way in 1999, the environmental protection in China was further enhanced, with great achievements made. The environmental quality in some cities and areas was improved to certain extent, which provided important guarantee to promote the reform and modern construction in China.

--- The total pollutant discharge load control and industrial pollution sources attainment have been significantly promoted. By the end of 1999, the total discharge of the eleven pollutants was lower than the stipulated indicators. The attainment of the industrial pollution enterprises in the whole is 74% and the attainment of the important enterprises is 56%. The basic capacity of environmental monitoring has been further promoted. There are over one hundred cities in the whole country, which have conducted weekly air quality report. In ten cities such as Shanghai, daily report has been conducted and in some cities such as Tianjin, forecast of air quality has been carried out.

--- Stage achievements have been made in the pollution prevention in cities, river basins, regions and marine regions. The ambient air quality in Beijing has been significantly improved. In Tai Lake, Dianchi Lake and Cao Lake basins, the attainment discharge of industrial pollution sources has been completed on time. Achievements have been made in the pollution treatment of the important enterprises in Hai River and Liao River basins. The SO2 discharge amount has been reduced by almost 800,000 tons in the "Acid Rain and SO2 Control Districts". The pollution prevention in Bohai Sea has been further enhanced and the land-based pollution has been controlled. The eleven coastal provinces, autonomous regions and municipalities directly governed by the Central Government of the whole country spent ten years in formulating the environmental functional zones in the offshore marine area.

--- Natural ecological protection has been developed. According to the latest statistics, there were 1146 nature reserves in the whole country by the end of 1999, the total area being 88.128 million hectares, accounting for about 8.8% of the total territory. We have established a network system of the nature reserves with comprehensive types, reasonable location and perfect functions. In 1999, China published the Country Report on Bio-Diversity and kicked off the legislation on bio-safety management.

--- The input for the ecological construction has been further strengthened. According to the National Ecological Environmental Construction Plan published and put to implementation in 1998, China has kicked the construction of a series of key ecological construction projects of natural forest protection, comprehensive ecological environmental treatment, shelter belt construction, desertification prevention and water and soil preservation. In 1998 and 1999, China increased the investment for the ecological construction by over 18 billion yuan (RMB).

2. Present Environmental Protection Situation in China

For the time being, the overall environmental situation in China is as follows: the total pollutant discharge amount is still quite large; the pollution remains at high level; in some areas, the pollution is rather serious; the degradation of the ecological destruction has not yet been effectively controlled and the environmental situation is rather tough.

The problems of environmental protection in China are: firstly, there are new changes as to the pollution structure - the industrial pollution tends to be stable and reduced while the domestic and agriculture pollution is increasing; secondly, the investment of environment protection is not enough according to the plans and the practical demands and the construction of the urban sewage and garbage treatment facilities are far lagging behind; thirdly, the legislation of environmental protection is not so perfect; the enforcement is not strict enough and the capacity of environmental monitoring, science and technology and information service capacity is rather weak.

At present, two great transits are taking place as to the policies of environmental protection in China:

Firstly, while focusing on the pollution prevention and treatment in different regions, river basins and sectors, we are actively promoting the transit of economic growth, especially to achieve the adjustment of economic structure and production structure through the policies, to promote the improvement of production mode and production process through the improvement of standards and the promotion of cleaner production and to achieve the targets of pollution prevention by enhancing the environmental infra-structure construction in urban and rural areas.

Secondly, environmental protection is transiting from pollution prevention to pollution prevention and ecological protection, especially that the limitation of the ecological degradation on the regional sustainable development and the improvement of river basin environment, as well as the improvement of the daily lives and the demand for safe and healthy food and ecologically beautiful entertainment places have become important drives for the development of ecological protection.

3. Tasks of Environmental Protection in China in 2000

The important tasks of environmental protection in China in 2000 are to devote efforts to basically control the degradation of environmental pollution and ecological destruction, and to improve the environmental quality in some cities and areas so as to lay good foundation for the environmental

protection in the new century.

--- To enhance the inspection and supervision of enforcement so as to "prevent the enterprises with excessive pollution to enter the new century" and ensure the discharge attainment of the industrial enterprises with pollution by the end of this year. The water in Huai River and Tai Lake should turn clean; the annual COD discharge in Hai River and Liao River basins is controlled within the planned quotas; the water quality target should be achieved in Dianchi Lake and Caohu Lake basins; and the formulation and implementation of Action Plan of Blue Bohai Sea.should be accelerated.

--- To follow the principle of paying attention to both pollution prevention and ecological protection and to actively develop ecological protection. By the year 2000, the area of nature reserve in the whole country will account for 9%, if included the scenic spots, forest parks, the area will account for 10% of the national territory. In the meantime, new projects of ecological construction such as restoring the cultivation land into forest and grassland, the protection and construction of natural grassland and the ecological belt surrounding Beijing will be kicked off.

II. Environmental Protection in China in Recent 5 Years

According to the new domestic and international situation and the development of environmental protection in the new century, and focusing on the sustainable development and the requirements of improving the environmental quality, the environmental protection in recent five years will be mainly focusing on the following key issues:

1. Pollution Control

Firstly, to enhance the environmental protection at the source of social economic development, to integrate environmental protection into various levels of social economic development and to integrate environmental protection with social economic development at the beginning of the planning;

Secondly, to promote the local governments and sectors to actively enhance environmental protection. While further enhancing the treatment in river basins, cities and marine areas, we should also focusing on the important sectors of chemical industry, paper production, ferrous metal smelt, power generation and cement so as to reduce pollution load and promote regional treatment by treatment in sectors.

Thirdly, to reform and perfect environmental protection management systems, make exploration on the EIA of important economic and technical policies, to establish and improve region EIA system and enhance the macro-management system. Active efforts should be made to promote the total pollution load control and permit system and to conduct pollution permit trade step by step. The public participation system and environmental supervision system will set up and improved.

2. Ecological Protection

Firstly, to carry out urgent protection of the important ecological function zones, including the head source areas of the rivers, important water source preservation and water and soil protection zones, natural flood adjustment and storage zones, as well as the shelter belts and sand fixing areas which are quite important to the ecological balance of the river basins and regions and to ensure the national ecological and environmental safety. In the important ecological function zones with ecological degradation, important ecological function zones will be set up and protective recovery measures will be carried out.

Secondly, to conduct compulsory protection on the ecological environment in the important resource development zones. The ecological functions of the natural elements such as water, soil, grassland, forest, marine, biology and mineral resources should be further clarified. Enforcement and supervision management should be enhanced so as to prevent the destruction to the ecological environment in the development of the above-mentioned natural resources and new degradation of the ecological functions.

Thirdly, to implement active protection in the areas with good ecology; to conduct demonstration of ecological economic construction and set up a series of demonstration models with healthy regional social economy, sustainable development and benign cycle of ecological environment. Efforts will be made to set up 4-6 ecological demonstration provinces and to achieve ecologically benign cycle in 6% counties and municipalities. In the meantime, a series of new nature reserves will be set up in the untouched areas with typical natural ecological systems.

China will mainly implement comprehensive environmental treatment projects of the Yangtze and the Yellow River. Based on the principles to combine the pollution prevention with ecological protection, the adjustment of economic structure with environmental treatment, industrial pollution prevention with domestic pollution prevention and pollution treatment and cleaner production, overall treatment will be conducted on the environmental pollution and ecological destruction of the Yangtze and the Yellow River. In addition, China will further enhance the ecological environmental construction according to the arrangements of the Ecological Environmental Construction Plan.

III. Environmental Protection in the Western Development in China

China is now organizing the implementation of the development strategy in the western part. The western part has a unique ecological position, with extreme natural conditions. The environmental protection and ecological construction is not only related with the successful implementation of the development strategy in the western part, but also has great significance in ensuring the national ecological safety and global environmental protection.

1. To improve the capacity of comprehensive environmental decision-making in the western part and enhance the environmental supervision management

A survey will be conducted on the present situation of the ecological environment in the western

part. Based on the survey, the ecological environmental function zones and the ecological environmental protection plan of the western part will be formulated, which will service as scientific basis for the national decision-making.

To carry out strict enforcement. Efforts will be made to enhance the environmental supervision management of the infra-structure construction projects, such as the industrial construction projects of various kinds, resources development projects and transportation, water resources, energy, as well as some key ecological construction projects so as to prevent the passive situation that destruction is made while conducting construction.

The capacity building of environmental protection will be enhanced in the western part. The ecological monitoring networks and ecological disaster warning systems will be set up. Training courses will be organized so as to improve the capacity of the administration of the environmental supervision and management staff according to law.

2. To enhance the protection of the important ecological function areas and natural ecological systems and to set up the demonstration models of coordinated regional economic and ecological development.

Important ecological function protection areas will be set up in the head source areas of the Yangtze and the Yellow River, as well as some important shelter belt and sand fixing areas. The development construction activities of various kinds that cause destruction to ecological environment will be forbidden in the protection areas. Necessary ecological migration will be organized. Appropriate development and utilization will be conducted with strict protection. The ecological recovery measures will be implemented by combining the artificial measures and nature so as to recover the ecological environment in the protection areas as soon as possible.

There are 486 nature reserves in the western part for the time being, among which there are 69 national level ones. A series of nature reserves will be set up urgently in the middle and upper reaches of the Yangtze and Yellow River. The wild life and animal resources of various kinds will be protected.

Projects of restoring cultivated land into forest and grassland will carried out in a planned way. The combination of environmental protection and improvement, economic development and poverty alleviation, as well as the development of environmentally sound products and eco-tourism in the western part should be encouraged.

3. To enhance pollution prevention and to improve the environmental quality in key regions, river basins and cities

In connection with the projects of "transmitting the natural gas of the western part to the eastern part" and "transmitting the electricity in the western part to the eastern part", efforts should be made to promote the restructuring of the urban energy and infra-structure renovation along the transmission lines so as to improve the urban air quality. The treatment of industrial and urban

sewage will be accelerated. A series of domestic sewage treatment plants will be constructed with the support of the central government to the construction of the infrastructure in the western part. In the meantime, we will promote the construction of other urban environmental infrastructures and guide the construction in the small towns in a reasonable way.

Cleaner production will be promoted together with the adjustment of the industrial structure in the western part and the environmental industry and the products with environmental labels will be developed. The existing technical capacity will be fully utilized to guide the development of environmental industry.

Ladies and Gentlemen,

We are resided in northeast Asia and have the common responsibilities and obligation to protect the environment in northeast Asia. China is willing to make all efforts to strengthen the relation and cooperation with relevant countries and areas so as to promote the environmental protection and social economic development in the northeast Asia region.

Thank you all.

KEYNOTE SPEECH

The Northeast Asian Conference on Environmental Cooperation
Ulaanbator, Mongolia, 26-28 August 2000

Presented by Chong Chun KIM,
Director General of the International Cooperation Bureau,
Ministry of Environment, Republic of Korea

Excellency, state secretary, Mr. Banzragch, Distinguished Participants, Ladies and Gentlemen:

It gives me great pleasure to share Korea's environmental experiences and policy development with you and to learn about success stories in Northeast Asia. I am honored to participate in this meaningful conference, and to work together towards ever-closer environmental cooperation. Allow me to take this opportunity to express our deep appreciation to the Mongolian Ministry of Environment and Nature for hosting this event and the Environment Agency of Japan for their assistance.

I would like to talk to you about two topics. I will first propose a suggestion for formalizing NEAC's structure and offer a definition its main objective and role. This is crucial for building NEAC's capacity for success in the region. Following that, I will bring you up-to-date on Korea's current environmental policy regime.

(1)

As you know, at the 8th NEAC in Kyoto in November 1999, participants discussed four main issues: (1) Environmental Conservation Administration Measures by Local Authorities, (2) Environmental Cooperation Initiatives of Local Authorities, (3) Climate Change Problems, and (4) Practical Use of the Internet in Environmental Cooperation. They agreed that a partnership, which includes governments, businesses, experts, and the public, is very important. They also viewed the NEAC as an important forum for the exchange of information and ideas on environmental protection measures, and that the NEAC should be strengthened.

Korea has been active in adopting the outcomes and agreements of the previous NEAC meetings. In this context, the Korean Ministry of Environment is making every endeavor to enhance local government and private sector awareness of environmental cooperation in Northeast Asia, in part by organizing the National Expert Network on Northeast Asian Environmental Cooperation. This network includes environmental experts, local and central governmental officials, and members of environmental NGOs. Through this mechanism, we intend to promote public awareness and understanding and facilitate the exchange of transparent information—essential keys to progress.

Additionally, the TEMM internet website has been established by the National Institute of Environmental Research of the MOE. The Northeast Asian Center for Environmental Data and Training is also creating a website to help analyze and effectively use environmental data. In this regard, I would like to emphasize that review process and mechanism is very important for NEAC's progress.

(2)

I would like to note that NEAC has been contributing to environmental awarenes and the development of other programs in Northeast Asia over the last 9 years (since 1992

However, it is also understandable that we did not further develop and upgrade the NEAC's role and functions beyond the initial stage. A number of experts and officials mentioned the lack of linkages and effectiveness, and identified redundancy as a major problem for environmental cooperation in Northeast Asia.

At this point, I would like to emphasize that each program and conference has specific roles and important functions. Therefore, in Annex 1, I would like to offer suggestions on the roles and structure of NEAC, including defined objectives and direction.

In short, NEAC would serve as a policy forum enabling increased access to advice and knowledge on environmental issues, within the existing environmental cooperation mechanisms in Northeast Asia. It would enhance public awareness and policy makers' understanding, and encourage closer environmental cooperation between local and national governments and the private sector, as well as environment ministry.

I hope for your full consideration and discussion on this suggestion as presented in Annex1, which will be presented in Session 4.

(3)

This year saw substantial progress on environmental cooperation within Northeast Asia. As most of you I'm sure are aware, the environment ministers of Japan, China and the Republic of Korea agreed at the 2nd Tripartite Environment Ministers Meeting to implement 9 concrete projects.

At the 6th NEASPEC in Seoul last March, the Vision Statement for Environmental Cooperation in Northeast Asia was adopted. In addition, member countries gave a mandate to the Northeast Asian Center of Environment Data and Training, and agreed to establish a core fund. These achievements and those to follow will strengthen environmental cooperation in the region.

I would like to emphasize that Northeast Asia will play a leading role in setting the environmental agenda not only in our region but also in the world. Many of the world's fastest growing economies are found in Northeast Asia, and as a result some of the fastest deteriorating ecosystems may also be found here. This has both positive and negative aspects. One positive is that if we are successful in meeting our shared environmental challenges and cooperate closely on the issues, we could then offer the world not only roadmaps of pathways from the economic periphery, as they say, but also pathways from environmental crisis.

I therefore believe closer cooperation between us is strongly needed in preparation process for of Rio+10 and the 4th ESCAP Ministerial Meeting on Environment and Development.

(4)

I'd now like to change gears and introduce the Republic of Korea's environmental policies and measures. 1999 was a period of consolidation of the decade's accomplishments and of identifying directions for environmental policies for the new century. We decided to focus on measurable improvements in the ambient environment—air, water, and soil—to raise the quality of everyday life in Korea.

After successfully establishing comprehensive measures for water quality in the Han River watershed, the lifeblood of the capital region, we established similar measures to manage the Nakdong River watershed by involving residents in the process. By doing this, we successfully resolved water conflicts between upstream and downstream communities. Furthermore the Ministry of Environment is going to establish similar measures for the Kuem and Youngsan River Watersheds.

Preparing for Korea's anticipated water shortage this decade, we have established nationwide water conservation measures, including the installation of conservation devices and the expansion of public campaigns.

The Ministry has started replacing some diesel buses with CNG buses. The government is investing 33.4 billion won (US$290 million) to introduce 1,500 CNG buses in Seoul, Pusan, and other large cities this year.

We aim to establish a comprehensive waste recycling system. We plan to implement additional waste management measures, such as strengthening regulations on disposable goods and packaging materials. The minimization and recycling of food

waste will also continue to be promoted. We will expand current measures in this area by introducing a recycling fee on the discharge of food waste. We will continue to increase recycling capacity and introduce efficiencies for collecting food waste.

The Ministry is in the process of systemizing and integrating wildlife regulations, which will help strengthen the overall conservation system. Specifically, we are planning to officially protect areas with exceptionally healthy or biologically diverse ecosystems. Meanwhile, the Wetlands Preservation Act was newly enacted to protect these sensitive and ecologically important lands, often referred to as treasure troves of biodiversity.

Another important goal is the creation of a mandatory system to institutionalize the environmental impact assessment process. We believe we can both simplify and increase the effectiveness of impact assessments by integrating the various impact assessment systems. These include transportation, disaster, population as well as environmental impact assessments.

To set the tone for these approaches, on World Environment Day the Ministry released its National Vision for Environmental Policies in the 21st Century. It contains guidelines for environmental ethics and values in the new millennium, environmentally friendly development, and the construction of what we call an "ecological community" on the Korean peninsula.

As we move into the new millennium, we will promote environmental policies that focus on managing demand and increasing efficiency, rather than morely trying to limit production directly. Policies based on partnerships across social sectors will be emphasized. Environmental policy should reinforce economic incentives for environmental management, and help build a sound environment and economy simultaneously.

I hope this overview of our environmental policy focus and vision helps you understand our perspective on where we've been and where we hope to go. If you would like more details on our activities, I'd be happy to talk with you further about it later, or to introduce you to the appropriate people or resources.

(5)

I am very pleased to attend 9th NEAC meeting held in this historic city as a representative of the Republic of Korea. I am quite honored to be participating in this meeting with the famous Korean environmental activist Kim Jae Ok, the CACPK, experts, and local governmental officials. The diverse collection of participants reflects our expectation that NEAC will be a truly open forum in which to share environmental knowledge, approaches and ideas at all levels.

To conclude, I would like to express our sincere hope for D.P.R. Korea's participation in NEAC conference since next meeting. As all of you may be aware, last month a historic summit meeting between south and north Korea held in the Korean peninsula. I believe that this peaceful climate will helpful in promoting environmental cooperation in Northeast Asia. So, North Korea's joining in NEAC will contribute to develop this framework. I wish for your concern and cooperation in this matter.

I would once again like to give my thanks to the Mongolian Ministry of Environment and Nature and the Japanese Environment Agency. I would like to close by saying that I eagerly hope that the NEAC will contribute to solving environmental problems in this region through the active participation and cooperation of each country, and the commitment shown by individuals such as yourself.

Thank you.

Annex1.

Objective and Roles of NEAC

1. Objective

(1) As environmental degradation accelerates throughout the region, and as it becomes clear that lasting solutions require increased involvement from NGOs, the private sector and the public, the main objective of NEAC should be to promote free discussion and policy exchange, and to enable access to useful, accurate information at all levels.

(2) Through these activities, NEAC is aimed at contributing to effectively cope with domestic and regional environmental problems, such as transboundary environmental pollution, conservation, and water and waste management, and to ultimately lower pollution throughout North-east Asia.

2. Roles

(3) The NEAC should play several roles. Through the NEAC Mechanism the participation of various stakeholders can be enhanced. These include environmental experts, institutions, local governments, and NGOs as well as relevant national government ministries and agencies.

(4) Since it is largely a forum for maintaining an open policy dialogue, it serves as a basic foundation for other environmental programs. Its ties to other conferences and programs such as TEMM and NEASPEC should therefore be strengthened. To this end, host countries will present information and results generated through NEAC at the following TEMM and NEASPEC meetings. The host country will take measures to share NEAC's outcomes, such as publishing and reporting the presentation documents and agreed results.

(5) Considering the timing of conferences of similar programs, it is possible to promote various measures for providing TEMM and NEASPEC chances for holding interim reviews and expert meetings in specific areas, such as transboundary air pollution, nature conservation and bio-diversity.

3. Participating and Hosting Countries

(6) Six Northeast Asian Countries--China, D.P.R. of Korea, Japan, Mongolia, the Republic of Korea, and Russia--will join this conference as member countries.

(7) Member countries would host NEAC meetings in turns. However, in case of special circumstances the venue can be changed by the conference participants.

(8) The host country would cover the expenses of two participants from each member country.

4. Structure and Agenda

(9) The conference consists of four sessions. The first and second sessions will be organized at the national government level, while the third session is at the local government level. The fourth session is for the private sector.

(10) Each session's agenda will include various environmental issues in Northeast Asia, and would be adopted in the previous meeting. In order to provide a policy basis for other environmental programs, approval items and ongoing projects of other environmental mechanisms can be considered in the process of selecting the agenda of NEAC meetings.

(11) In collaboration with local governments and private organizations, host countries can organize special activities, such as public symposia and exhibitions.

Keynote Speech

Wednesday, July 26, 2000

Hiroyuki Taguchi,

Director, Office of Overseas Environmental Cooperation

Environment Agency, Global Environment Department

1. Introduction

Distinguished delegates, ladies and gentlemen.

On behalf of the Japanese delegation, it is a great honor for me to deliver a keynote speech at the very first stage of this conference, and I would like to express my profound gratitude to the government of Mongolia.

I recognize that this year's conference has its noteworthy significance. It is because this is the first time for Mongolia to host the conference. This is also the ninth conference when it is a good time to review the past decade of NEAC and discuss the next decade of NEAC. I believe that NEAC has made continued progresses in promoting policy dialog since the first NEAC in 1992. It is our responsibility to make sure that the progresses will be extended and developed further to tackle with such environmental challenges as global warming, air pollution, and other environmental problems.

2. Japanese Environmental Policies

First of all, I would like to introduce Japanese environmental policies. We are now reviewing the Basic Environment Plan, which was developed five years ago, to make the plan suitable for the early 21st century. The followings are the Environment Agency's priority policies in line with reviewing the Basic Plan.

<Global Environmental Issues>

The first is to take initiatives to deal with global warming and other global environmental problems. As for global warming, We will make every effort to ensure the success of COP6 (the Sixth Conference of the Parties to the United Nations Framework Convention on Climate Change) this November, and to have the Kyoto Protocol come into force in 2002 at the latest. At the same time, we will promote domestic comprehensive programs to achieve our GHGs six percent reduction target. We will also address global environmental problems through such ministerial-level international frameworks as the Tripartite Environment Ministers Meeting among Japan, China, and the Republic of Korea, the G8 Environment Ministers' Meeting, the ESCAP Ministerial Conference on Environment and Development in Asia and the Pacific, Eco Asia and "Rio plus 10."

<Environmentally Sound Resource Cycling>

The second is to establish a social and economic system to realize "environmentally sound resource cycling." This system means extracting the minimum necessary amount of resources from the ecosystem; utilizing them at maximum efficiency; and returning them with minimum burden to the environment. The last Diet session has passed the basic law to expedite the formation of a system of "environmentally sound resource cycling" and the Law on "Promoting the Purchase of Green Products by the National Government and Other Entities" for promoting a shift in demand to recycled and recyclable products. We are also pursuing the development and dissemination of eco-friendly products and technologies, providing necessary supports for grassroots activities and promoting environmental education and learning.

<Dioxins and Chemical Substances>

The third is to control dioxins and other chemical substances. Our government will control dioxins through maintaining and attaining environmental quality standards for air, water, and soil, based on the Special Measures Law on Dioxin Control that has been in effect since this January. We are also preparing for overseeing and publicizing the amounts released on chemical substances towards the enforcement of the Japan's Pollutant Release and Transfer Register law. At the same time, we are promoting the researches and studies for scientific findings on endocrine disruptors.

<Air Pollution>

The fourth is to strengthen motor vehicle-related environmental measures in major urban areas. Next year's Diet session will revise the Motor Vehicle NOx Law to alleviate air pollution in major cities caused by nitrogen oxides and particulates, through getting the recommendation from Central Environment Council within this year. As for the regulation on emissions by diesel-powered vehicles, the Central Environment Council is now considering its reinforcement earlier than planned previously. As for the airborne particulates, we are promoting the studies on measurement and assessment methods, as well as the health impacts, of even finer particulates. The last Diet session has passed the Law to Partially Revise the Offensive Odor Control Law for reinforcing measures on odors that arise in conjunction with accidents and enhancing the system for measuring odors.

<Bio-Diversity>

The fifth is to pursue the strategic conservation of bio-diversity in accordance with each type of area such as forest and wetland. We are promoting the scientific and planned protection and management of wildlife

in accordance with the Wildlife Preservation and Game Act, which was revised last year. We are also providing for those facilities that promote the symbiosis with nature and learning on eco-system in natural parks, and opportunities of experiential learning from nature.

<Environment Ministry>

The last is to prepare for our becoming the Environment Ministry next January. Since the upcoming Ministry unifies the administrative functions of controlling wastes and chemical substances, and enhances initiatives on global environmental issues, We strengthen organization and system by increasing and enhancing personnel, reorganizing departments.

3. Recent Trends of Environmental Policies: Policy Mixture

Next let me discuss the recent trends of environmental policies in domestic and international fields. I think that the issues on environmental policies can be focused on three types of policy mixtures.

<Integration of Environment and Development>

The first type is a mixture in policy areas. That is to say, the integration of environment and development. Sustainable development is not achieved only through what we call "environmental policy." It is necessary to pursue environmentally sound policies in every sector of economy. For example, the policies on forest, water and energy should be reformed in environmentally sound manners like improving efficiency of their resource production and usage. Development plans should go through "Strategic Environment Assessment" to make development consistent with environment. International organizations like UNDP and UNEP have already facilitated a strategy of

mainstreaming environment throughout all sectors. OECD-DAC has promoted new development strategy through the guidance of policy integration to developing countries. World Bank is now preparing a new environment strategy aimed at integrating environmental concerns into its mainstream poverty alleviation and economic development efforts towards December this year.

<Mixture of Regulation and Economic Instruments>

The second type is a mixture in policy methods. There are two kinds of policy methods in general. One is a rigid command-and-control approach, typically establishing and enforcing such regulatory standards as emission and effluent standards to control air and water pollution. The other is economic incentive instruments, typically such market-based instruments as emission and effluent charges and emission trading. There have recently been the moves toward introducing economic instruments for their efficiency and effectiveness in several countries, especially since such frameworks as emission trading were formulated as one of the Kyoto Mechanisms. However, the command-and control regulations are still appropriate in cases where even small quantities of pollutants can cause significant damage, such as toxic or hazardous waste. Therefore, environmental management should be based on a mixture of regulation and economic instruments.

<Partnership between public and private sectors>

The third type is a mixture in policy players. There are many players to tackle with environmental problems; central and local governments, private companies, research institutes, NGOs, etc. Each player has its own role and comparative advantage in its activity. For instance, central government is responsible for such basic policies as national planning, guideline, standards

and so forth. Local governments have much experience in such resident-oriented measures as spatial planning and monitoring. NGOs are engaged in such grass-root activities as afforestation and environmental education. To cope with big environmental challenges, it has become essential for all players' activities to be mobilized and integrated in both domestic environment conservation and international cooperation. Therefore it is expected that players take partnership in their activities. I think that NEAC is one of the opportunities for supporting the partnership, which will be discussed later on.

In this way, the crucial issues are to find and pursue a best mixture in policy areas, policy method and policy players, in other words to integrate environment with development, to combine regulation with economic instruments, and take partnership among players.

4. Ending Remarks

Participating countries vary in their histories, cultures, social systems, the sizes of their economies and their natural resources. Despite these differences, I believe that we all share the will to address global and regional environmental problems. Needless to say, this conference is of great significance because it allows us to exchange information among ourselves and to further reinforce our cooperative ties. I hope that this conference will yield common fruits and be a success for everyone in attendance.

Lastly, as you can see from the materials at hand, I am pleased to inform you that we have received from Kyoto Prefecture Governor Mr. Teiichi Aramaki and Maizuru City Mayor Mr. Mitsuoki Emori, the messages that the previous conference yielded significant results, and congratulatory notes on this year's conference.

Remarks to the 9th Northeast Asian Conference on Environmental Cooperation

July 26, 2000

Teiichi Aramaki
Governor
Kyoto Prefecture

Ladies and Gentlemen,

Participants of the 9th Northeast Asian Conference on Environmental Cooperation, I would like to extend my warmest greetings on the opening of the 9th Conference on behalf of the people of Kyoto Prefecture who hosted the 8th Conference.

The 8th Conference was held in November 1999 in Maizuru-City of Kyoto Prefecture, one of the chief Japanese trading ports. I understand that the 8th Conference resulted in great success in recognizing the importance of forming partnerships and collaboration among local governments, through the active discussion of local government initiatives in promoting international environmental cooperation.

At the 9th Conference, the results of past conferences will come under review, while the participants are expected to discuss the future initiatives in environmental cooperation among the parties involved. I sincerely hope that this conference will bring about constructive achievements.

Kyoto Prefecture, as a responsible local government, intends to devote its committed efforts to promoting environmental cooperation in the Northeast Asia region, on the basis of our achievements at this Conference.

I am full of expectation that the 9th Conference will contribute to the definite progress of environmental cooperation in the Northeast Asia region. In closing, I would like to extend my best wishes for the health and prosperity of all the participants.

Dear Sir,

On the occasion of the Ninth Northeast Asian Conference on Environmental Cooperation, I would like to extend my warmest greetings to you. I hope the conference has great success in Ulan Bator, Mongolia where boasts of its tradition and beautiful vast plain.

We discussed about environmental policies and exchanged information in the city of Maizuru, the former host city of the conference last year. We contended energetically for four days, including symposium. Last conference was very significant for both our citizen and government to cooperate and implement environmental policy and it was also meaningful for us to cooperate and exchange with the people of Northeast Asia.

Now there are many environmental problems and we need to try hard to solve environmental problems in every level of society. I anticipate the conference in Ulan Bator achieves splendid result and makes great success. I hope mutual understandings and cooperation that was raised in Maizuru strengthen more.

Finally I hope the Ninth Northeast Asian Conference on Environmental Cooperation has fruitful result and extend my best wishes for participants from abroad and all of you.

Mitsuoki Emori
Mayor of Maizuru
July 26, 2000.

Ministry of Protection of the Environment and Natural Resources Russian Federation

All-Russian Research Institute for Nature Protection

9th Northeast Asian Conference on Environmental Cooperation
July 26-28, 2000
Ulaanbaatar, Mongolia

Keynote Speech

Dr. Peshkov

Councillor of Minister,
Director of All-Russian Research Institute for Nature Protection

On the threshold of the 10th jubilee of the Conference – time to sum up and make new prospects.

Dear National delegates, distinguished participants,

First of all, please allow me, to extend warm congratulations on the opening 9th Northeast Asian Conference and sincere thanks Ministry of Environment of the Republic of Mongolia, ESCAP Secretariat and organizations-sponsors for organizing this important event. We are very pleased that we have the opportunity to exchange our views and concerned for environment conditions in the region. This is our 9th Conference and we stay in a nopore the 10th jubilee. I supposed it is a good time to say some words about our overall results and future.

I believe I express not only my own point of view saying that for this period we possessed a very good basis for work - we found the fundament for understanding and work together very well. This

Conference becomes a very considerable tool for support of encouraging environmentally sound politics in this region and provide the unity of the efforts of all it's countries at different fields. It is seems, that the concentrations in several key points in every meeting is a good and fruitful way to deal with enormous and complicated environmental problems. But, if we work in this manner for some consequences years - we decide all our questions very soon. I suppose, that we also need to summarize the results in some fields of our cooperation, which we agreed upon, see first results and give new aims in some studying issues. This would be especially helpful as at the field, which grow in a good rate, where we need to increase our activity in a higher level and also in a direction, which would be not so promising. Although, we could not raise all the questions in one Conference - we may start from the positions, which request the greatest attention due to opinion of distinguish delegates. It would be very useful, if we choose the positions beforehand.

Now I would like to say several words about changing in administrative structure for management of environmental protecting in Russia. Now is the last days when the State Committee of the Russian Federation on Environmental Protection work, since 7th of August the all it's functions will be given to Russian Ministry for Natural Resources. This Ministry was established 3 years ago and comprised several Ministries specialized on exploitation of resources - geology and . Possibly, it is very early to say defensively about our future, but to be realists, we need to point that the situation with control for environmental protection and especially for bio - resources conservation is not very promising. The nowadays structure determines the situation, when within one Ministry both exploitation of natural resources and control of their utilization activity exist. This is also not so good for the nature resources' conservation because the new-formed Minister is a geologist. He just expressed his

intentions of changing the situation when a minerals' fields exploitations will be in favor in compare with establishing of protected areas This position difficult to be called "environmental friendly". But we hope, that this is a temporarily situation - and the pendulum of interest for nature conservation after turning against the conservation concerns returns again in the nearest future. Indeed, sociological polls have shown that for majority of people environmental problem for now less important than others, as example, economic instability, growing prices and criminalization of society. Possibly, that is why we lost our positions in the society in a whole and as a reflection to it in the governmental structure. But I would like to say that "every cloud has a silver lining". The present situation encourages us to find new ways for working with Governmental Authorities, to draw attention and including public participation more actively, to use modern technology, to be operative, scientifically proved and so on. Also, we are in a right position for increasing out international contacts and to use the support of our foreign colleagues and organizations to pursue our Government for environment oriented politics.

Let me now briefly take the opportunity to present some general positions about the latest actions and priorities in the field of our main.

Starting with the forest conservation I would like to say following. The Russian forest fund occupies 69 % of the total lands. Almost 78 % of all dense forests are located in Asian Russia, this is the greatest part and it outlines our special concern of this territory.

To say about modern forestry practice, it is important to say, that in 1997, since the introduction of the Russian Federation Forest Code, the structure of ownership for the forest fund has radically changed. The Code made for a transfer of a part of the ownership of Federation subjects and enacted other forms of its possession, disposal and use. Forests, their

biodiversity and biological resources determine the life of population and economic structure on almost a half of the country's territory. In addition to the supply of timber that is harvested annual on about 10 000 sq km, forests have notable environmental, resource and recreation functions. Due to support the exploitation forests for their ecosystem, environmental functions it will be important to incorporate the values of forests for people survival in terms of economy. For this purpose could serve the program of increasing the non-ligneous forest production, which just have been elaborated in some territories. We are in a process of elaborating and funding a way for including the forest management into the process of sustainable development.

Among the main problems in the conservation of forests in Russia for today, I would like to point that it is a paradoxical situation that the forestry authorities define the volume of exploitation, use forest resources free of charge and at the same time inspect themselves. The modern situation, when forestry authority is included to the new formed Ministry of Natural Resources do not imply the change of the situation. There are several measures to improving the situation. We need to change our existing forest legislation to ensuring environmental security of forest preservation and prevention of their degradation. Also, we need to establish status of forestry and stop merging of the forestry and the forest industry. The results of this merging in the recent past can be still traced as vast areas non-restored slashes, open woodlands and marshes that emerged in places where forest used to be. The function of Forest management must be taken by special authority, which could provide proper forest management and remediation. The important part of forest conservation could be done with help of non-governmental organizations and international organizations in Russia. Some of them as example IUCN, WWF and Greenpeace are very active at the promotion of forest

conservation. As example, IUCN in 1995-1998 developed a program "Conservation and use of primary and secondary forests in Central and Eastern Europe". There are several forest program developed by other organizations. Unfortunately, their gaining results sometimes could not be used in practice; the conclusions are very ambitious, but very subjective. Still scientific authority, governmental environmental institutes and governmental organizations are elaborating more adequate program.

As concerned protected area I would like to outline, that Russia possesses the high-developed and unique system of protective territories which comprises state nature reserves - zapovedniks (the strongest protected areas - the highest type of protection by IUCN categorization), national park, prirodniy park (nature park), natural monument, state game reserve territories and so on. The System of state nature reserves, the leader of protected areas in Russia, has been formed for as much as 80 years. The zapovedniks have been carried out active scientific studying of nature conditions – "Chronicles of Nature" and monitoring of rare and endangered flora and fauna species. In recent years the system of national parks, nature monuments and natural parks has been developing rapidly. The aims of the development of protected areas are the support network of protected areas, which provide survival of rare and endangered species, ecosystems, landscapes and ensure sustainability in ecological conditions for all territory. Today the active work on the Concept of the Russian special protected territory is in progress. We are beginning to develop eco-tourism in protected areas and need to accumulate world's protected areas experience in this activity. We should make an attempt to learn form other people experience and mistakes rather when do it ourselves.

As our system of National Parks has just started to be formed, we are in a process of development a Strategy for managing of Russian National Parks. Today there are 35 national parks representing valuable and state-

important territories. However, they are acutely short of laws and definitive prospects for their development. The problem of interrelationship between national park and the human population living within its territory is a problem of special emphasis in the Strategy. The most important components of the Strategy for managing is one associated with sustainable survival which include

- involving of the local population in protecting valuable natural and cultural cites;
- creating conditions for the participation of the local community in managing the economic development of the national park and so on.

An important element of sustainable development of nature reserves management coupled with a reliable public support. Now we are in the process of elaborating of mechanisms to achieve mutual understanding with society using international experience and trying a new form.

And finally, I would like to stress the necessity for solving the environmental problems more effective and properly we need to strengthen building capacity for active exchange of the information between countries. It will be very useful to have a special connection to raise a system of awareness helpful for organizing of ecological security for the Notheastern region.

In assumption, I need to outline that participation of Russian Federation in Northeast Asian Conference on Environmental Cooperation is very efficient to encouragement for Environmental Protection in the region in Russia. The practical examples of the implementation of the decisions of the Conference will be demonstrated in the session reports.

9th Northeast Asian Conference on Environment Cooperation

Keynote Speech

July 26 , 2000

Dr. N. Sarantuya, Director of Policy Coordination Department, Ministry of Nature and Environment, MONGOLIA.

Mr. Chairman,
Distinguised participants,
Ladies and Gentlemen,

It is my great pleasure and honour to deliver a keynote speech to 9th Northeast Asian Conference on Environment Cooperation. As a representative of host country I would like to expand to you my wholehearted welcome and thank all of you for coming such a long way to Ulaanbaatar.

On the threshhold of new millennium, the deepening of global environmental problems and increased damages to diversity of nature, have resulted in deterioration of surrounding nature, reduction of natural resources, and a negative impact on national development progress. Critical environmental issues such as greenhouse gases, ozone depletion, global warming, drought, desertification, a loss of biological diversity, acid rain, and natural disasters have become worldwide threats.

As the owner of the nature, the numan race has rejected the development path of too-rapid leaping forward that cause natural resource depletion and damage to the nature. Instead, the sustainable development strategy that address the issues of living sustainable and compatible with the nature has been considered as the best option. Environmental pollution and degradation know no frontiers and environmental problems are becoming ever more international in scale.

Mr. Chairman,
Distinguised participants,

I would like to take this opportunity to introduce the present Mongolian environmental challenges and and state policy in this field.

Mongolia is a land-locked country which occupies an ecological tranzition zone where Central Asia and Sibirian Taiga meet and it has an extreme continental climate and its ecosystems are rather fargile and sensitive.

The worthwhile traditions of the Mongolian people, who since ancient times have aimed at conserving the environment and proper use of natural resources , now are enriched by

the new concept of sustainable development. However, increased population, industrialization and development in mid of this century have had considerable impacts on Mongolian traditional lifestyle and nomadic civilization.

During the last 20 years , the degree of exploitation of renewable and non-renewable natural resources has grown rapidly, leading to adverse impacts on the environment. Mining products account for over two thirds of the nation's total exports. Also the cooperative movement involving husbandry and establishment of a new sector for cultivated land made significant changes in the traditional life style. Through the cooperative policy, a large number of livestock of the same kind was concentrated in on place exceeding carrying capacity, which caused decrease of soil productivity and water supply. The total forested area has decreased by 1.4 million hectares, and the total pastureland declined by 6.9 million hectares. Privatization of public enterprises and the emergence of thousands of private enterprises in recent years with little oversight of their activities by monitoring agencies have led to the irrational exploitation of natural resources in a chase for short term profits, inadequate and polluting waste management practices, and failure to rehabilitate natural resources damaged by the economic activity.

The most urgent environmental and natural resource issues facing Mongolia are environmental challenges due to urbanization and socio- economic development, such as degradation and overexploitation of natural resources, air pollution, overexploitation and pollution of limited water resources, solid and hazardous waste disposal, land use conflicts between pasture and biodiversity conservation, non-sustainable utilization of land and forest resources, expansion of deserts by natural and human impacts, and recurrent natural disasters.

In the 1990's, when democratic and market oriented policies started, able conditions for environmental reform were created. During 1994-2000, the Parliament of Mongolia enacted a package of laws and programs regarding nature conservation and rational use of nature resources. Laws decentralize authority to local governments concerning protection, restoration and rational use of natural resources i.e. to increase the role of local governments and communities in this matters.

Since 1995, numerous initiatives and programs have responded to Mongolia's environmental challenges. Among other achievements can be mentioned;

- Significant progress has been made in drafting specific environmental legislation e.g. for natural resource management, air emissions, waste discharge, environmental taxes, and royalties form the exploitation of natural resources
- An impressive number of strategies and action plans have been approved over the last 5 years, and it is now an important challenge to implement all these plans: State Policy on Ecology, Biodiversity Conservation Action Plan, National Action Program to Combat Desertification (NAPCD), National Plan for Protected Areas, National Water Policy Program, Forestry Program, Program on Wastes: Program on Air Protection, National Program for Environmental Education and Public Investment Program (PIP) 1999-2002.

- Mongolian Action Program For 21 century (MAP-21) was elaborated in accordance with the Earth sustainable development methodology and principles. This program is a document that can serve as a national guideline which embraces and defines the whole complexity of the requirements, policy goals, working directions and methods for developing all the spheres of our country's life while maintaining environmental checks and balances.
- NGO and public participation in environmental protection has increased
- 14 percent of territory has been included in the protected area network
- EIA knowledge, procedures and implementation ability has been strengthening
- National environmental monitoring system, including environmental Information system with ecological database has developed
- Many projects have been focusing on environment and natural resource management and protection at local level.
- In February 2000 the Mongolian Parliament approved the Law on 'The ratio of the income from the natural resources use payments to be spent for environmental protection and natural resource restoration''. It is very important law for mobilizing financial mechanisms and finding sources to develop enhanced environmental protection and natural resource management.

Since 1993, Mongolia has joined 9 Conventions that regulate the critical global environmental issues such as biodiversity conservation, climate change, combatting desertification, reduction of ozone layer depletion, the trade in rare and endangered species of flora and fauna, transboundary transmission of hazardous wastes and its disposal, protection of wetlands, production, storage and disposal of chemical weapons, and protection of migratory animals. Besides, Mongolia is cooperating effectively with foreign countries and international organizations. As Mongolia joined international conventions, there opens a door for us to have an opportunity to make a contribution to the prevention of the world ecosystem from ecological threats and to increase its reputation on the international arena. To date, there are 7 intergovernmental agreements established between 1990-1999 out of 20 bilateral environmental agreement of great importance for the protection of the whole country's territory, particularly the nature around state border. It is worth to be noted that the agreement established with the Russian and Chinese governments in environmental field in 1994 forms a basis for the development of multilateral transboundary cooperation with the neighboring countries. In addition, according to the intergovernmental agreement established with the neighboring countries on protection and use of water around border areas, it has become possible for the participants to implement activities such as prevention of water from drying up and reduction of water contamination, to control water quality, carrying out investigation, and exchange of information during natural disasters. Several meetings were held by representatives of proper authorities.

The underlying and critical factors for the achievement of environmentally sustainable development in Mongolia are sound environmental legislation, a capable institutional framework, proper information and knowledge basis, public understanding and participation and targeted investment programs to mitigate environmental deterioration

and to create work and development opportunities for the local societies. We have been confronted with a task, duty and a need to start implementation as well as to bring about legal environment, personnel, financial and technological resources and conditions in order to materialize all mentioned before policy and programs. There is shortage of financial sources for funding of nature protection and restoration at national and local level. In order to achieve successful implementation of these programs it will be important to ensure nationwide participation of key players including state institutions, NGOs, business sector.

Mr. Chairman,
Distinguised participants,

Since the first meeting of the North-East Asian Conference on Environmental Cooperation in 1992 the participating countries have continued their efforts to seek the effective measures for regional cooperation. I think this 9th Conference is an extremely important opportunity to discuss all of our achievements and cooperation tackling problems and to reinforce regional cooperation channels.

In closing, I would like to emphasize the role that NEAC could play in addressing global and regional environment issues like global warming, combatting desertification, biodiversity conservation We believe that advanced countries of region will participate actively in the various field of cooperation, particularly in technology transfer and financial assistance for developing countries.

I wish every success to all of you.

Thank you for your attention.

Ninth North-East Asian Conference on Environmental Cooperation
26 - 28 July 2000
Ulaanbaatar
Mongolia

SUBREGIONAL ENVIRONMENTAL COOPERATION IN NORTH-EAST ASIA
- Perspective 2000 -

Masakazu Ichimura
Expert on Environmental Policies
Environment and Natural Resources Development Division
UNITED NATIONS ECONOMIC AND SOCIAL COMMISSION FOR ASIA AND THE PACIFIC

This region-wide ministerial conference on environment and development has been held every five years since 1985, and has broadened the environmental awareness and strengthened alliances among countries and stakeholders seeking to address the environment and sustainable development issues of the region. In particular, the last Ministerial Conference held at Bangkok in November 1995 made an intensive deliberation on how to promote implementation of Agenda 21 in the region, and adopted the Ministerial Declaration and the Regional Action Programme for Environmentally Sound and Sustainable Development 1996-2000 addressing the regional environmental priorities.

Based on this achievement, the fourth Ministerial Conference is planned to be held from 31 August to 5 September this year, in Kitakyushu, Japan, with primary objective of assessing the state of the regional environment and developing a consensus for further strengthening implementation of the Agenda 21. The Conference is expected to adopt a new Regional Action Programme for national and regional follow-up for the beginning of the new millennium. The expected outcome also includes Kitakyushu Initiative for Clean Environment, which is proposed to be a priority mechanism for RAP Implementation, with special focus on urban environment, a new declaration to reaffirm commitment of decision-makers to implement priority policies and measures, and a collective message from the Asian and Pacific region for "Rio + 10" review of the global implementation of Agenda 21.

I would like to highlight that importance of subregional cooperation have been consistently emphasized in deliberations of the past Ministerial Conferences, in particular in the Regional Action Programme for 1996-2000, adopted in 1995. To assess the progress since 1995, an issue paper "REVIEW OF THE IMPLEMENTATION OF AGENDA 21, INTERNATIONAL ENVIRONMENTAL CONVENTIONS, THE REGIONAL ACTION PROGRAMME FOR ENVIRONMENTALLY SOUND AND SUSTAINABLE DEVELOPMENT, 1996-2000" has been prepared for submission to and deliberation of the forthcoming Ministerial Conference in Kitakyushu, and in this paper, development of subregional activities have been recognized as one of the major indicators of implementation. Having reviewed the remarkable progress in the subregional activities, the "REGIONAL ACTION PROGRAMME FOR ENVIRONMENTALLY SOUND AND SUSTAINABLE DEVELOPMENT 2001 - 2005", another issue paper to be submitted to the Ministerial Conference for adoption, calls for further promotion of the subregional activities, in particular though development of effective subregional mechanism for cooperation.

Among numbers of ongoing activities assessed in the "REVIEW OF THE IMPLEMENTATION" issue paper, major development in subregional programmes have been reported from South East Asia, such as the haze action plan, ASEAN Regional Centre for

Biodiversity Conservation and Greater Mekong programme, and also from South Asia with particular reference to the Malé Declaration on Control and Prevention of Air Pollution and Its Likely Transboundary Effects. Also reported are initiatives to combat marine pollution at the subregional level through the Regional Seas Programme of UNEP, which included the formulation of action plans and implementation of projects for the East Asian Seas, South Asian Seas, North-West Pacific, and the Black Sea. Many more subregional environmental cooperation programmes have been emerging in Caspian Sea and Aral Sea basin.

The development of the subregional cooperation in the North East Asia has also been impressive for last few years. This Conference, North-East Asian Conference on Environmental Cooperation, has been held on annual basis as a result of valuable and continuous efforts of the five participating countries. A variety of issues have been taken up and discussed at this Conference, reflecting priority concerns of environmental administrations and practitioners of the subregion. The review of the environmental issues and exchange of information have resulted in in-depth understanding on the environmental situation in the participating countries that provided the sound basis for environmental cooperation projects formalized in different shapes in the subregion.

But perhaps in this subregion, the Tripartite Environment Ministers Meeting among China, Japan and the Republic of Korea, has been showing a most impressive development in the past two years. Through the past two meetings held last year and this year, the Ministers of three countries reaffirmed the usefulness of setting a regular forum at the ministerial level for further fostering regional environmental cooperation and sustainable development, and agreed to take steps to develop more concrete project-type cooperation among three countries in their six priority areas.

Another admirable initiative originating from this subregion should be the effort towards the establishment of the Acid Deposition Monitoring Network in East Asia, EANET. After two years of preparatory phase activities, it is now reaching the final phase to conclude the institutional and financial arrangement towards the formal establishment of the Network, which is to include North-East Asia and South-East Asian countries.

I am now very excited to report on the recent development of the North-East Asia Subregional Programme for Environmental Cooperation, NEASPEC in short. I trust that you are mostly well aware of the NEASPEC development and its activities, as it is a unique intergovernmental mechanism for comprehensive environmental co-operation in this subregion. But, for those who are not familiar with the programme, let me provide very quick overview on the background, past development and ongoing activities of the NEASPEC.

The efforts at promoting subregional environmental cooperation in North-East Asia were first undertaken by ESCAP in cooperation with UNDP, UNEP, ADB and the World Bank, immediately following the Rio Conference in 1992. The First Meeting of Senior Officials was held in Seoul in February 1993, as the first attempt of such kind in this subregion at the official level. Since then, through the consultation process in a series of Meetings of Senior Officials, NEASPEC has continuously developed its function primary as policy dialogue forum to deal with environmental issues with common concern of the countries in the subregion, in parallel with pursuing environmental co-operation projects in the relevant fields, with participation of six North-East Asian countries, i.e. China, Mongolia, Japan, Republic of Korea, Russian Federation and Democratic People's Republic of Korea.

Throughout this inaugural process, the primary highlight should be placed on the adoption of the Framework for the North-East Asian Subregional Programme of Environmental Cooperation at the Third Meeting of the Senior Officials, held at Ulaanbaatar in September 1996. The Framework elaborated, among other things, the geographical coverage, Programme

objectives, decision-making functions of Senior Officials Meetings, and coordination, management and financial mechanism of NEASPEC, which have constituted a firm basis for the subsequent cooperation activities.

Having such cooperative Framework in place, NEAPEC has also been progressive in the project formulation and implementation. As the Second Meeting of Senior Officials held in Beijing in November 1994 endorsed five priority areas for project identification, including air pollution control in energy sector, biodiversity management and environmental data, three subprojects were identified and implemented with funding support by the Asian Development Bank and ESCAP.

Starting with the first Demonstration and On-site Workshop on Clean Coal Technology in China, the NEASPEC projects were implemented through sixteen activities, which included six technology demonstration and on-site workshops, four expert meetings, and two project review meetings. Additionally, four project profiles for follow-up activities have been developed for the second-phase funding by the Asian Development Bank and ESCAP to be provided shortly. In the meantime, inter-phase activities are going on under the initiatives of the Government of the Republic of Korea and the Government of Japan, in particular, for the establishment of two NEASPEC Training Centres in the Republic of Korea, one on the environmental data and one on the pollution control of coal-fired power plants.

On top of the past progress I have described so far, the Sixth Meeting of the Senior Officials, held in Seoul in March this year, can be termed as a significant milestone for the beginning of new era of NEASPEC as it adopted a very momentous Vision Statement. This Vision Statement, which *inter alia* committed NEASPEC to develop the present Framework for NEASPEC into a comprehensive Programme for environmental cooperation in North-East Asia, preferably by the Eighth Meeting of Senior Officials, to be held most probably here in Ulaanbaatar in two years time.

Another important decision in Seoul Meeting was the establishment of "Core fund for North-East Asian Environmental Cooperation" aiming at enhancing subregional environmental cooperation and implementation of approved projects. We are gratified to note that the Republic of Korea has made a pledge to contribute US$ 100,000. I am, no doubt, that other countries would follow suit and make voluntary contribution to the core fund.

The Seoul Meeting was also unique as it invited for the first time, the presentation of the activities of a number of environmental cooperation initiatives and projects in North-East Asia, namely, Acid Deposition Monitoring Network in East Asia (EANET), Environment Congress for Asia and the Pacific (ECO ASIA), Northwest Pacific Action Plan (NOWPAP), North-East Asian Conference on Environmental Cooperation (NEAC), and Tumen River Area Development Project (TRADP). The Meeting also welcomed the outcome of the Tripartite Environment Ministers Meeting among China, Japan and Republic of Korea. The Meeting recommended that sharing of information and experience of the ongoing initiatives was very valuable and should be continued with a view to fostering a better understanding of their contribution, which would help in improving synergies and avoiding redundancies among those initiatives. I believe that NEASPEC countries are now determined to forge an enhanced partnership, which, over longer time frame, would help in taking a proactive stance towards effective cooperation among the various initiatives.

We at ESCAP are very happy to work with NEASPEC countries to further promote the subregional environmental cooperation in the North-East Asia as we ESCAP Secretariat have been entrusted by the countries of this subregion to provide secretariat, professional and technical support to NEASPEC in collaboration with UNDP, UNEP, ADB, the World Bank and other relevant institutions. However, the most fundamental driving force for evolution of

subregional cooperation should no doubt come from initiatives of the participating countries. In this regard, we would like to congratulate this Conference and participating countries for including in its Agenda - Session 4, Review and Future of the Northeast Asian Environmental Cooperation.

I trust you will have a very stimulating and rewarding deliberation, and I look forward to the outcome of this Conference, which should provide fresh insights and new aspects for further development of the Northeast Asian Environmental Cooperation.

Annex

VISION STATEMENT FOR ENVIRONMENTAL COOPERATION IN NORTH-EAST ASIA

Adopted by

THE SIXTH MEETING OF SENIOR OFFICIALS ON ENVIRONMENTAL COOPERATION IN NORTH-EAST ASIA
Seoul, 8-10 March 2000

Background

The countries of the North-East Asia are varied in size and diverse in their economies and environmental problems. This diversity creates vast potential for extensive subregional cooperation as the North-East Asian countries can complement and supplement their efforts according to the strengths and weaknesses of their respective economies. It was recognized that the concept of North-East Asia as a subregional unit was relatively new and evolving and the problems were not easy to unravel.

Environmental challenges of the North-East Asian subregion were serious and daunting. The air pollution in many of the cities is among the highest ever recorded while the efforts at the use of cleaner fuels and many policy measures are positive signs. Water quality was also getting increasingly degraded in industrial and urban centres. The coastal and marine environment were experiencing serious problems of pollution and depletion of resources. Some areas were suffering from deforestation and desertification and loss of biodiversity. Waste disposal needed greater attention as some of the big cities recorded as low as 5 per cent treatment of household wastes. Most of these environmental problems required strong national commitment for their redressal and capacity-building through exchange of experiences as well as active cooperation and collaboration among the countries. All the North-East Asian countries are likely to benefit from information sharing and exchange, technology development and transfer, capacity-building and collaborative financing.

In view of multi-faceted environmental problems and potentialities, the countries of North-

East Asia launched environmental cooperation in 1993 as a follow-up of the Earth Summit in 1992. It aimed at promoting environmentally sound and sustainable development of the subregion by undertaking collaborative environmental programmes in the subregion based on the following principles.

1. Step by step and practical approach towards subregional cooperation with the emphasis on priority environmental concerns of the countries of the subregion;
2. Decision making by consensus;
3. Programme thrust on capacity building, information sharing and technology transfer.

The principal vehicle for evolution and carrying forward this programme was the Meetings of the Senior Officials' on Environmental Cooperation in North-East Asia (SOM).

Achievements

As the first step in forging cooperation, the Framework of the North-East Asian Subregional Programme of Environmental Cooperation (NEASPEC) was established in 1996 through a dialogue among the senior officials of China, Democratic People's Republic of Korea, Mongolia, Japan, Republic of Korea and the Russian Federation. Three priority areas for environmental cooperation namely, energy and environment, ecosystems management, in particular deforestation and desertification and capacity building remained the focus of their cooperation. Several projects in the field of energy and air pollution and capacity-building have been implemented to address the issues of common concern and further strengthen cooperation at expert level. The national and subregional centres are planned to be established for the training and capacity building of power plant managers and engineers, and for environmental monitoring.

The agreed Framework of NEASPEC institutionalized the Meeting of Senior Officials as the Governing Body of the Programme and the driving force for further strengthening subregional cooperation. The ESCAP secretariat in collaboration with UNDP, UNEP, Asian Development Bank, the World Bank and other relevant institutions was to provide secretariat, technical and financial support pending a final decision on the future institutional and financial arrangements of the Programme. The Programme is being managed through project-based funding support.

Strategic Vision

With the dawn of the new millennium and faced with deteriorating environmental situation in the North-East Asian subregion, in accordance with Agenda 21 and as elaborated at the Special Session of the United Nations General Assembly held in June 1997 (UNGASS), the Meeting of Senior Officials at its Sixth Meeting agrees to:

1. Periodically review the environmental conditions and trends as well as the implementation of priority projects in the North-East Asian subregion with a view to identifying additional priority areas for cooperation;
2. Promote common policy dialogue on approaches and views and coordinated actions on subregional environmental issues;
3. Develop the present Framework for North-East Asian Subregional Programme of Environmental Cooperation (NEASPEC) into a comprehensive Programme for environmental cooperation in North-East Asia, preferably by the Eighth Meeting of Senior Officials on NEASPEC, bearing in mind that the development of institutional and financial arrangements should proceed in a realistic way, taking into consideration the diversity of the participating countries.
4. Request the ESCAP secretariat to administer a "Core Fund for North-East Asian Environmental Cooperation" should one or more participating countries make voluntary contribution for promoting subregional environmental cooperation. The fund could be utilized for projects adopted by the meeting of senior officials and aimed at enhancing subregional environmental cooperation;
5. Request the ESCAP secretariat to continue to provide secretariat support to NEASPEC, in collaboration with UNDP, UNEP, ADB, the World Bank, and other relevant institutions. The Meeting of Senior Officials will keep under review the institutional mechanism. The participating countries shall extend support, as appropriate, to ESCAP secretariat for its efficient operation, which also shall enhance the ownership of participating countries of NEASPEC.
6. Provide appropriate assistance for "North-East Asian Centre for Environmental Data and Training" and "North-East Asian Training Centre for Pollution Reduction in Coal-fired Power Plant," both of which are expected to make a great contribution to the goal of NEASPEC. To forge a mutually beneficial partnership with ongoing environmental

cooperation initiatives and projects in Northeast Asia such as Acid Deposition Monitoring Network in East Asia (EANET), Environment Congress for Asia and the Pacific (ECO ASIA), North-East Asian Conference on Environmental Cooperation (NEAC), Northwest Pacific Action Plan (NOWPAP), and the Tumen River Area Development Project (TRADP) with a view to enhancing synergies and avoiding duplication and overlapping in their activities.

7. Develop Websites for wider dissemination of information in order to raise public awareness of NEASPEC's activities. The Websites shall be developed by each of the participating countries and the ESCAP secretariat in languages of participating countries as well as, if possible, in English. The Senior Officials shall also consider other means to strengthen the public awareness of NEASPEC activities.

8. Make an input by providing information on achievements of NEASPEC to the fourth Ministerial Conference on Environment and Development in Asia and the Pacific in 2000.

9. Make further efforts to increase the involvement of major groups particularly the local governments, civil societies, the private sectors and other interested groups to contribute to NEASPEC.

KEYNOTE SPEECH

Mr. Yoshihiro Natori
Deputy Regional Director,
United Nations Environment Programme
Regional Office for Asia and the Pacific
(UNEP/ROAP)

Global Ministerial Environment Forum
(6th Special Session of UNEP Governing Council)

29 – 31 May 2000, Malmo, Sweden

- Established by UN General Assembly
- Over 100 World's Environment Ministers attended (over 600 delegates)
- Discussed:
  - Important and emerging environmental issues
  - Major environmental challenges of the 21st century
  - The role of private sector
  - The role and responsibility of civil society

Malmo Declaration

Since Stockholm

- Made great progress
  - Framework of international environmental law and national law
- But not enough
- Growing trends of environmental degradation
  UNEP's GEO 2000
  (Global Environment Outlook 2000)

- Accelerating trends of urbanization
- Development of megacities
- Climate change
- Freshwater crisis
- Unsustainable exploitation of biological resources
- Drought and desertification
- Uncontrolled deforestation
- Hazardous chemicals
- Land-based sources of pollution

Two Main Global Environmental Threats

- Unsustainable production and consumption patterns in developed countries

+

- Poverty on the developing world

Full participation of all actors in society

Role of Private Sector

- Technological Innovation
  - new resource-efficient technologies
  - clean technologies
- Transfer of environmentally sound technologies
- Life-cycle approach (economy)

Role of Civil Society

- Bringing emerging environmental issues to the attention of policy makers
- Raising public awareness
- Promoting transparencies

Rio+10 (Decisions of CSD8)

55th Session of UNGA
- Agenda and possible main themes
- Timing and venue of the 2002 event
- Other organizational and procedural matters

Preparatory Activities
- UNEP's role (involvement)
- National and regional level

Establishment of trust fund

From Malmo Declaration
- At the summit level
- Not to renegotiate the Agenda 21
- Inject a new spirit of cooperation and urgency

Ministerial Conference on Environment and Development in Asia and the Pacific, 2000 (MCED4)

Date: 31 August – 5 September 2000

Venue: Kitakyushu City, Fukuoka Prefecture, Japan

- Review the state of the environment and sustainable development policy
- Review of the implementation of Agenda 21, multilateral environmental agreements, and the Programme of Action for the Sustainable Development of Small Island Developing States

- Review of the Implementation of the Regional Action Programme for Environmentally Sound and Sustainable Development (RAP), 1996-2000
- Critical environment and sustainable development issues of the region and measures for promoting sustainable development

<u>Expected Outcomes:</u>

- RAP, 2001-2005
- Ministerial declaration on environmentally sound and sustainable development in Asia and the Pacific, 2000
- Regional message for Rio+10
- Kitakyushu initiative for a clean environment

Northeast Asian Regional Workshop on Environmental Law and Policy

3-4 July 2000, Seoul

- UNEP's contribution to NEASPEC
- Focused on two priority areas of NEASPEC:
  (1) Air Pollution with special refer to energy
  (2) Biodiversity conservation

Air Pollution and Energy

- Develop a structured and organized information dissemination system (UNEP and ESCAP)
  - Compendium of issues
  - Directory of national/regional/global sources of information

Cooperation in the field of Biodiversity

- Organize a regional Workshop on Biodiversity
- Develop a GEF Project on regional cooperation for the conservation of biodiversity
  - Adequate national participation in its design
  - Based on needs and capabilities of the countries in the region

National/Subregional Workshops on the UNFCCC and its Kyoto Protocol

with special reference to the Cooperative Mechanisms

28-29 August 2000, Seoul

Objectives

- Inform national stakeholders of the current status of negotiations, scientific and economic implications of these issues
- Enhance their understanding of these issues (potential developmental advantages, challenges)

Expected Participants (from Korea and Mongolia)

- Government Agencies (environment, energy, transport, etc.)
- Private sector (energy, industry)
- NGOs, Academia, etc.

Projects under NOWPAP

- NOWPAP/1: Establishment of a comprehensive database and information management system
- NOWPAP/2: Survey of national environmental legislation, objectives, strategies and policies
- NOWPAP/3: Establishment of a collaborative, regional monitoring programme
- NOWPAP/4: Development of effective measures for regional cooperation in marine pollution preparedness and response
- NOWPAP/5: Commence the establishment of regional activity centres and their network
- NOWPAP/6: Public awareness raising on the marine, coastal and associated freshwater environment

Northwest Pacific Action Plan (NOWPAP)

1994 (1st Intergovernmental Meeting)
- The Action Plan for the protection, Management and Development of the Marine and Coastal Environment of the Northeast Pacific Region was adopted

1996 (2nd Intergovernmental Meeting)
- Approved Workplan and Budget for 1997/98

1998 (3rd Intergovernmental Meeting)
- Revised Workplan and Budget for 1997/98
- Establishment of Regional Activity Centres

1999 (4th Intergovernmental Meeting)
- Need to establish Regional Coordinating Unit (RCU)

The Fifth Intergovernmental Meeting (29 – 30 March 2000, Incheon, Republic of Korea)

- Approved the proposed procedure for the establishment of RCU
  - Japan
  - Republic of Korea
  - China

  (Final Decision will be taken at the Sixth Intergovernmental Meeting to be held in Tokyo at the end of this year.)

- Reviewed and Adopted the Programme of Work for 2000/2001

Session 1

"Forest Protection and Afforestation"

(Session 1)

Forest Protection and Afforestation in China

Mr. Guotai Zhuang
Deputy Director General, Natural Conservation Department,
State Environmental Protection Administration, China

1. Main Causes of Eco-environmental Degradation

—— this spring , some serious dust storm happened in the north China. They were the consequences of climate change and eco-environmental degradation.

—— the main causes of eco-environmental degradation are deterioration and destruction of natural vegetation under the pressure of over population, over-cultivating in grassland area, over-grazing, over-cutting or defforestation, and over-utilization of water resources in arid and sub arid region.

2. Strategy and Action, which we have taken, we are taking and will take:

—— In 1998, 《 the National Plan of Eco-environmental Construction 》 was published by the State Council of China, Which set up the China's strategy of eco-environmental construction, including its target or objects, task and actions such as prevention of soil erosion, combat to desertification, natural forest conservation, afforestation, grassland rehabilitation and conservation, and natural resource conservation.

—— in next five years, the main actions of forest protection and afforestation consist of four parts,

A. the natural forest conservation project and the steepland agricultural conversion to forest project at middle and upper reach of the Yangtz River and Yellow River.

B. the natural forest conservation project in the inner Mongolia region and the northeast part of China.

C. the project of control to desertification and rehabilitation of deserted

land.

D. the project of shelter-forest system construction in the "three-north" region , that is north, northwest and northeast of China, coastal area, Taihang Shan Mountain area.

Through these project, the forest coverage of China will be to 19.4% by 2010.

3. Main Problem we are taking, which Related to Forest Protection and Afforestation

—— In some arid and sub-arid region, the grassland conservation and rehabilitation is more important than afforestation. However, the local government pay little attention to grassland conservation and rehabilitation. It will destroys the weak balance between the different original natural ecosystems in that region, especially the regional water balance.

—— In implementation of the natural forest conservation project, it is very urgent how to find the new way and sources of income for the local people to substitute their previous incomes related to forestry industry.

We are trying and will give our best to solve these problems and welcome all of you to join us.

Thank you.

(Session 1)

Responsibility of Governments and NGOs to protect Forestry in East Asia

Kim Choony
Chief of International Section
Korean Federation for Environmental Movement

1. Forest Resources in Korea

Table 1) forest resources in the Korean peninsular (as of 1999)

	ha	percentage of the land (%)	average stock volume
South Korea	6,430,000 ha	65%	60.30 ㎥/ha
DPR Korea	9,130,000 ha	68.1%	34 ㎥/ha

Table 2) stocked & unstocked forest land (as of 1999)

	ha	%
unstocked forest land	168,000 ha	3%
stocked forest land	6,262,000 ha	97%

Table 3) natural & artificial forest (as of 1999)

	ha	%
natural forest	4,308,000 ha	69%
artificial forest	2,122,000 ha	33%

Table 4) Coniferous & Non-Coniferous (as of 1999)

	ha	%
Coniferous	2,727,000 ha	43%
non-Coniferous	1,676,000 ha	26%
Mixed forest	1,851,000 ha	27%
Bamboo	80,000 ha	4%

2. Forest Ownership

Forest lands are classified by ownership into national, public and private forests and are also classified according to utilization into reserve and semi-reserve forests.

2-1. National Forest

22% of the total forest land is national forests and most forests are managed by the Regional Forest Management Office. The national forests can be subdivided into two categories, permanent and disposable forests. Most national forests are permanent forests, and they are managed for land conservation, forest management, scientific research, development of forestry techniques, preservation of both historical relics and tangible cultural heritage, and other public benefits. The remaining national forests are disposable forests, and may be converted to other uses. To efficiently manage the national forests, the Forestry Administration has enhanced its capabilities in various ways; first, enlargement and grouping of the national forest lands; second,

improvement of the public functions of forests; and third, improvement of basic forest management infrastructure.

2-2. Public Forest

Forests owned by local governments and public organizations such as schools are classified as public forest, and these forests comprise about 7% of the total forest land. Public forests contain only 7% of the total stock volume, and their average stock volume per ha is low compared to the national forests.

2-3. Private Forest

The private forests constitute 71% of the total forest lands. Private individuals and organizations, such as peoples' parties, families, and cooperative groups, own them. Private forest owners number about two million persons. However, 96% of the owners own less than 10 ha of forest. To support these small-scale owners, the Forestry Administration developed a model program called the Private Forest Cooperative Management Program with assistance from the Korean-German Forest Management Project begun in 1975. After 1984, the program was introduced to private forest owners and to date, the response has been good.

Table 5) forest ownership (as of 1999)

	ha	%
national forest	1,426,000 ha	21%
public forest	487,000 ha	8%
private forest	4,517,000 ha	71%

table 6) growing stock in volume of forest ownership (unit : 1,000 ㎥)

(as of 1999)

	ha	%
national forest	121,284 ㎥	31%
public forest	29,639 ㎥	7.6%
private forest	236,835 ㎥	61%

3. Re-forestation Planning

3-1. Background and successful history

In the 19th century, Korean forests were rich old-growth forests. However, these forests were totally destroyed by over-cutting and illegal cutting for construction materials and fuel throughout the turbulent periods of the Japanese occupation (1910-1945) and of the Korean War (1950-1953). The average stock volume per ha in 1960 was only 10.6 ㎥. The Forest Law of 1961 requires the Forestry Administration to set up a national forest plan every 10 years in order to establish and manage the forest resources. Local governments should set up local forest plans on the basis of the direction of the national forest plan. A turning point in Korean forestry was witnessed in 1973 with the initiation of the First 10-year Forest Development Plan, which targeted the reforestation of denuded forest lands. One million ha was to be planted within 10 years under the following objectives: to implement the national tree planting movement through the participation of all people in various reforestation projects; second, to develop new economic zones of forest lands directly connecting the goals of land conservation and income enlargement, reforestation and forest production; and third, to achieve rapid reforestation of denuded forest land through the planting of fast-growing tree species. During this period, remarkable progress was made in emphasizing forest protection by minimizing man-made damage to forests,

restricting access to mountains, and the formation of rural fuel wood forests. Through the implementation of this movement the reforestation target of one million ha originally planned to for 1978, was reached in only 6 years, with the reforestation of 1.8 million ha.

3-2. Limitations

- Planted tree species were not diverse because of poor quality soil. This resulted in low economic value of trees.
- The monoculture planting of Coniferous species makes the forest more vulnerable to diseases and fire. In fact, there was a large-scale forest fire in 2000.
- The production target and usage of trees has now been well planned [DO YOU MEAN NOT WELL PLANNED OR NOW WELL PLANNED?] and post management work such as thinning and pruning has not occurred.

3-3. Effects

- The recovery of the denuded forest has improved wildlife habitat and increased of the wildlife populations.
- Forests help retain water resources (green dam)
- Increased recreational function for public.

Table 7) Increasing of wildlife populations (populations per 100ha)

	'79	'81	'91	'96	reasonable populations
Phasianus colchicus	9.4	15.0	18.9	25.7	20
Streptopelia orientalis	9.9	20.8	23.8	31.5	30
Passer montanus	22.2	428.1	382.0	357.5	250
Lepus sinensis	2.7	5.8	7.2	9.3	20
Hydropotes inermis argyropus	0.4	1.7	3.7	4.2	5
Sus Scrofa		1.3	4.3	5.3	5

Table 9) Public service with the forest (as of 1999, 2000)

	'87	'98	'99 or '00
Number of Recreational Forest	0	67	83(as of '00)
Number of Green Shower place	0	15	41(as of '99)

4. NGO activities on forest protection in Korea

There are 20 national parks in Korea. The Ministry of Environment announced an increase in the total area of national parks from 6,473km^2 to 6,719km^2 on 30 June 2000. This is a 3.8% increase. At the same time, 33% of the forests in Seoul were cut in 10 years. About 500 species are cut each year. In 1999, 150 tree-covered mountains were removed for their stones and soil for use on the Saemangeum reclamation project.

Over 1,000 environmental NGOs in Korea have acted to raise public awareness on a range of environment issues including air pollution, water quality, large-scale construction projects, nuclear power plants. Citizens' movements are also concerned about a number of forestry issues.

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4-1. Protection of Mt. Songak on Jeju Island

Jeju local government issued a permit to build a golf course, hotel, sea park, and condominium on Mt. Songak, which is a double crater environmentally valuable site. Civic groups in Jeju Island, including Jeju KFEM and 11 plaintiffs, filed two law suits in the Jeju District Court on 29 March 2000 calling for the project to be cancelled. Jeju District Court issued a judgment accepting the plaintiff's request for a halt to construction, but the Jeju local government filed an appeal to a higher court. Construction, which was scheduled to start on June 5, has not yet started. The lawsuit calling for cancellation of the project has now gone to trial three times. Unfortunately, only 1 of the original 11 plaintiffs is still involved in the case, as pro-construction interests at the local level have convinced ten of the plaintiffs not to participate in the lawsuit.

The Public Center for Environmental Law, an affiliated organization of the Korean Federation for Environmental Movement, also filed a lawsuit against the project in the Prime Minister's Administrative Judgment Committee on 29 March 2000. The committee will issue an opinion, forwarding it to the Ministry of Construction and Transportation, and the Ministry will make a final decision. The final decision must be made within 90 days. As of July 18, the Ministry had not made a final decision.

4-2. Forest for life

Massive unemployment occurred during the IMF crisis that started in late 1997 in Korea. Civic groups including KFEM (Korean Federation for Environmental Movement) and CCEJ (Citizens Coalition for Economic Justice), as well as academics and the Forestry Administration (a government agency) launched a committee to find work for some of the unemployed. In April 1998, the unemployed began work in forest management jobs such as pruning and thinning trees. This work has resulted in many positive outcomes such as employment and better forest management.

Table 8) Impact analysis of the 'forest for life' campaign

	employment	environmental impact	environmental agriculture
'98	1,490,000 employed	42,000 ha forest for life	38,000 ㎥ organic fertilizer production
'99	4,830,000 employed	129,000 ha forest for life	200,000 ㎥ organic fertilizer production system

4-3. National Trust

Civic groups in Korea that have not been successful in their opposition to the government's 1999 plan to dismantle the Greenbelt Zone, with the government failing to recognize that these valuable natural asset sites are needed to enhance the quality of the people's lives. So, Citizens' Coalition for Environmental Justice launched the National Trust on 25 January 2000, with experts and academics. The purpose of this organization is to protect at-risk natural and cultural assets for the good of all the people, to pursue equitable usage of them among all classes of people, and to preserve them for future generations.

4-4. Mt. Mudeung Trust Movement

A plan to build a resort by the metropolitan Gwangju government, adjacent local governments, and local companies was initiated in 1994. Civic groups created a committee in 1994 to oppose the plan, which will cause environmental destruction. The Citizens' Committee to protect Mt. Mudeung has raised public awareness of the issue and created a citizens fund to buy the mountain.

4-5. Cancellation of the Haein golf course on Gaya Mountain

This campaign began in July 1996, when plans for a golf course in Gaya national park became known. The campaign against construction of the golf course was carried out in conjunction with the monks of Haein temple and local residents. After legal action and a campaign in which one million people signed a petition against the proposed golf course, the National Park Authority rescinded approval for the project in January 2000. Efforts to preserve Gaya Mountain and Haein temple had borne fruit.

4-6. National park, Mt. Dukyu destruction

The government planned to build the Muju resort in the heart of Mt. Dukyu National Park. Korean environmental organizations opposed this plan, along with academics and the university students. The forest where the Muju resort is a national park and public forest. This area is home to at least 16 endangered species. The land was sold to a development company. Construction was launched in 1989 following a weak environmental assessment. Academics and environmental organizations continuously issued information about the project and the Ministry of Environment recognized the problem in August 1990. Unfortunately, the small number of environmental NGOs in the late 1980s and early 1990s could not give this project the attention it deserved. Therefore, the project continued without much resistance from the environmental NGOs. In 1997, environmental NGOs protested about this project jointly with international organizations, but it was too late to protect the Dukyu National park.

4-7. Research and campaign on destructive Siberia forest caused by Hyundai

A joint research and campaign between KFEM and Greenpeace was launched in 1994. Greenpeace revealed in 1992 that Hyundai and the government in the far eastern region of Russia contracted to cut the trees for 30 years. Greenpeace made a strong protest along with local residents at that time. The purpose of the joint research and campaign was to stop the cutting of trees in the ecologically sensitive area. Hyundai was using clear felling techniques, not selective cutting. KFEM, Greenpeace, and local people initiated a strong campaign tying campaigners to the bulldozers with iron chains. This campaign had an impact internationally on timber trading by the companies involved, but the issue did not receive much coverage in Korea.

5. Conclusion

Even though environmental NGOs in each country are actively campaigning to protect their forestry, lots of deforestation is proceeding worldwide. East Asian countries have different backgrounds economically and environmentally - from Russia to Japan. That is why we have had difficulty in resolving the environmental problems in our region. We have environmental problems such as Yellow Sea pollution, trans-boundary air pollution between China and Korea, and huge ecologically destructive projects.

5-1. I would urge governments in East Asian countries

- To have a strict policy to protect old growth forests and natural forest. We need set aside these forests for future generations.

- To regulate development of the mountains and to encourage local governments' to have an environmental consciousness. Local governments' development policies are a major reason that valuable environmental resources are being devastated.

- To reduce road construction because road construction in forests is one of the ways in which forest destruction starts.

-To establish a fund for environmental protection.

-To reduce the importation of wood from overseas.

5-2. I would urge the Citizens organizations

- To research and monitor the timber trade by multinational companies. Timber harvests should avoid slow growth species. Consumers should avoid purchasing this type of wood. Timber companies are searching for new places to cut trees, for example timber companies in Russia and the USA were moving from their exhausted areas to the far eastern areas of Russia as the forests in other regions were destroyed.

- To pay attention to established networks on forest conservation such as AANEA (Atmospheric Action Network in East Asia) and NNAF (No Nuke Asia Forum), to participate in cooperative programs such as international conferences, to educate the people and government on forest protection.

- To create greater public awareness to change citizens' wood consumption patterns.

(Session 1)

RE-AFFORESTATION ACTIVITIES IN MONGOLIA

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1.Introduction

Mongolia has comparatively not very rich forest resource which covers an area of 17,5 million hectares on the southernmost fringe of the Great Siberian forest and some mountain ranges in the western and north western part of the territory. Mongolia is the seventh largest country in Asia and among the biggest of the land locked ones. But forest takes only 8,1% of the territory. Location and growth of forest greatly varies throughout Mongolia. Population increase with the ever increasing demand for forest products, logging, forest fire, pests have progressively depleted the forest cover. The forest cover of Mongolia consists of coniferous and deciduous forests and Saxaul (Haloxylon ammodendron) forests. And 92,1 percent or 16,1 million hectares of the total original forested area is currently growing trees, while 7,9 percent or 1,382,570 hectares is not. The area covered by coniferous and deciduous forests (excluding saxaul forests).The most common tree species in these forests is larch.

The coniferous forests play very important role in protection of soil, water and regulation of its flow, maintaining of ecological balance. Lately, forestry situation of Mongolia has been getting more complicated
because of exporting timber products and sow material to China at very low price. But in 1999 the government imposed rather high tax on wood export and it aimed to develop national industry and to improve domestic supply of wood.
Mongolian Forest Law adopted in 1995 allows the private sector and communities to establish and maintain plantations
on state lands with the approval of the government.
In the more arid areas the sparse woodlands are used for firewood, and there is reportedly no management as well. Woodlands around settlements have been cleared and ever-increasing circles of deforestation have occurred.

In the northern forests commercial logging is practiced. Unfortunately, clear cutting of all trees is the standard practice.

In areas of such a harsh climate, clearcutting may lead to greatly reduced regrowth and productivity. In many areas there is no regrowth and replanting is the only way to try to regain the wood resources. *A regime of inventory and assessment was established but progress has been relatively slow, and only a small part of the forest has been covered each year. There are foresters at the key aimag centers, but reportedly much cutting is done without any formal management (Mongolian Environmental Action Plan, 1995).*

2. Forest area, forest types and it's natural regeneration

In 1994, the Forest Survey Expedition of Mongolia, Ministry for Nature and Environment, released the document: "Commonwealth Forest Review 1994" which provided an official version of the forest cover and some aspects of forestry development in the country.The following extracts are taken from this important document. The total forest area of Mongolia is 17516,200 hectares, including 12711,670 hectares of closed forest or 8,1 percent of the total land area.

In the June 1995 the country passed new forest law protecting forests, the proper utilization and regeneration of Mongolian forests. According to this law, forests in Mongolia are divided into three zones: **special, protected and industrial zones**- with a different management scheme applied to each zone. Due to the mountainous character of Mongolia, their operation is performed in accordance with their protection and recreational qualities.According to their basic functions the forests are subdivided into:

1. **Special forests** - about 6,0 % of the forestland which include the forestland in the upper forest boundaries which is named "sub-alpine forests" and protected area within National Conservation Parks.
2. **Protection forests** - 48 % of the total forest land. To this category belongs the forests of the green zone, prohibited strips, saxaul forests, oasis, small forest areas covering up to 100 hectares and forests at slopes greater than 30 degrees.
3. **Industrial forests** - 46 % of the forestland. These, above all, are forests used mainly for production of wood and timber.

Estimates for Mongolia's total forest standing volume is about 1335,9 million cubic meter. The most forest volume are in the north and central part of mountain regions in the country.The average standing density of timber in the northern, commercially important forests is about 109 cub.m/ha with a mean annual increment of about 1.4 cub.m/ha.The sustainable yield per annum from these forest resources is 5.5 million cub.m.

The current forest land classification of Mongolia is shown in table 1.

Table 1. Distribution of forestland of Mongolia ('000 ha)

Forest covered land	Open forestland	Non-forestland	Total forestland
12711,6	3421,9	1382,5	17516,1

The total forest covered land is distributed by tree species as follows:

N°	Species of trees	Forest area,ha
1	Siberian larch **(Larix sibirica.)**	7728 300
2.	Scotch pine **(Pinus silvestris)**	503 300
3.	Siberian pine **(Pinus sibirica)**	1986 000
4.	Spruce **(Picea obovata)**	27 800
5.	Fir **(Abies sibirica)**	2 300
6.	Birch **(Betula platyphylla)**	930 500
7.	Poplar **(Populus)**	35 400
8.	Willow **(Salix)**	8 500
9.	Saxaul **(Haloxylon ammodendron)**	2028 800
10	Total	12711 600

Natural regeneration process in high mountain forests depends on location, stand structure, soil condition and forest type. Depending on forest location elevation and sensitiveness in human activities, forests in Mongolia are classified as **forest-steppe; sub-taiga; taiga; pseudo-taiga and sub-alpine forest.**

Natural regeneration practices are followed in areas with young trees and seedlings to encourage them to grow into mature and old forest stands. Intensive tending operations such as cleaning, improvement felling are the essential cultural operations for this option to be successful. In naturally regenerated areas with at least 0.5 relative stock density, thinning and tending are carried out to promote growth of best trees. In the some gaps, enrichment planting with coniferous species should be carried out to improve species composition.

In addition to the above methods, the other effective way of achieving successful natural regeneration is to assist it when mature trees flower, by tending and cultural methods, so that growth ensures movement of recruits into the upper story of the high forest stands.

There are generally two and three strata in the profile of the mountain taiga forests. The lowest is the dominated stratum. The dominant stratum is the tallest and is the thickest layer occupied

by tree crowns of the dominant class trees. The predominant stratum is intermediate between the other two and has scattered tree crowns generally of the species in the dominant stratum.

Above mentioned fact is main picture of stand structure of uneven-aged stands of Mongolian taiga forest. According to this peculiarities of stand structure of Mongolian high mountain forest suitable management skills are needed to be taken for each one.

3. Main Causes of Deforestation

There are three main factors that cause deforestation:

- Increasing of livestock numbers
- Increasing of fuel and industrial wood demand
- Forest fire impact

Increasing of livestock numbers

The vastness of the country's pasture land, its climate and its limited population naturally favor extensive animal husbandry. The current 33.3 million head of livestock comprise 15 million sheep, 11 million goats, 3.8 million cattle, 3.2 million horses, 0.3 million camels. The stress on land resources observed in crop farming has also emerged in the extensive livestock subsector, especially in the forest-steppe zones. A careful assessment of the scope for further increase of the livestock subsector in these areas and its environmental repercussions is urgently needed.

The grazing and browsing in forest area are most destructive to plantations and tree growth, causing deformities and stunting growth. Natural regeneration is destroyed through trampling. livestock breeding causes major destructive impact on remnant forest growth.

Increasing of fuel and industrial wood demand

In present, production and supply of saw timber boards on domestic market, no consideration is being given to the quantity. And the real forest products demand and supply is not estimated or registered in present by the statistics, because of insufficient data collecting methods used now.

The main reason for it should be summarized as; all logging, sawmilling, other forest product trade and production data not reported and registered and/or collected, because of unmanaged, uncontrolled contacts by the private people and private entities to the forests.

Consumption of industrial forest products per capita in Mongolia is very low. Current consumption of Sawnwood, which is the main industrial forest product, was 0.04 cubic meter per capita in 1994 while the average consumption in Europe is 0,2 cubic meter per capita. The consumption of other products such as plywood or particleboard is also low.

Besides of sawnwood and panel products there are also some demand for mining poles, transmission poles and railway sleepers, but no figure are available about the consumption volumes.

By 1996, Mongolian forest industry had total sales amount of 2,3 billion tugrigs (national currency) which is 13 percent more than comparing with the 1995.

In past, in the central planned economy 4-6000 cubic meter plywood, 10-12000 cubic meter particle board being produced per year in Mongolia, but the demand have been supplied never, and the shortage was satisfied by import. Hardboard was fully imported for domestic market demand.

The production of the forest main products are shown in the table 2.

Table 2.
Production of main forest industry products during 1990 - 1996
'000 cub.m

No	Type of product	1990	1991	1992	1993	1994	1995	1996
1	Logging	950,0	720,0	500,0	450,0	325,0	263,0	275,0
2	Logs	670,0	465,0	360,0	250,0	185,0	-	-
3	TIMBER BOARD,	509,0	270,0	124,5	84,5	50,3	61,2	70,2
4	Ger wooden articles mln.tug	-	-	20,7	23,1	67,3	101,5	265,9
5	Plywood	,4	1,9	1,0	0,2	-	-	-
6	Particle board	5,5	1,1	0,8	-	-	-	-
7	Door, window '000.m2	39,8	39,8	20,6	14,7	8,1	7,4	7,8
8	Furniture	31,0	33,0	45,2	42,3	113,0	542,5	156,4

	mln.tug							
9	Small wood article mln.tug	-	-	-	-	18,2	143,4	45,9
10	Match mln.box	26	29	17,6	22,3	17,1	19,6	12,4

The wood based products in Mongolia are represented as : railway sleepers, window and doors, wooden boxes for packing, school and office furniture. Besides, there are products made for Mongol "Ger" frame and inside specific furniture.

The wood based products are not so various in kind as other industries related to forest and wood resources. Even these are limited to some kinds and can not cover the shortage in the market.

Forest fire impact

During 1992-1995 the fire occurrence in forest areas increased, because of number of people, who go to forest and steppe areas to cut trees, pick up berries, nuts, firewood and deer horns, and hunting purposes are sharply increased. About 29 per cent of total fire causes were not identified.

60-70 per cents of total fire causes respectively were not identified as shown in the graphic of 1996, 1997 fire causes. Reason is that many fires have started at the same time and there was a lack of human resources to investigate causes. Also mismanagement and carelessness of relevant authorities contributed to this situation. It is necessary to take strong measures in order to identify social and economic causes of fire outbreaks.

The main fire causes in Mongolia which have led to an increasing occurrence of forest fires are :
Escaped campfires (Open fire) - Campfires are common in forest or steppe for cooking and warming (day temperatures of +10 to 25°C drop at night to 0 to -10°C). Many additional escaped campfires are caused alongside roads by people affected by transport breakdowns and car accidents.

Military Units - Nowadays the Mongolian army units cause extensive fires by military activities (field exercises, artillery, mining, tanks pipes, open fire, smoking).

Transport - Agricultural machinery and equipment, particularly tractors with chain are mostly used in the agricultural and animal

husbandry sectors.

Cleaning (Plantation) - After the harvest, all residues (straw, stalk) are gathered and burned. Fires often escape if these burns are not controlled sufficiently.

Spark from Ger chimneys (or chimneys)- Most of Mongolian rural people use chimneys from which spark can be transported to the surrounding dry grassland.

Children - If they are not accompanied by adults in the field and they cause forest fire occasionally.

Stove ash - Nomadic families in the steppe pasture lands live in Ger (Traditional dwelling) and use common stoves and dried cattle dung (argal) is burned. Glowing embers are a major source of steppe fire ignitions.

Power lines - Extremely high wind speed in Mongolia often damage power lines and cause ignition by electric sparks.

Antler collectors - The high demand on deer antlers (both naturally shed "bone" antlers and live antlers taking from hunted animals are expensive raw material for medicine) on the Chinese and South East Asian markets drives illegal antler collectors and hunters into the forests. These people are a major source of starting wildfires (campfires, smoking).

Lightning - Lightning storms of 40-60 hours per year were recorded in Central and Northern Mongolia and represent a source of natural ignition.

Damages and losses caused by wildfire in Mongolia during last five years shown in table 3.

Table 3

DAMAGES AND LOSSES CAUSED BY WILDFIRE IN MONGOLIA BETWEEN 1995-1999

No	Indicators	1995	1996	1997	1998	1999	Total	Average of 5 years
1	Number of Aimags and Sums, where fire occured	12/32	16/120	14/98	15/69	15/44	72/363	14/72
2	The number of forest-steppe fire	120	417	239	132	67	1065	213
3	Total burnt land (ha):	1,7	10,2	12,4	5,2	3,125	32,628	6,525

	forest steppe		0,03 1,7	2,4 7,8	2,7 9,7	0,7 4,5			1,2 5,7
4	The number of died peoples			25	3	1		29	6
5	The number of scalded people		9	61	5	2	1	78	16
6	The number of burn Livestock		600	7726	1628	2363	380	12697	2539
7	Burnt in Fire	Nomadic tent Livestock Machinary		175 7,726	14 1628	29 2363 12		218 11717 12	
8	Ecological and economical damages (mln.tug)		37	1128,4	486,7	370	611,3	2633,4	526
9	Property damages (mln.tug)		28,2	589,7	140,5	94,1	15,2	867,7	173,5
10	Expenses for suspenssion activities (mln.tug)		44	372	127,5	93,9	98,2	735,1	147
11	Total losses(mln.tug)		109,2	2090,1	754,7	558	724,7	4236,7	847,3

4. Reforestation and tree plantation

Mongolia has not long history of tree plantation and reforestation. It started with trans-plantations removing young saplings from forested areas.
Since 1970 forestry and timber harvesting companies have been instructed by the five year's State plan to harvest wild seeds, breeding seedlings and conduct re-forestation activity.

Main tree species used in plantations

Species - site (environmental conditions included) matching is most important in plantation establishment. The following are the factors to be included in the choice of species for the reforestation.

- adaptable to the climate condition
- ability to stand moisture stress
- fast growth after plantation
- use of seedlings of uniform size
- high survival rate for the local condition

The choice of species has to be decided based on how species requirements match with the local conditions and whether the are indigenous. The main species used in the reforestation and plantation : Larix sibirica; Pinus silvestris; Picea obovata; Populus laurifolia and Haloxylon ammodendron etc.,

Some achievements of reforestation

A major issue relating to forest management in Mongolia is afforestation due mainly to the difficult site conditions. In the situation existing in Mongolia, after logging operation and/or fire incidence, natural regeneration of desired species such as pine and larch cannot often be achieved. Under such a situation artificial planting or sowing with desired species will be necessary, to supplement the natural forest regeneration.
The are planted over a period of some 30 years is very small compared to the deforestation which has taken place during the last years and the degradation level of the remaining accessible forests. Even if only the area harvested during the period is considered, the reforestation rate still is lower than 15%.

In 1980-1990, on nation wide level, in over 40 permanent nurseries over 20 million standard seedling were planted and supplied the reforestation work. At that time the scope of reforestation boarded. At the beginning of 1970-s about 50 ha was re-afforested annually, in 1990 about 5000 ha was re-afforested annually.

Results of the last year's reforestation, it's expenditure, survival rates by the reforestation type and tree species are shown in the table 4.

5. Problems, constraints and shortcomings

The reforestation and tree plantation techniques and methods adopted in Mongolia are labour intensive and time consuming. Insufficient skilled labour and chronically limited financial allotments are the main constraints to reforestation activities.

The incomparably low wages of forestry enterprises compared to the prevailing local wages is a great handicap to plantation works. Hence the unavailability of workers. Moreover the reforestation season coincides with giving off-spring and crops planting, reducing labour availability.

Another problem is that adequate quantities of proven quality seed is not available for large planting programme. This is due to the lack of seed orchards genetically proven seed sources.

Plantation policy is yet to be formulated with the definitive objectives of the end uses and with rotations for different category of plantation.

Lack of land use policy and well defined forest landuse plan constrain the re-afforestation process. A lack of vision in ad hoc re-afforestation programmes must be corrected. Even though there are prescriptions for cultural and tending operations, lack of funds prevented them being carried out on time or as prescribed. This is a major issue which will reflect heavily on plantation quality in the future. Lack of staff motivation is another constraint in re-afforestation programmes.

Research activities related to re-afforestation are partly academic in approach. Research institutes must devote more time to applied research on plantations.

Established plantations are almost never monitored and evaluated, except for survival counts at the end of the first year. Plantation Registers must be re-commenced and accurate information recorded.

Animal damage in young plantations, losses caused by people in commercial plantations and inadequate tending all contribute to failed plantations. Repeated re-planting of some areas is often the case with plantations in area which borders with pasture land.

Forestry extension is still in its nascent stage, with little or no planning or financial support. An efficient extension service is needed to promote and disseminate the message to grass roots levels on community and participatory practices.

6. Suggestions and Solutions

Suggestions for problem resolutions:

- Provide incentive mechanisms and revise the prescribed norms to realistically match prevailing labour wages and allocate adequate funds to successfully and effectively deliver the work programme.
- A national integrated landuse policy should be in place with criteria and standards for different forest landuse categories, and definitive plantation policy, formulated in harmony with it.
- Seed orchards and seed production stands should be established with genetically proven quality trees
- Forest Research Institutes should conduct more experiments on-site species matching and distribute findings to local forest enterprises. Research plots should be established in plantation areas and growth measured regularly on all species and provenance.

- Institute mechanism for regular monitoring and inventory of all plantations. Plantation Registers are to be well kept with all relevant information. A plantation management information system is needed to collect, collate and analyze data.
- Because of limited finances, cost effective plantation procedures need to be developed. Economics of plantation establishment, ecological impacts and social benefits and costs must be taken into account.
- The Forestry Bureau must be strengthened in staff members and resources to plan, implement and monitor forestry extension.
- Adopt programmes to motivate peoples' involvement in community forestry

7. CONCLUSIONS

Maintenance of environmental stability by preserving permanent forest estates, and conserving species and ecosystem diversity, are some of the main principles of the national forest policy. In addition, establishment of plantations on degraded and denuded lands advocated as a policy imperative.

Re-afforestation should be strictly carried out to ensure an effective outputs. Norms and funding constraints have been disproportionately low for plantations and unless corrected, poor and failed plantations will result with few benefits and substantial costs.

It is the sole responsibility of the Forestry Bureau to give proper attention to cultural operations and measures to improve and maintain plantations.

Table 4.

Forest plantation and it's expenditure by type between 1997-1999

No	Name of aimag	1997 year				1998 year				1999 year			
		Area, ha	survival rate,%	Expenditure Ttug/ha	Gross expenditure, M.tug	Area, ha	Survival rate, %	Expenditure Ttug/ha	Gross expenditure, M.tug.	Area, ha	Survival rate, %	Expenditure Ttug.	Gross expenditure, Mtug
Reforestation by pine seedlings													
1	Selenge	939	91	29.4	27594.8	1055	90	47.1	49687.1	750	85	52.0	39000.0
2	Khentii	290	71	33.4	9677.4	330	63	43.3	14299.9	420	73	50.0	21000.0
3	Bulgan	371	87	33.5	1243.8	436	74	40.0	17440.0	381	85	42.0	16002.0
4	Dornod	205	68	33.5	6867.5	203	61	40.2	8169.5	160	72	45.0	7200.0
5	Darkhan Uul	107	63	33.5	1597.6	114	81	40.0	4580.0	150.8	80	50.0	7540.0
6	Tuv	209	67	29.1	6105.9	283	62	40.7	11521.7	334	88	45.0	15030.0
7	Orkhon	100	66	33.5	3350.1	115	65	50.0	5750.0	130	76	45.2	5876.0
Reforestation by larch seedlings													
8	Arkhangai	799	73	33.5	26766.0	570	81	44.0	25428.0	595	75	40.0	23800.0
9	Uverkhangai	230	67	34.8	8004.0	100	63	50.0	5000.0	145	60	52.0	7540.0
10	Khuvsgul	393	76	33.4	13126.0	455	66	48.8	22198.0	448	85	40.0	17920.0
11	Dzavkhan	441	80	33.5	14773.0	531	84	43.1	22888.9	429	85	45.0	19305.0
12	Uvs	270	66	31.9	8613.0	365	70	43.4	15837.3	300	68	40.0	12000.0
13	Ulaanbaatar	100	64	31.3	3130.0	125	64	42.7	5348.6	150	64	45.0	6750.0
14	BayanUlgii	108	65	35.5	3834.0	95.6	72	45.4	4336.0	85	69	45.0	3825.0
		Re-afforestation by saxaul seed and seedlings, deciduous seedlings											
15	Dundgobi	50	65	35.5	1775.0	50	70.0	43.0	2150.0	60	65.0	52.0	2900.0
16	Umnogobi	40	55	35.5	1420.0	40	56.0	41.5	1660.0	40	55.0	41.5	1660.0
17	Gobi-Altai	60	75	31.7	1900.0	75	57.1	43.5	3262.5	-	--	-	
18	Bayankhongor	36	56	35.5	1278.0	40	58.0	44.7	1790.0	30	51.5	35.0	1050.0
19	Khovd	90	66	35.5	3195.0	100	53.1	40.0	4000.0	120	67	38.1	4575.0
20	Sukhbaatar	100	63	33.5	3350.0	100	60.1	52.0	5200.0	94.5	55.0	52.0	4914.0
21	Dornogobi					6	53.5	61.0	366.0	15	52.0	61.0	915.0
22	Gobisumber					10	56.5	61.0	610.0	10	57.0	61.0	610.0
23	Uverkhangai					100	75.5	35.0	3500.0	-	-	-	-
	Total	5100			120649	5299			170992	5065			180000

(Session 1)

Forest Fire Impact to Permafrost Degradation and Regeneration of Forest

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Eastern Eurasia is widely covered with Boreal forest, "Taiga", which is the largest forest area in the world. The development of Taiga is closely related to the existence of underlying permafrost. The annual precipitation at the entire
Siberian Taiga regions stands around 250-400 mm/year. Underlying permafrost is non permeable to percolating surface water, and this character of permafrost permits to grow Taiga with small amount of precipitation. Once permafrost tends to thaw, then surface soil layer becomes too dry to grow Taiga. Permafrost in eastern Siberia extended its vertical and horizontal distribution in Last Glacial Period, and tends to be unstable under the global warming condition. Coverage with Taiga in early Holocence over Permafrost region impedes the propagation of warming wave into permafrost.

The disturbance of surface vegetation condition induced by forest fire leads to unbalance of heat budget of permafrost and tends to thawing permafrost.

Southern part of Siberian permafrost, the coexistence relationship between Taiga and permafrost performs under the present climate condition. Once severe burn of Taiga impacts the damage of surface boundary condition, then permafrost degrades its distribution. In the area severely impacted by forest fire, permafrost disappears in rather short time period, and Taiga does not regenerate due to dry soil condition.

The degree of forest fire severity is key to regenerate Taiga in southern Siberian permafrost region. In 1996 there occurred one of severest forest fire in Mongolian Taiga region, and permafrost is retreating its vertical and horizontal distribution in the affected region. Ground temperature monitoring at the affected area may indicate quick response of permafrost degradation. Careful monitoring of soil characteristics is requested to conduct for successful re planting on burned area. For example in Yak tia region severely burned ar a in Taiga changed to grass land called Alas. Top layer of soil profile accumulates salt-rich layer and impedes regeneration of Taiga.

The total system of management for protection of severe forest fire occurrence will be establish based on the application of remote sensing analysis and ground truth monitoring on site.

Forest Fire Impact to Permafrost Degradation and Regeneration of Forest

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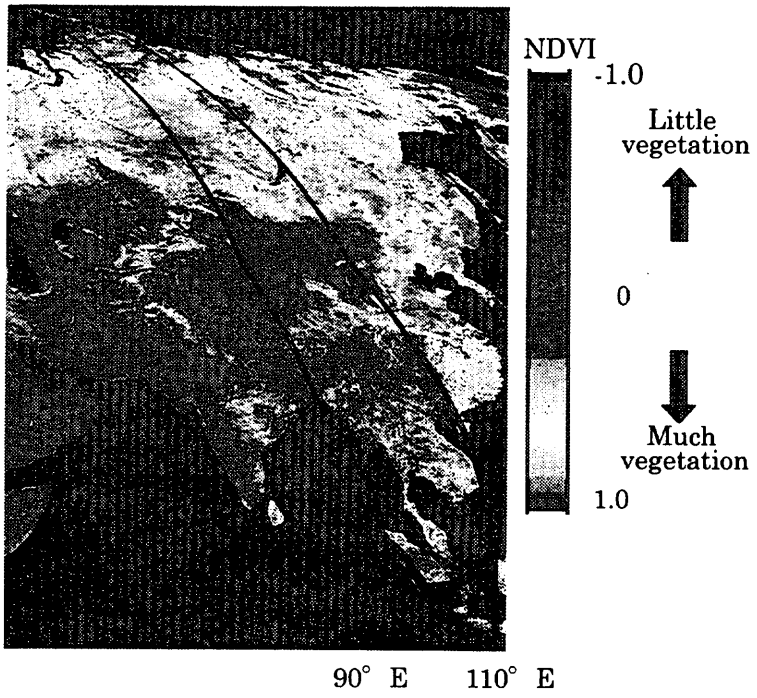
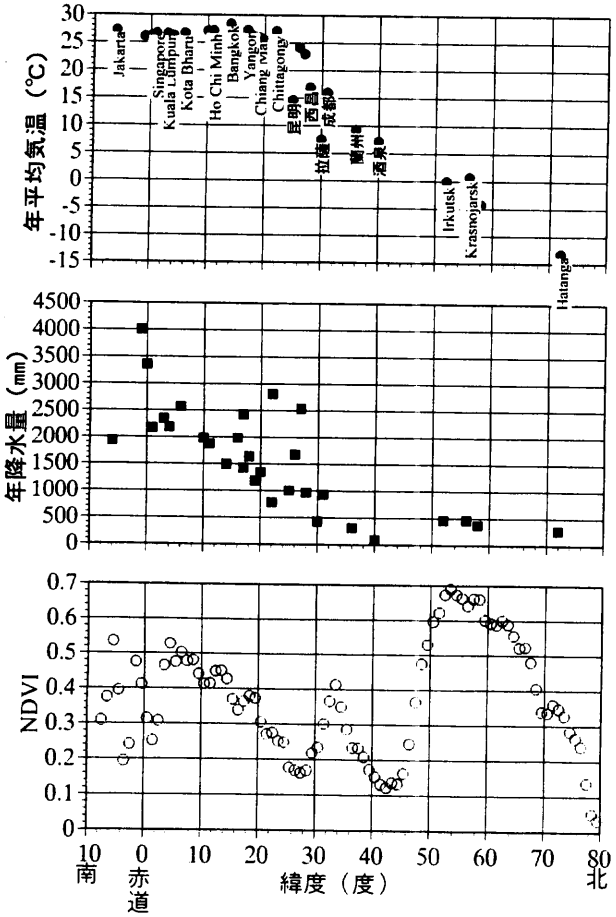
Sapporo JAPAN

Protection of Taiga Forest
→ Local

Global Warming Influence
→ Global

NOAA NDVI (July 1～10, 1995)





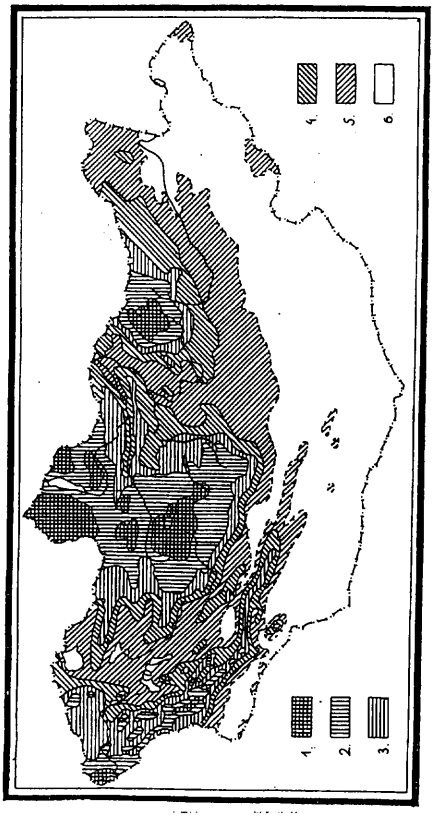


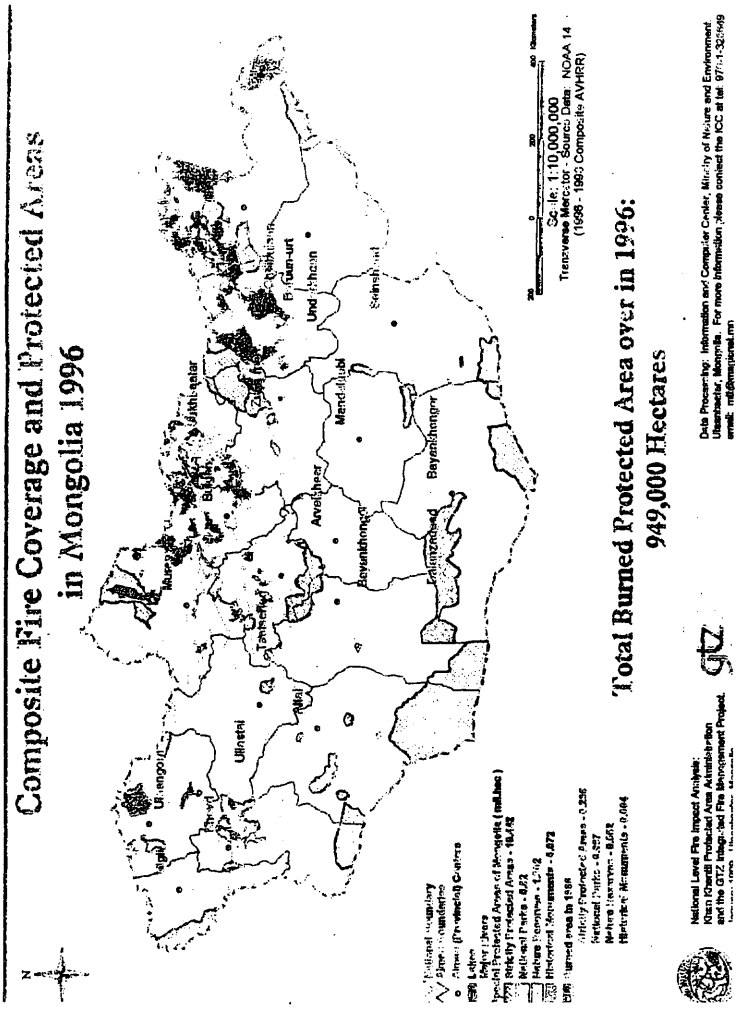
Fig. Map of permafrost regionalization in Mongolia. (N.Sharkhuu, 1989).
1. Continuous (85-100%), 2. discontinuous (50-85%), 3. widespreed island (10-50%), 4. rare island (1-10%) and 5. sporadic (0-1%) permafrost areas, 6. only seasonal frost area.

COEXISTENCE of PERMAFROST and TAIGA

YAKUTSK Annual mean Temp. –10°C Precipitation 236 mm

Lanzhou China Annual mean temp. +7.2°C Precipitation 316mm

Forested areas damaged by fire (per 1 000 ha)





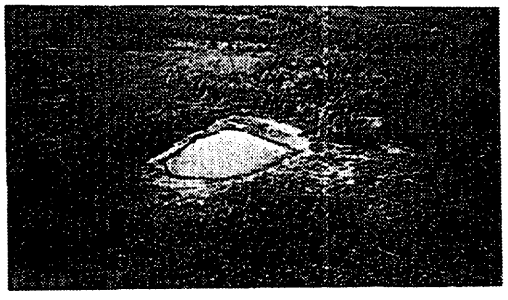


Disturbance caused by forest fire





火災直後
(地表面熱収支



Alas formatic
(near Yakutsk)

(アラス)

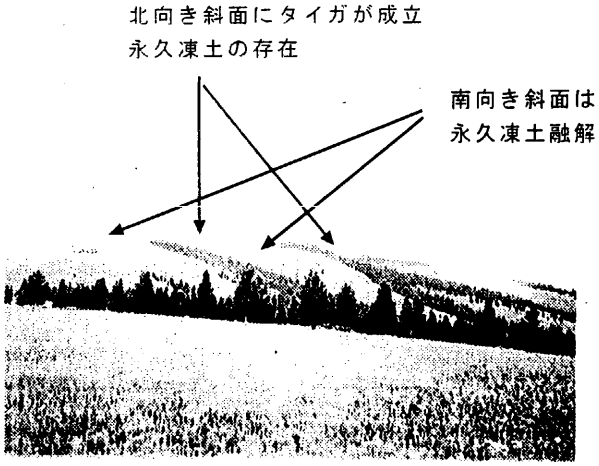


Alas and Pingo (Central Yakutsk)

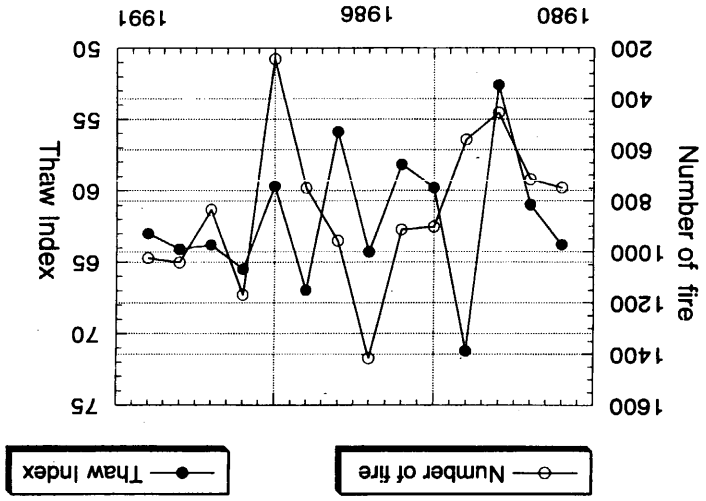


Alas, Thermokarst Depression

モンゴル北部　ヒンテイ山地の植生　　推定年平均気温　－５～－６　℃
年降水量　　400mm

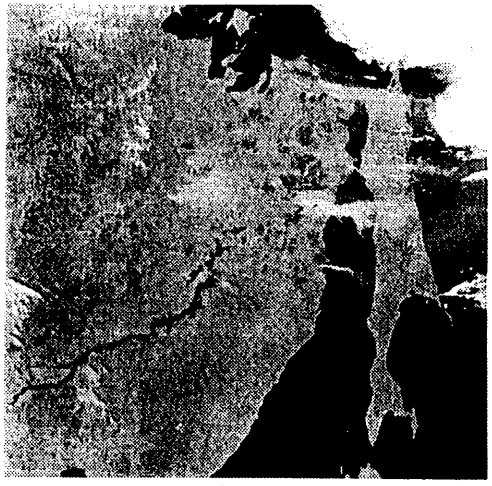


この地域の推定永久凍土
深さ　４０－５０ｍ



森林火災発生分布図

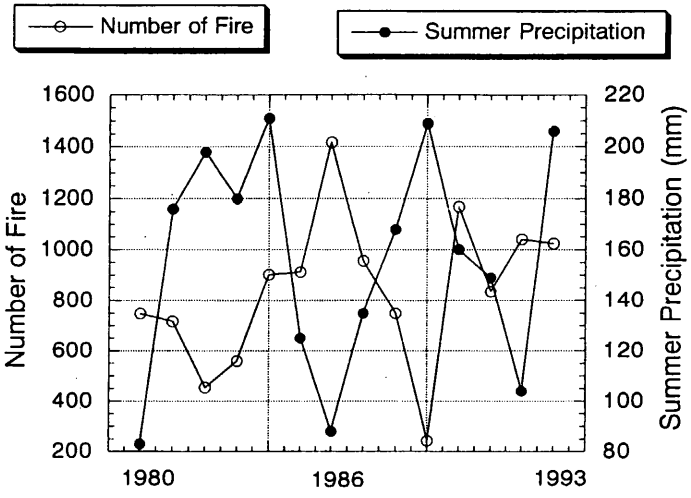
12/20



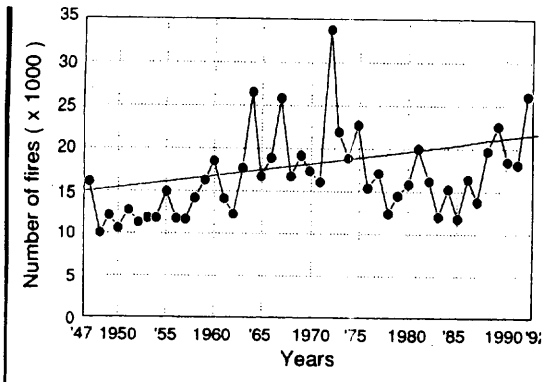
７月２１日～７月３１日

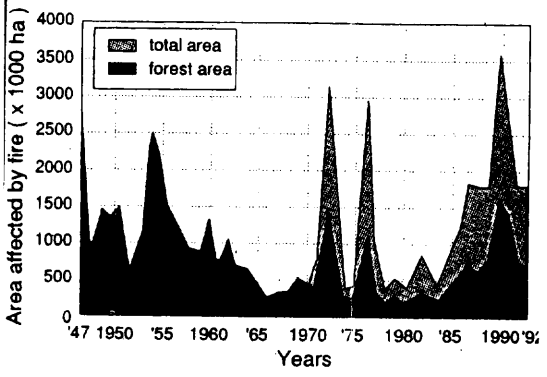


４月１日～７月３１日



東北大学大型計算機センター ㊗





Forecast of possible Fire Occurrence

Based on Weather Records

Preservation of Fire Occurrence

Detection of Fire Occurrence

by Satellite Images

Early Extinguishment

Replanting planning at burned sites

Soil characterisitics

Soil water condition





Once fire occurs, how we extinguish effectively?

Conclusions

Coexistence between Permafrost and Taiga

↓

Forest Fire Impacts disturb thermal condition of permafrost

↓

Degradation of Permafrost

↓

Different Soil Characteristics

↓

No Regeneration of Taiga

Decrease of fire occurrence

Ministry of Protection of the Environment and Natural Resources Russian Federation

All-Russian Research Institute for Nature Protection

9th Northeast Asian Conference on Environmental Cooperation

July 26-28, 2000
Ulaanbaatar, Mongolia

Session 1: Forest Protection and Afforestation

Background

Forests represent the most prevalent, the most highly organized and significant for the biosphere eco-systems on our planet. They synthesize almost half of the total organic mass of the Earth and play a decisive role in the life of humankind as a renewable source of energy resources; they are the most important regulator for large-scale natural processes; they perform erosion-preventive, water-protective and water-regulatory functions; they are of primary importance for the conservation of biological diversity. Forests are rightly thought of as a territory's environmental framework, whose condition in many ways determines the environmental situation both on the whole planet and in individual regions, especially those that are rich in forests.

The basic condition for ensuring environmental security of the planet today is conservation and recovery of eco-systems, including forest ones, in their natural surroundings.

The recognition of the global economic importance of forests and the necessity to preserve them have been reflected in a number of international conventions and agreements (the UN Convention on the Climate Change, the UN Convention on Biological Diversity, the AGENDA 21, the Statement on Principles for Global Consensus on Proper Management, Conservation and Development of Forest, and others), as well as in a number of national concepts and strategies on sustainable development.

The conservation and the sustainable management of all types of forests is recognized as a critical factor of social and economic development, protection of the environment and the system of life support on the whole planet. All countries — members of UN are recommended to develop coordinated approaches to the conservation of forests and sustainability in the forest management.

Russia is to play a significant role in the solution of the above issues, as it possesses almost one fourth of the planet's forest resources. Our country has the largest in the world area of forests and forested territories undisturbed by economic activity. They are of major importance for conserving biological diversity at the level of species and eco-systems. Russia's forests represent the largest carbon reservoir. The annual carbon deposition in forest vegetation is estimated as 262 MT C $year^{-1}$, which is nearly 1/2 of its annual power engineering and industrial emissions in the country. As a result of reforestation and afforestation steps, the annual carbon deposition in forest vegetation can be increased by 140-150 MT C $year^{-1}$

In the last three decades, the area of forested lands in Russia has enlarged by 61.2 million hectares, or by 9.3%. However, along with growing areas of forested lands, a number of negative changes in the country's forest fund have been observed, which reduce the environmental potential of forests: degradation of breed composition and productivity of forests, replacement of primary forests by secondary ones possessing a lower environmental potential, pollution of forests resulting from industrial emissions, accidents of oil pipelines, economic development of Siberian and Far-Eastern regions rich in forests.

Today reliable quantitative information about the ecological state of forests is virtually unavailable. Materials of state forest accounts mostly reflect the forests' resource potential and are practically inaccessible due to the cessation of publication of reference books on the forest fund. The reported statistical data provided by the Federal Forestry Department and other agencies dealing with forests are very incomplete and controversial.

Negative factors having a destructive impact on Russian forests

Forest fires. The total area of burned-out forests and destroyed stands is 24.9 million hectares, which is 5 times as much as the total non-afforested cutting area. The enhancement of the destructive effect of spontaneous fires on Russian forests in recent years stems from the dramatic reduction of expenses on their protection, as well as from the significant weakening of forest fire-control departments,

Primary and intermediate utilization cuttings. The drastic reduction of the volumes of forest industrial production in recent years has led to a considerably lower effect of logging activities on forests. At the same time, however, a 3-4-fold decrease in the area of primary utilization cuttings was accompanied by a dramatic diminution of tree planting and seeding, and a reduced number of measures promoting natural afforestation. Along with unsystematic logging and multiple violations of the rules for primary utilization cuttings, intermediate utilization cuttings damage forests as well.

Injurious insects and forest diseases. Every year loci of mass breeding of injurious insects and forest diseases are registered. They cause annual stand destruction on tens and hundreds of thousands of hectares.

Industrial emissions. The total area of forests destroyed by industrial emissions is nearly 1 million hectares, while the area of weakened by
industrial emissions forests is 1.0 to 1.5 million hectares. For the time being, the impact of industrial pollution on forests retains its local significance. About 3.5 million hectares of Russian forests have been subjected to considerable anthropogenic radioactive contamination. In addition to serious problems in the protection, utilization and regeneration of forests in these areas, there is a risk of secondary contamination as a result of radioactive emissions caused by forest fires.

Economic activity relating to development of forest areas with the purpose to develop the infrastructure.

One of the causes of negative changes in Russian forests is the inadequacy of existing forest and environmental legislation. The burden of expenses on fire control, protection from injurious insects and diseases and hence the burden of responsibility for the conservation of forests is imposed on the federal budget and federal forest authorities. In compliance with the current normative acts, the level of protection throughout the entire actively protected

territory is the same irrespective of the role and value of the forest, the extent of economic development of the area and the intensity of economic activity in the forestry.

There are yet a number of drawbacks, among them poor encouragement for the improvement of quality and preservation of forests, growing profit-making capacity, optimization of woodiness and formation of a forest-macrostructure depending on the forest's priority, functional and purpose-oriented designation, as well as on the economic (tax) system of the forest sector.

Poor mechanisms for encouragement and realization of forest management in a forest fund possessing a considerable wood potential could lead not only to the improper utilization of forest resources, but also to the degradation of forests' age structure and to the reduction of their protective and ecological functions.

Integrated forest management has not been properly attended to in the forest policy and practice and therefore it is realized only where economic actors take the initiative in doing this. The non-ligneous resource potential of forests is utilized at a level of 3-5% only.

There is a serious drawback in the sphere of state oversight of forests. The vicious practice of combining administrative functions of nature management and economic activity still persists. The latter is carried out on favorable conditions, which makes the things still worse. The situation on the whole is aggravated by the monopolization of the state oversight functions in this sphere.
This can have especially negative consequences in the execution of forest management, in particular in performing remediation cuttings by the forestry administration with an evident commercial purpose.

Positive trends

In recent years, positive changes have surfaced in the Russian Federation relating to the ecologization of nature management and in particular of forest management. This was favored by the adoption of legislative acts, among them the Forest Code of the Russian Federation. The Forest Code retained the fundamental ecological principles of classical forest science and the sustain-ability of forest management that were for the first time complemented by state-of-the-art principles of sustainable forest management and the conservation of biological diversity. An important aspect was the wording: "the owner shall bear the burden of outlays on the conservation, protection, regeneration and organization of proper management for any forest lands belonging to the owner". This significantly raised legal and economic responsibility of forest land owners pretending to the ownership of the forest fund.

The convergence of forestry and environmental requirements observed in recent years has made it possible to finalize the revision of rated cuttings (norms of forest use), to establish their optimal size, to further specify and approve them virtually for all enterprises — owners of the forest fund. Today the legal steps prohibiting forest use above the standards and oversight over the size of cuttings and volumes of logging allow us to state that the practice of excessive cuttings has stopped.

The cutting regulations and other normative acts regulating forest use, reforestation and protection of forests have been revised towards tightening of forestry and environmental requirements. Work is proceeding on the reduction of use and the prohibition of application

of equipment and technology that fail to meet the state-of-the-art requirements.

The focus of the value of forests is being shifted from the purely wood resource potential to other no less important utilities of forests, such as environmental, social, economic, or ones associated with an integrated use of non-ligneous products. This is reflected in the reclassification of forests in order to transfer them to categories of more stringent regimes of forest management that would enable their preservation.

Problems

Environmental problems of Russian boreal forests are closely related to a complex of institutional, economic and social issues of the forest sector, the state and the tendency of the development of forest eco-systems. The large size of the forest fund in the Russian Federation (1180 million hectares) evens the negative effects on forests due to the imperfect forest policy and practice. At the regional and local levels, however, these effects have really tangible environmental consequences.

Assessing the dynamics of the environmental state of Russian forests on the whole, it should be admitted that the environmental situation has stabilized, while for some parameters there is a tendency towards improvement. However, in a number of cases this has happened not owing to environmental steps but rather as a result of decreased volumes of industrial production (in particular, logging has dropped by three times as compared to 1998), reduced harmful emissions and discharges into the natural environment (on the average, by 20%).

The priority problems in the conservation of forests in Russia:

First, we should specify the notion of "conservation of forests in Russia". By this, people most often understand banning various types of cuttings and expanding special protected areas. In reality, the problem of conservation of forests is much more complicated. The main objective of foresters is ensuring a sustainable multipurpose forest management with reasonable preservation of forest's resource and environmental functions.

It is not a secret that today Russia's forestry is in a difficult situation. The perpetual financial deficit prevents foresters from taking necessary economic steps in full measure. In searching for requisite means, the forestry authorities resorted to commercial cutting of wood thus becoming lumberers. This is probably one of the most dramatic problems of today.

A significant problem in the improvement of the state of Russian forests is the availability of huge stocks of mature and overmature wood of soft-leaved breeds. The various restrictions on the exploitation of forests in plantations of higher protection category, introduced from good intentions, have resulted in the formation of low-grade overmature stands on vast territories. Reconstruction of such forests without loosing their resource and environmental potential would require considerable financial investments and high expertise of foresters.

What should be done for conserving forests in the first turn?

The requisite condition for maintaining the role of Russian forests in ensuring environmental security is preservation of forests and prevention of their degradation. This objective can be solved through improving forest laws, developing and implementing the national strategy on sustainable forest management and improving the existing system for forestry financing.

It is extremely important to establish a legal status of a forestry as an essential link of economic forest activity. If forestries are viewed as enterprises carrying out commercial activity to gain profit and to mobilize their own resources, then they must have a status of public authorities. If however they are considered to be management bodies, then their own funds should not be replenished at the expense of profits from woodcutting. Any type of cutting resulting in wood of commercial value must be done by non-budgetary organizations only.
A fundamental revision is required for normative acts regulating industrial activity in the forest in order to create favorable conditions for the development of the forest complex. It is not a secret that the standards established in recent years, promote supersession of businesses of the forest industry by forestries for which the standards are actually created.
Another most important forestry's objective is the organization of fire protection for forests. In this respect, proposals to transfer fire protection departments to direct financing are worthy of notice. This would ensure concrete responsibility for the extent of dramatic effects caused by fire.

What could be done by public organizations?

Public organizations must play a significant role in the improvement of Russia's forest management. Their activity should not be reduced to revealing drawbacks but it should be manifested through constructive participation in the realization of production process, as well as in the execution of supervisory functions in the system of public "green patrol".

Public movements should demonstrate high civil responsibility and carry out their actions backing on the professionalism and competence of experts realizing the essence of arising problems. It is not a secret that under the influence of NGO quite a big part of population is against any wood cutting at all. But the forest as a sophisticated living organism grows, matures, becomes old and dies. The objective of public organizations is to help the forest authorities disseminate silvicultural information, to participate in the shaping of public opinion aimed at the conservation of forest environmental and resource functions, to take part in the work of forest protection commissions, and to demand maximum open access to information about Russian forests. All programs relating to the strategy of forest management, exploitation of forest resources should undergo a stage of public discussion and be implemented with active involvement of representatives of the green movement.

Afforestation

The use of forest is closely connected to reforestation. Reforestation as the main step ensuring not only the regeneration of withdrawn forest resources, but also the formation of full-fledged forest eco-systems in forest-free areas, needs more attention and responsibility from the forestry authorities, adjustment of its current policy and practice, and higher efficiency.

Today, due to the inadequacy of Article 108 of the R.F. Forest Code, reforestation is artificially broken up technologically and financially making doubtful that it is practicable to identify realistically the required volume of regenerated forests and to implement the corresponding federal and regional programs.

The Russian Forests federal program providing for reforestation steps has been funded by less than 30% of the scheduled volume that would ensure maintenance of the balance of forest areas. The main strategic objective of a large-scale reduction of forest-free areas in the forest fund in essence has not been gained.

One of the lines of the new approach to resolving this problem could be a scientifically justified definition of a territory's optimal woodiness followed by approving this environmental standard by corresponding authorities and using it as a basic standard in developing and implementing reforestation programs and other programs in the forest sector, and as a criterion for justification and decision-making with regard to transferring forest lands to non-forest ones.

Improving nature management capacities to promote sustainabte development

The environmental project ROLL (Replication of Lessons Learned), supported by the USAID (US Agency for International Development), has been implemented in Russia since 1996. The ROLL'S strategic objective — improving nature management capacities to promote sustainabte development and economic growth — is realized in particular through better managing natural resources and conserving biodiversity.

Active work on ROLL'S "green" projects is carries out in the south of the Far East and in Baikal region. In Khasan District of Primorsk Territory, experts from the Pacific Institute of Geography have conducted integrated assessment of natural resources and developed functional zoning of this district. In doing so,-they identified areas with especially valuable natural complexes for which it is needed to establish and maintain an environmental regime. The Administration of Khasan District has commenced practical implementation of the project's materials.

A program on conservation of forests in connection with the problem of global change of climate is another ROLL project. In the territories of Primorsk, Khabarovsk and Krasnoyarsk, as well as in Irkutsk Oblast projects on the improvement of forest policy, prevention of forest fires, forest pest control and reforestation are in progress. In particular, in the Artyomov forestry of Primorsk Territory a greenhouse has been built in which nursery Korean cedars are grown and a selection center is organized.

Session 2

"Water Contamination and Purification"

Presentation on the Ninth Northeast Asia Environmental Cooperation Meeting

(Session 2)

Water contamination and Purification

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(July, 2000)

As a country with numerous river systems, China has a total water resource of 2800 billion cubic meters, occupying the sixth place in the world. However, the water resource per capita in China is 2300 cubic meters, being approximately 1/4 of the average level in the world. China is faced with a serious problem of water pollution, which causes negative impact on the health of the residents and the sustainable growth of economy. According to the statistics, the total industrial and urban wastewater discharge in the whole country in1999 reached 40.1 billion ton, of which the industrial wastewater discharge was 19.7 billion ton, the urban wastewater was 20.4 billion ton. The total COD (Chemical oxygen demand) discharge reached 13.89 million ton. In 1999, 87.2% of the industrial wastewater was treated and 66.7% met the pollution control standard for the effluent. The main rivers in China are polluted by organic substances and the surface source pollution is increasingly serious. The rivers such as Liaohe River, Haihe River, Huaihe River and the Yellow River have been seriously polluted, the water quality of the lakes including Taihu, Dianchi and Caohu is obviously degraded. The groundwater in majority of the cities in China is polluted to some extent, the water quality is increasingly degraded.

In recent years, the Chinese Government has been paying more and more attention to water pollution control. Great effort has been made to strengthen the water environment management by means of legal, administrative, technical, economic and educational instruments.

Strengthening water environment management. Since 1984, 12 laws and regulations such as "Environmental Protection Law", "Water Pollution Prevention and Control Law"and 21 standards such as "Environmental Quality Standard for Surface Water" and "Integrated Wastewater Discharge Standard"on water pollution control have been promulgated. A water pollution control system under the socialist market economy has been established. On the other hand, high attention is being paid to the environmental protection enforcement. The competent departments of environmental protection have been granted with more authorities for inhibitting and control the water pollution.

Establishing comprehensive decision-making mechanism. Joint effort of different competent departments is encouraged for decision-making in water pollution prevention and control. For instance, a comprehensive policy system including industry,

environmental protection, technical and economic instruments, finance and tax has been established for water pollution control in the Huaihe River.

Strengthening administrative supervision and technical service. Administrative instruments including construction project examination, environmental protection standard establishment and enforcement are utilized to make up the shortcomings of the market mechanism. In the meantime, the Chinese Government has made great effort to promote technical progress, develop environmental protection industry market and provide technical service for water pollution control.

Establishing market economy mechanism and paying attention to economic instruments. The Chinese Government has made great effort to develop the environmental resource market by establishing the socialist market economy system. For instance, the pollution levy system has been adopted for water pollution control.

The water pollution control in China has the following characteristics:

Unified target. In 1996, the unified target and tasks for water pollution control were proposed in "The Decisions of the State Council on Environmental Protection".

Focusing on water pollution control of the main water systems. "The Ninth-Five-Year Plan and the Long-term Target for National Economy and Social Development" were adopted at the Fourth Session of the Eighth National People's Congress. At this session the water pollution prevention and control in the so-called "Three rivers and three lakes" (i.e. Huaihe, Haihe, Liaohe, Taihu, Caohu and Dianchi) was listed in the key tasks in China's environmental protection in the period of 1995-2000.

Paying high attention to the safety and protection of drinking water areas. The competent departments of environmental protection of all levels have made great effort to strengthen the management and protection of drinking water areas. For example, 2244 drinking water wells have been drilled using the subsidy from the central finance in the heavily polluted areas of the Huaihe River basin. Approximately 4 million residents in the river basin benefit from the diversion works.

Strengthening urban wastewater treatment. In the past, almost little attention has been paid to the urban wastewater treatment in China. At present the total discharge of domestic wastewater is more than the industrial effluent. In many of the coastal cities, 70% of the total discharge is domestic wastewater. However, less than 30% of the urban wastewater has been treated. It is required by the State Council that wastewater treatment plants must be built in all the cities with the population of more than 500,000 people during the Ninth-Five-Year period. In 1998-1999, a total sum of 12.3 billion yuan RMB of subsidy from the central finance was used for the construction of urban wastewater plants in 202 cities. Upon the completion of the projects, a capacity of 22 million ton/day of domestic wastewater will be reached.

The Chinese Government is faced with enormous difficulties in water pollution prevention and control although great effort has been made. As a developing country, China is still weak in water pollution control facilities. The first problem to overcome is the shortage of funds. It is hoped that the foreign capital is available for the water pollution control in China. Wide international cooperation is needed in drinking water area protection, cleaner production, water pollution control technologies, water quality monitoring, water environment management, rural surface pollution source control and ecosystem restoration.

As we all know, water resource is the basis for the existence and development of the human beings. In the field of water environment protection, the whole northeast region has a common target and wide benefit. The governments of the related countries and the non-governmental organizations (NGO) have much to do in the field of water pollution control. I'd like to say that the Northeast Asia Environmental Protection Meeting has made great contribution to the regional environmental protection. I hope that, the Northeast Asia Environmental Protection Meeting as a forum, will play an increasingly important role in promoting the environmental protection and development in the Northeast Asia region. The Chinese Government will cordially cooperate with other countries to promote the water pollution control and sustainable development.

Thank you for your attention!

(Session 2)

The current status, policy and water treatment with regard to water quality renovation system in Korea

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1. Introduction

In this century the growing challenge in all over the world is the awareness of increased contamination of water resources for drinking water. Previously, major surface water problems resulted from agricultural activities, so contaminants were predominantly organics and some other inorganic contaminants. More recently, however, due to natural resources development projects and fast industrialization, contamination of usable surface and groundwater by synthetic organic chemicals has been observed or experienced accidently, raising concerns that a major water resource will require to be treated by advanced water treatment.

In Korea, since the modern water treatment facility was built in 1908 water supply evolution reached to abundant development such as 585 supplying cities, 80% supplying ratio, 385L/cap./day supplying water, and 18 million ton/day supplying water until 1992. However, so far, there had been 182 water related episodes such as heavy metal incident in 1989, THM in 1990, phenol spill in 1991, and bad ordor problem at Nakdong river down stream in 1994, ..etc. which were occurred since 1988. Also, the raw water quality supplied to water treatment plant is continuously worse by increasing concentration and variety of contaminants due to population increase, urbanization and industrialization.

Accordingly, The quality of drinking water is losing its confidence because most of the water treatment plants are applying conventional treatment process like coagulation, sedimentation, sand filteration and disinfection, in spite of increased and sophisticated contaminants to be treated.

Also, modernization of living style and improvement of living standard have shifted public health concerns from acute illnesses to the chronic health effects of trace quantities of organic, inorganic and microbiological contaminants. This shift is reflected in the increasing number of regulated contaminants from 35 to about 50 water quality parameters. Therefore, the demand for new technology to produce better quality water is anticipated although the raw water quality is deteriorating.

In the United States, and other developed nations through the world, had already developed advanced water treatment processes incorporating with activated carbon filteration, ozonation, and microbiology treatment,..etc. and applied to the field where THM by-products and micropollutants are required to be removed. In Korea, activated carbon filteration was adopted first at Bupyung water treatment plant in 1986 and facility for ozonation was built at Whamyung water treatment plant. After the spill of phenols into the Nakdong River in 1994, the government formulated and announced the Water Quality Improvement Measures for the four major rivers running throughout the south part of the Korea peninsular. During 1993-1995 government implemented installing advanced water treatment systems for 18 water treatment plants as part of the Water Quality Improvement Measures.

However, Korea lags behind other developed countries in the technology evolution which is necessary to implement the Measures, so the project for the development of advanced water treatment system was included into the G-7 Environmental Engineering Technology Development Project which was launched by government as part of Highly Advanced National(HAN) Project in 1992. Accordingly, this study is to address the current status and future trends in advanced water treatment in Korea by focusing on G-7 Environmental Engineering Technology Development Project.

2. Current Status and Related Policies on Water Quality Renovation System

2.1 Current status of water quality renovation system

In this part, current status of raw water quality, water quality renovation system, and applied treatment technologies are reviewed. 4 major rivers are Han River, Keumkang River, Nakdong River, and Youngsan River. One table and a figure are depicted to show data for 11 years of raw water quality at the specific place of each river. Figure 1. shows the water quality of rivers was at the stage of improving until 1988 but it turned into worse condition during 1994-1995.

Table 1. 4 major rivers BOD concentration status

(unit: mg/l)

watershed	'85	'86	'87	'88	'89	'90	'91	'92	'93	'94	'95
Han River (Noryangjin)	4.	3.6	4.3	4.3	3.4	3.4	3.9	3.6	3.1	3.3	3.5
Keumkang River(Puyo)	2.5	3.0	2.9	3.2	3.5	3.1	3.0	3.2	3.1	3.7	4.3
Nakdong River (Mulgum)	3.7	3.6	3.6	3.9	3.6	3.0	4.0	3.3	3.4	4.6	5.1
Youngsan River(Naju)	5.2	5.2	4.2	7.0	6.6	6.7	5.6	5.6	4.5	7.3	7.0

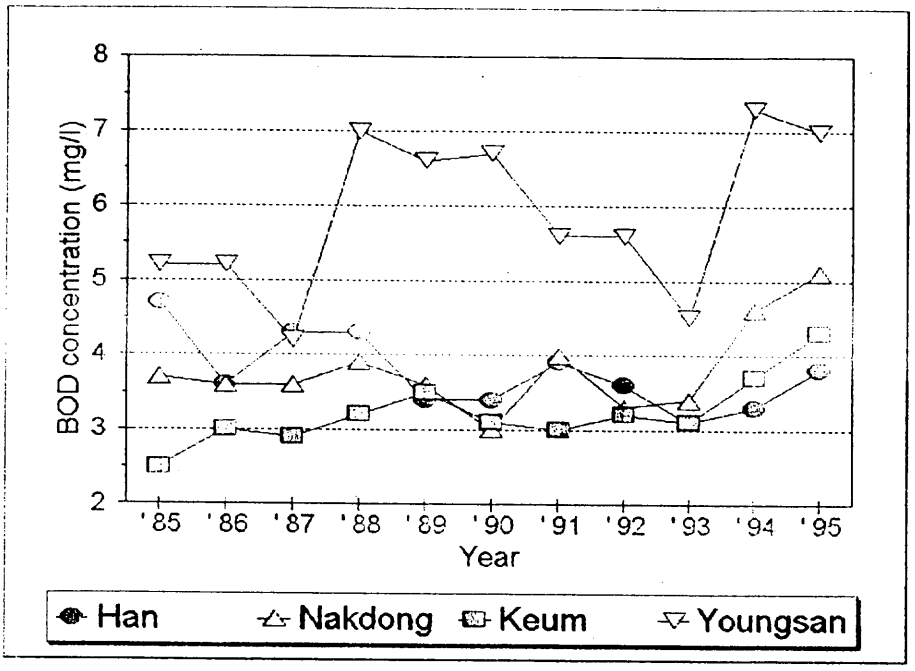

Figure 1. 4 major rivers BOD concentration trend

The government has placed priority on expanding infrastructure, so the number of water supply systems are increased from 489 in 1987 to 28,283 in 1994. The table 2 showed a 12.1% increase in the ratio of piped water service from 70% in 1987 to 82.1% in 1994 over the eight years.

Table 2. Current Status of Water Supply

year / classification	'89	'90	'91	'92	'93	'94	'95	'96	unit
Water sevice ratio	77.7	78.4	80.1	80	81.1	82.1	82.9	83.6	%
Total population	42.4	42.9	43.3	44.6	45.1	45.5	46.0	46.4	million
Water serviced population	33.0	33.6	34.7	35.6	36.6	37.4	38.1	38.8	million
Facility capacity	15.7	16.3	16.9	18.8	20.1	21.0	21.8	22.9	$x10^6$ m^3/d
Per capita water service	339	369	376	385	394	398	406	409	L
Number of cities serviced	524	551	572	585	625	654	684	699	num. places

Figure 2 describes continuing increase in water service per capita from 102L in 1961 to 409L in 1996. It also showed three fold increasing in per capita water service over the 26 years between 1961 and 1987. During same period, per capita water service rose from 102 liters/cap.day to 311 liters/cap.day. At the end of 1996, the service rate reached 409 liters/cap.day, which was higher rate than the goal of 1995 which had been set as 400 liters/cap.day.

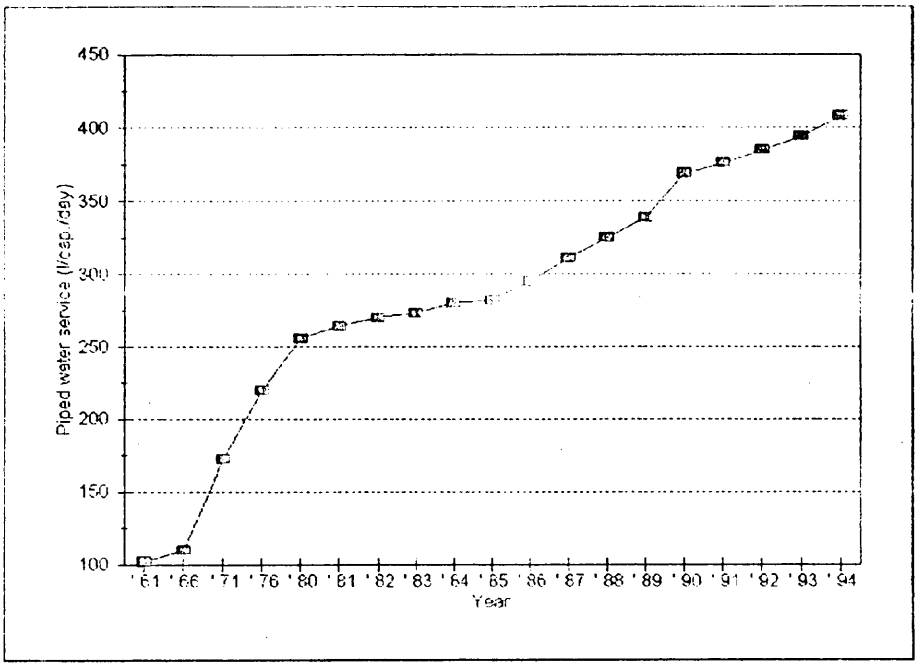

Figure 2. Trend for transmit of per capita water service per day

The ratio of each water treatment process type in the water treatment plants in Korea are diagramed in Figure 3. Rapid sand filteration process is applied to most of the plants and slow sand filteration is adopted by some of the plants.

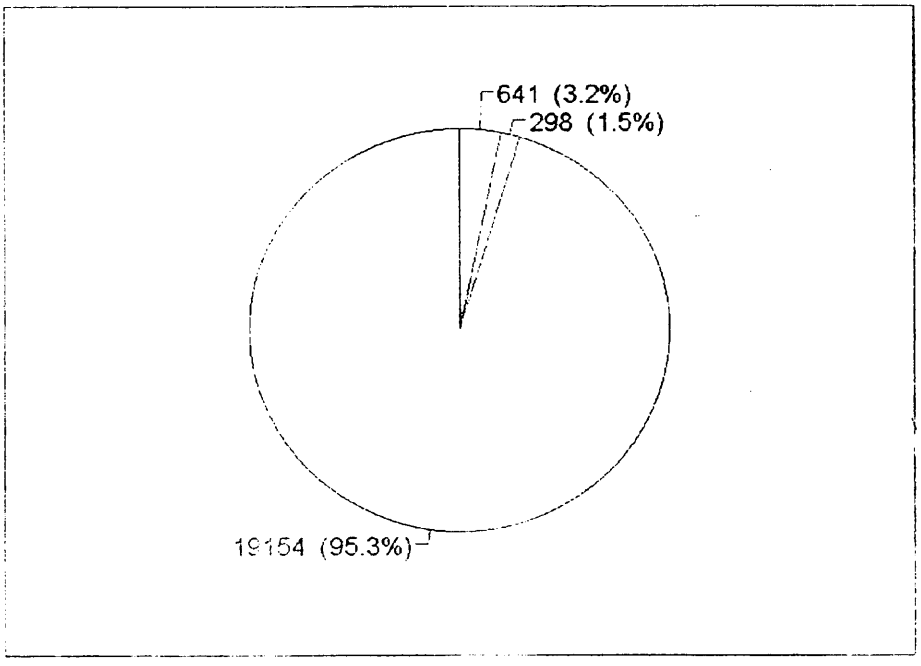

Figure 3. The ratio of filtration type in water treatment plants in Korea

For the current status of advanced water treatment facilities, the 18 water treatment plants which adopt advanced water treatment processes are listed in table 3. After the water pollution accidents occurred in the Nakdong and Youngsan River in 1994, the government planned to reinforce 18 water treatment plants in which the raw water quality was the worst with advanced water treatment facilities. As in the table 3, three water treatment plants around Han River basin, twelve plants around Nakdong River basin, two plants around Keum River basin, and one plant around Youngsan River basin are included in this project.

The government established the "Advisory Committee on Technologies of Advanced Treatment Facilities," consisting of 30 experts by Prime Minister Directive No. 297, on May 28, 1994. The committee is incharge of reviewing governmental projects and providing advices on the size and the installation of advanced treatment facilities, the optimum model process for advanced treatment system, and the design of treatment facilities.

Table 4. The current status of water treatment plants operating advanced treatment process

classification	capacity ($x10^3$ m^3/d)	total budget (million won)	project period	regional specification
total(18 places)	3,944.7	349,330		
Han River(3 pla.)	128.4	14,390		
Dongduchun	38.5	5,390	'94-'96	drought, eutrophication
Wonju2	85	8,500	'94-'96	serious contamination (sewage inflow)
Wonjumunmak	4.9	500	'94-'95	serious contamination (wastewater inf.)
Nakdong River(12 pla.)	3636.3	316,580		
Nakdongkang 1	310	30,400	'94-'95	midstream(industrial complex at upstream)
Nakdongkang 2	800	67,200	'94-'97	midstream(industrial complex at upstream)
Kyungsan Hayang	10	980	'92-'94	downstream intake at contaminated river
Masan Chilseo	400	41,000	'94-'97	downstream at Nakdong River
Chinhae Seokdong	70	6,200	'94-'96	"
Kimhae Samkyue	136.8	5,800	'94-'96	"
Yangsan Bumea	37.5	5,000	'94-'96	"
Wulsan Whaeya	420	42,000	'94-'98	raw water quality worse, city expansion
Wulsan Seonam	60	5,000	'94-'96	intake at Wondong on downstream
Busan Duksan	1,055	89,500	'92-'97	downstream at Nakdong River
Busan Myungchang	277	19,300	'94-'96	water quality worse at Whaedong reservoir
Busan Oryun	60	4,200	'94-'96	"
Keum River(2 pla.)	60	7,160		
Kongju Oakryung	22	3,360	'94-'97	bad quality on downstream at Keum River
Kunsan 2	38	3,800	'94-'97	
Youngsan River(1 pla.)	[illegible]	11,200		
Mokpo [illegible]	120	11,200	'94-'95	downstream at Youngsan River

2.2 National projects for environmental technology development policies

The government promotes Highly Advance National Project(HAN Project), so called G-7 Project, to elevate Korea's science technology to the level of western 7 developed countries, and G-7 Environmental Engineering Development Project(G-7 EEDP), which is one of the project among 18 G-7 Projects, is managed by the Ministry of Environment.

The final goal of G-7 EEDP is focused on the elevation of public living quality and ability of environmental industry for international competition through preserving environment by developing competitive high environmental technology and securing basic fundamental technology. Also, it is focused on bringing up environmental industry as strategic export industry.

The G-7 Project is divided into 3 stage for 10 years of project period. At the first stage(1992-1994), it was promoted by emphasizing early secure and development of environmental basic technology. For the second stage, research is being performed to achieve development of core technology and establishment of utility base on the basis of technology developed at the first stage. During third stage(1998-2001) the Project will be derived to gain practical use, merchandising, and export industrialization. Also, the progress of the projects will be analyzed thoroughly and evaluated carefully during same period. The full Project is being modified and reinforced within every two or three years intervals for the rolling plan. The promoting goal of each stage for the Project is listed in the Table 5.

Table 5. The promoting goal of each stage of G-7 Project

classification	1st stage (1992 - 1994)	2nd stage (1995 - 1997)	3rd stage (1998 - 2001)
Basic Goal	secure basic technology	core technology development and establishment of basis for practical use	practical use, merchandizing, establishment of integrated control system for environment
Emphasized Technology Development	technology development for pollution prevention		clean technology, technology for remediation and regeneration
Industrialization	self-supporting environmental technology		industrialization for exporting environmental technology

During 3 years of first stage for G-7 Project, government invested 25.5 billion won(Ministry of Environment: 14.8, Ministry of Science and Technology: 6.9, Ministry of Trade, Industry and Energy: 3.8) and private sector invested 30.1 billion. The planning of the past and future investment for G-7 Project is described in the Table 6. The table showed total investment of 431.5 billion won by government and private sector by the year of 2001.

Table 6. The planning of the past and future investment for G-7 Project

(unit: billion won)

classification	Total	1992 - 1995	1996	1997 - 2001
Total	431.5	93.8	42.2	295.5
Government Private sector	249.5 182	42.1 51.7	23.7 18.5	183.7 111.8

G-7 Project, which is composed of 23 major group projects, is promoted to develop innovative technologies in the areas of air pollution prevention , water pollution prevention, waste treatment, clean technology, global environment preservation, marine environment preservation, ecological control, and environmental health. Those 23 major group projects include the following projects such as stack gas desulfurization & denitrification, advanced water treatment, low or non-pollution processes, and ecological restoration,..etc.

Among 23 major group projects, the advanced water treatment technologies developed by the cooperation of government and private sector are expected to contribute to relieving public diffidence in water treatment and service. Also, THM, nitrogen, phenol, and other contaminants can be removed over 90% by that technology. Once the advanced water treatment technology is developed, competitive ability for environmental technology export will be sustained strongly to attain superiority over other country because other developed countries are also on the way of developing technologies.

2.3 Advanced technology development for water renovation system

The project for advanced water treatment technology continued its development for 3 years from 1992 so far. In 1993 the current status of domestic technology was analyzed to investigate potential for new advanced water treatment technology and innovative unit processes. Processes capable of removing contaminants according to raw water quality were also suggested. In 1994 processes possible for realization of practical use and new unit processes requiring additional research were studied to examine the treatability of surface and groundwater among potential unit processes and systems selected for development in the first year. In 1995 demonstration plant selected as most suitable system out of 10 system evaluated by pilot scale test was built and operated. According to the results from demonstration plant test the research was focused on development of technology for design, construction, and maintenance of advanced water treatment system adequate for domestic water treatment plants.

The current status of technology development at each year of period during first stage of project were reported and evaluated. During 1993 conventional water treatment system(CWTS) combined with advanced water treatment system applied in other developed countries were investigated and some adequate advanced water treatment system, which are

suitable to seasonally distinct condition, were suggested in Table 7 around activated carbon, AOP, and membrane filteration.

Table 7. Advanced unit processes suitable to domestic water treatment system

Type	Advanced water treatment system
combined with activated carbon process	Inflow→CWTS→AOP→GAC, BAC Inflow→CWTS→BF→O_3→GAC Inflow→CWTS→O_3→GAC, BAC Inflow→CWTS→Ion Exchange→GAC
combined with AOP process	Inflow→CWTS→AOP→Membrane Inflow→CWTS→TiO_2/AOP→GAC, BAC Inflow (Inflow→CWTS)→DAF→TiO_2/AOP→BAC
combined with Membrane process	Inflow, (Inflow→CWTS)→Membrane Inflow→CWTS→BAC→Membrane Inflow→CWTS→PAC→Membrane

In 1994 the unit processes, which are related to activated carbon and ozone process, selected from the last year research were tested to find feasibility with raw water of major rivers. Accordingly, during 1994 and 1995, activated carbon (GAC/BAC) process, ozone/AOP process, and membrane process were screened to formulate systems additive to conventional treatment plants.

Table 8. Feasible advanced unit processes suitable to domestic water treatment system

Type	Advanced water treatment system
combined with activated carbon process	Inflow→ ozone, AOP → CWTS → AOP → GAC, BAC→disinfection coagulation BF sedimentation Ion Exchange
combined with AOP process	Inflow→ ozone, AOP → CWTS → AOP → GAC, BAC→disinfection coagulation membrane sedimentation sand filteration
combined with Membrane process	Inflow→ ozone, AOP→ CWTS → GAC, BAC→Membrane→disinfection coagulation BAC sedimentation PAC sand filteration

Also, unit processes such as ozone/AOP, GAC/BAC, PAC, Membrane process, Air stripping, DAF, Ion Exchange, and biological process are possible processes to be developed for advanced water treatment. Among these processes, ozone/AOP, GAC/BAC, and Membrane process showed prominent results in removing variable contaminants and treatment efficiency. Especially trace organics, taste and odor causing substance, THMFP, and ammonia nitrogen are commonly related to raising water quality problem in Korea, so GAC/BAC and ozone/AOP unit process resulted in most optimum process with consideration about adapting to old system, simplicity, easy operation, economic benefit, and produced water safety,..etc.

Accordingly, to accomplish maximum treatment efficiency, adequate advanced water treatment systems are categorized according to raw water quality and characteristic of water supply resources in Table 9.

Table 9. Advanced water treatment system compatible to raw water quality

Classification	adequate systems suitable to water quality and characteristic
Category I	Inflow - coagulation/sedmentation - sand filteration - AC filteration
	Inflow - preozone - coagulation/sedmentation - sand filteration - AC filteration(GAC/BAC)
Category II	Inflow - coagulation/sedmentation - sand filteration - postozone - BAC
	Inflow - coagulation/sedmentation - midozone - sand filteration - AC filteration(GAC/BAC)
	Inflow - preozone - coagulation/sedmentation - sand filteration - postozone - AC filteration(GAC/BAC) - (sand filteration)
Category III	Inflow - preAOP - coagulation/sedmentation - sand filteration - AC filteration(GAC/BAC)
	Inflow - coagulation/sedmentation - sand filteration - postAOP - BAC
	Inflow - preozone - coagulation/sedmentation - sand filteration - postAOP - AC filteration(GAC/BAC)

※ category I denotes : less contaminated up and midstream region
category II denotes : medium contaminated midstream region
category III denotes : highly contaminated downstream region

3. Future Trend in Water Quality Renovation Systems

3.1 Trend in the technology development policies

In recent years many water treatment plants belonging to local governments are planning to adopt advanced water treatment processes through pilot scale test because due to frequent accidental water pollution, central government announced master investment plan

supporting development of advanced water treatment system in January 1994. However, most of these pilot test tend to focus on optimizing parameters for design and operation of ozone and activated carbon process, so it is inefficient if the test is performed without combining to existing plants and without developing systems related to economic processes.

Consequently, the future prospective technology development programm for advanced water treatment system is suggested to focus on adapting tested and evaluated systems by the technology development research to existing water treatment plant and on studying technology development for removal of secondary contaminants in piped service water. The suggesting scope for the future research are listed in the Table 10.

Table 10. Scope for the future research concern

Classification	1995 - 1997	1998 - 2001
Research focus	Adaptation developed advance water treatment technology to water treatment plants	developing and exporting advanced water treatment technology
Technology development	- development of technology to elevate the efficiency of existing water treatemtn plant - development of technology to prevent secondary contamination of piped service water - development of technology to disinfect and remove byproducts - development of materials used for water treatment	- development of technology for operation and management to control byproducts - development of technology for water quality control and improvement in the water distributing mains - development of innovative advanced water treatment technology - development of optimum management techniques for automation

3.2 Investment policies

The Ministry of Environment and other seven ministries established the Comprehen ive Plan for Clear Water Supply and finalized it at the Environmental Preservation Council in July 22, 1993. After the phenol spill accident at Nakdong River in early 1994, central government formulated the Water Quality Improvement Measures for the four major rivers. Under this Measures the investment plan for basic environmental facilities, and expansion of the large-scale water supply networks was implemented earlier than originally scheduled. Table 11 presents the investment status to the area of advanced water treatment under the Comprehensive Plan for Clear Water Supply.

Table 11. Investment status for advanced water treatment (unit: billion won)

Classification	1993 - 1995	1996
Advanced water treatment	156.7	108.9

The investment status for the development of advanced water treatment technology in the G-7 Project, so far, is listed in the Table 12.

Table 12. Investment status in the G-7 Project (unit: million won)

Classification	1992	1993	1994	1995	1996
Advanced water treatment	495	1,000	1,654	2,632	3,858

4. Conclusion

In the United States, Safe Drinking Water Act was amended in 1986, so EPA established Maximum Contaminants Level(MCL) and Maximum Contaminants Level Goal(MCLG) regard to 83 pollutants (180 pollutants in the long run) to regulate serviced water quality step by step.

In Korea two more pollutants such as CCl4 and 1,1-dichloroethylene were added to 43 pollutants of Drinking water Standard in 1996. Also, by the end of 2002, 147 more pollutants among materials recommended by WHO and investigated by US-EPA are to be examined and added to the number of parameters for sustaining adequate water quality standard suitable to this country. The current number of pollutants regulated by the water quality act to meet the established standards in the developed countries are listed in the Table 13.

Table 13. Comparison of Korea's water quality standard parameters with developed countries

Country	WHO	U.S.A.	U.K.	German	Japan	Australia	Korea
number of standard parameter	121	85	56	49	46	44	45

The development of advanced water treatment technology is suggested to promote with the integrated analysis of our own water quality characteristic and specification of water quality problem. New strategies to adapt the developed unit processes or systems to the

existing water treatment plants are also required to accomplish efficient development goal for advanced water treatment technologies.

The secondary contamination of piped service water is also necessary to be addressed for optimum public health safety. There are demands to develop the technology for disinfection and removal of byproducts to meet these current conditions.

Conclusively, the objectives of developing advanced water treatment technologies are to attain economic benefit from technology export by technical renovation and independence and to preserve water quality for our safety. Accordingly, to achieve these goals, the technology development for advanced water treatment need to be carried on the basis of integral analysis about our current status of water treatment, development of suitable innovative unit processes, and implementation of adapting developed technology to current water treatment technology.

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(Session 2)

Prospects of Water Environment Restoration Using Ecotechnology and Biotechnology in Japan

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1. Introduction

The water pollution problems in Japan have shown an overall improvement and grown out of what was so serious as before, but there still exist areas which further improvements must be made. For instance, Japanese government promulgated the environmental quality standards for water in 1970, these standards are consisting of two major categories: one for the protection of human health and the other for the conservation of living environment (Table 1, 2). The environmental quality standards relating to the protection of human health were amended from nine items into twenty three items in March 1993, and the compliance ratios were more than 99.5% in 1999. However, for the second category including BOD, COD, the compliance ratios for rivers, lakes and coastal waters were 81.0%, 40.9% and 73.6%, respectively, which still remains in low levels. Especially in urban rivers, lakes, inland sea and bays, the water bodies are extremely eutrophicated because of the direct discharging of gray water, which represents a substantial portion of the total household effluents, and the wastewater from the small scale factories. They are almost 70 % of the total pollutants in public water areas. On the other hand, as for the environmental quality standards relating to nitrogen and phosphorus in 60 determined lakes and 112 sea aeras were 38.3% and 70.5%. The removal of nitrogen and phosphorus in effluent from domestic and industrial wastewater treatment facilities is most important to control the eutrophication.

The extreme growth of poisonous picoplankton and the occurrence of water bloom even caused the crisis of water supply systems. The control of micro pollutants such as organochloride and agricultural pesticides is also an urgent problem. For these reasons, Japanese government including the Environment Agency, has made great efforts in the research and control projects concerning the household wastewater treatment, not only for the removal of BOD, COD, but also for nitrogen and phosphorus removal. And a series of laws and regulations have been established. The regulation concerning the prohibition of the penetration of harmful substance through soil, nitrogen and phosphorus effluent standard for coastal area, Basic Law on Environment and Law concerning the Conservation of Water Resources were enacted in September 1989, October 1992, November 1993 and February 1993. With the people's rising conscious about the deterioration of the global environment, the awareness about the need to overcome the crisis that humankind faces regarding " sustainability", and to ensure development of human society, has begun to be used at various international conferences as key concept related to global environmental issues. Thus, the policy concerning sustainability, self-support, coexistence with environment and international cooperation has been emphasized in Basic Law on Environment.

Some successful results have been reached through the cooperative studies of government, companies and research institutes. Some of the acquired new technologies have been applied to the practical use. At the meantime these technologies are adopted as advanced treatment methods and begun to spread to whole country. Among them the application of the ecotechnology and biotechnology is one of the important tasks for the treatment of wastewater and the conservation of water environment. However, the new biotechnology such as using the genetically engineered microorganisms (GEMs) is not applied yet.

The purpose of this study is to introduce the present state of the application of ecotechnology and biotechnology to the restoration of water environment field in Japan, and to prospect the new technology which is applicable to other countries(Inamori et al, 1995).

Table 1 Standards related to the conservation of the living environment in Japan (BOD, COD)

1)Rivers (BOD) (mg · l^{-1})

	Category					
	AA	A	B	C	D	E
BOD	1 or less	2 or less	3 or less	5 or less	8 or less	10 or less
Purposes of water use	AA: Water supply, class 1; conservation of natural environment, and uses listed in A-E A: Water supply, class 2; fishery, class 1; bathing and uses listed in B-E B: Water supply, class 3; fishery, class 2; and uses listed in C-E C: Fishery, class 3; industrial water, class 1; and uses listed in D-E D: Industrial water, class 2; agricultural water, and uses listed in E E: Industrial water, class 3; conservation of the environment					

2)Lakes and reservoirs (COD) (mg · l^{-1})

	Category			
	AA	A	B	C
COD	1 or less	3 or less	5 or less	8 or less
Purposes of water use	AA: Water supply, class 1; fishery, class 1; conservation of natural environment, and uses listed in A-C A: Water supply, classes 2; and 3; fishery, class 2; bathing, and uses listed in B-C B: Fishery, class 3; industrial water, class 1; agricultural water, and uses listed in C C: Industrial water, class 2; conservation of the environment			

3)Coastal waters (COD) (mg · l^{-1})

	Category		
	A	B	C
COD	2 or less	3 or less	8 or less
Purposes of water use	A: Fishery class 1; bathing; conservation of natural environment and the uses listed in B-C B: Fishery class 2; industrial water and uses listed in C C: Conservation of environment		

Table 2 Standards related to the conservation of the living environment in Japan (nitrogen and phosphorus)

1) Lakes and reservoirs (mg · l^{-1})

	Category				
	I	II	III	IV	V
Total nitrogen	0.1 or less	0.2 or less	0.4 or less	0.6 or less	1 or less
Total phosphorus	0.005 or less	0.01 or less	0.03 or less	0.05 or less	0.1 or less
Purposes of water use	I : Conservation of natural environment and uses listed in II - V II : Water supply classes-1.2 and 3 (excluding special types); fishery class 1; bathing and uses listed in III - V III : Water supply class 3 (special types) and uses listed in IV - V IV : Fishery class 2 and uses listed in V V : Fishery class 3; industrial water; agricultural water; conservation of the environment				

2) Coastal waters (mg · l^{-1})

	Category			
	I	II	III	IV
Total nitrogen	0.2 or less	0.3 or less	0.6 or less	1 or less
Total phosphorus	0.02 or less	0.03 or less	0.05 or less	0.09 or less
Purposes of water use	I : Conservation of natural environment and uses listed in II - IV (excluding fishery classes 1 and 2) II : Fishery class 1; bathing and uses listed in III - IV (excluding fishery classes 2 and 3) III : Fishery class 2 and uses listed in IV (excluding fishery class 3) IV : Fishery class 3; industrial water; conservation of biotic environment			

2. Ecotechnology for Conservation of Environment

Pollution problems became widely recognized during 1960s. Although many billions of dollars have been invested all over the world in solving these problems, it is still far from an acceptable solution to many serious problems, which threaten the survival of Homo sapiens. Some even claim that we are further from a total solution of our environmental problems today than we were 10 to 20 years ago, owing to the continuous growth of population and continuous disappearance of natural resources. As industry and society become more complicated, clean, safe water is more necessary both for everyday life and for industry. Sewage treatment facilities, plants play an important role in environmental conservation. But the high cost of constructing and operating these plants, in addition to potential for inadequative wastewater treatment and disposal, has led to the demand for and creation of innovative technologies designed to treat wastewater. In the forefront of these alternative technologies is biological treatment using ecotechnology.

Ecological engineering and ecotechnology is defined as the design of human society with its natural environment for the benefit of both (Mitsch, 1988). It is engineering in the sense that it involves the design of this natural environment using quantitative approaches and basing our approaches on basic science. It is a technology with primary tool being self-designing ecosystems. The components are all of the biological species of the world. On the other hand, biotechnology is the commercial exploitation of existing and novel biological techniques and processes. Clearly, man has exploited biological processes for centuries in such activities as brewing, wine making, bread making, food preservation and modification (e.g., cheese, vinegar, soy sauce), and waste treatment. Some of the contrasts between the approaches of ecological engineering (ecotechnology) and bioengineering (biotechnology) are shown in Table 3.

Table 3 Comparison of ecotechnology and biotechnology

Characteristics	Ecotechnology	Biotechnology
Basic unit	Ecosystem	Cell
Basic principles	Ecology	Genetics; cell biology
Control	Forcing functions, organisms	Genetic structure
Design	Self-design with some human help	Human design
Biotic diversity	Protected	Changed
Maintenance and development costs	Reasonable	Enormous
Energy basis	Solar based	Fossil fuel based

Natural Self-purification of water bodies is a well-known process. Untreated wastewater maybe directly discharged into natural water bodies such as streams, rivers, ponds, lakes, and seas. Although it is very convenient and is usually practiced in most regions, the actual result of implementation of this method is mostly negative, with respect to both environmental social efficiency and economic benefits. Most of the streams, rivers, ponds, and lakes in the vicinity of cities or towns are regarded as unlimited sewers. This kind of pathway for treating wastewater is unaccommodating and should be improved.

Current philosophy suggests that ecotechnology, utilizing biological systems, wetland, algae and higher plants, soil, stream purification process depends on the natural self-purification ability and it requires a minimum of hardware, energy, and chemicals. Furthermore, a great deal of material wealth and many other economic benefits can be obtained by regeneration and retrieval from wastewater of many abandoned resources. Through its operation, a local section of non-point pollution can be controlled.Each system has different constrains, operating conditions, and design criteria.

An overview of the ecological methods is given below.

1) Wetland systems

Wetlands are defined as land in which the water table is at (or above) the ground surface long enough each year to maintain saturated soil conditions and the growth of related vegetation. The capability for wastewater renovation in wetlands has been verified in a number of studies in a variety of geographic settings. Pollutants are removed in both natural and constructed wetlands by

physical and chemical mechanisms including adsorption, precipitation, sedimentation, and most importantly, bacterial transformation. Wetlands used in this manner have included preexisting natural marshes, swamps, strands, bogs, peat lands, cypress domes, and systems especially constructed for wastewater treatment. Vegetation in the water column-stems, leaves, and detritus provides suitable sites for microbial growth. In addition, wetland plants diffuse oxygen through aerenchyma tissue to the root tips where, depending on the permeability of the root tissue, an oxidized zone can exist in an otherwise anaerobic substrate. This rhizosphere provides a unique environment that supports aerobic microorganisms that conduct desirable modifications of nutrients, metallic ions, and other compounds. As an example (Hosomi, 1994), from a 1200 m^2 field wetland experiment in Ibaraki, Japan, where gray water (BOD=77, TN=6.2, TP=0.97 mg $\cdot$ l^{-1}) was discharged in this wetland system, the removal of BOD, total nitrogen and total phosphorus was found to be 60-90%, 30-70% and 10-60%, respectively. It can be seen from this example that wetland system can be also used for advanced wastewater treatment.

Table 4 summaries the design features and expected performance for the three basic wetland categories (Reed, 1988). A major constraint on the use of many natural marshes is the fact that they are considered part of the receiving water by most regulatory authorities. As a result, the wastewater discharged to the wetland has to meet discharge standards prior to application to the wetland. Constructed wetland systems avoid the special requirements on influent quality; they can also ensure much more reliable control over the hydraulic regime in the system and therefore perform more reliably than natural marshes.

Table 4 Design features and expected performance for wetland systems

Concepts	Treatment goals	Typical criteria				Effluent characteristics mg $\cdot$ l^{-1}	
		Climate needs	HRT days	Depth m	Hydraulic Loading $m^3 \cdot ha^{-1} \cdot day^{-1}$		
Natural marshes	Polishing, AWT with secondary input	Warm	10	0.2-1	100	BOD TSS TN	5-10 5-15 5-10
Constructed wetland	Secondary, or AWT	None	7	0.1-0.3	200	BOD TSS TN	5-10 5-15 5-10
Rush or reed beds	Secondary, or AWT	Warm	0.3	—	600	BOD TSS TN	5-40 5-20 5-20

AWT: Advanced Wastewater Treatment

2) Aquatic plant/aquaculture systems

Macrophyte-based aquatic treatment systems use submerged, emergent, or rooted aquatic vascular plants and their associated algal and microbial epiphytes to effect wastewater restoration in managed pond or wetland systems. In most applications they consist of macro-phyte-filled ponds or of natural/artificial wetlands through which secondary effluent passes. The most commonly used plant in these systems is the emergent floating macrophyte *Eichornia crassipes*, the water hyacinth. Full-scale water hyacinth treatment systems have been operating successfully in China, the Philippines, Burma, the United States, India, and Thailand, and other subtropical locations for years. They are efficient not only in removing biochemical oxygen demand (BOD) and total suspended solids (TSS), as in conventional secondary treatment systems, but also in removing large amounts of nutrients (nitrogen and phosphorus), heavy metals, and trace organics (Bishop 1989).

Aquaculture, or the production of aquatic organisms (both flora and fauna) under controlled conditions, has been practiced for centuries primarily for the generation of food, fiber, and fertilizer. The water hyacinth (*Eichornia crassipes*) is a promising plant for wastewater treatment and has attracted the attention. Other flora, however, are also being studied. Among them are duckweed, seaweed, midge larve, and alligator weeds. Water hyacinths are large fast-growing floating aquatic

plants with broad, grassy green leaves and light lavender flowers. Hyacinth harvested from these systems has been investigated as a fertilizer/soil conditioner after composting, animal feed, and as a source of methane when anaerobically digested, and was used to make shochu (a kind of Japanese spirits) in Japan.

Aquaculture utilization has also been demonstrated by applying sewage stabilization pond systems including anaerobic ponds, facultative ponds, aerobic ponds, and fish culture ponds. In order to mobilize fully the self-purification of a water body for sewage treatment, the main principle is to utilize the coordination among four kinds of chief factors in the aquatic ecosystem, namely, producers (algae, aquatic vegetation), consumers (fish and other aquatic animals), decomposers (bacteria), and abiotic factors (solar energy, water with other chemical components). The bacteria-algae symbiotic system plays an important role in this sewage stabilization pond system. Bacteria decompose and biodegrade organic materials, including organophosphates and chlorides, and purify the wastewater in a preliminary fashion. In this procedure, bacteria produce CO_2, NH_4^+, PO_4^{3-}, and so on, which are absorbed by algae and other aquatic vegetation and assimilated in their bodies under sunlight. The oxygen released by the photosynthesis of algae is supplied for the needs of oxidizing organic materials by bacteria. Then through transfer and transformation among various trophic levels, a great quantity of algae and other plankton is utilized in the procedure of purification by rearing fries. The energy fixed by algae appears finally in the form of fish harvesting, and the water is further purified.

This system may be more effective if the aquatic plants can grow up whole year. Therefore it is most suitable to the tropical countries.

3) Treatment and utilization of sewage by land treatment systems (LTS) *or soil systems*

Soil ecosystems include various types of soil organisms such as bacteria, fungi, protozoa, and metazoa. Organic material is generally decomposed into inorganic compounds by the actions of these soil organisms. The farmland, grassland, and forest ecosystems, all based on soil, not only can degrade and purify many kinds of pollutants in sewage, but also can produce many useful products by utilizing these pollutants. Inorganic salts, especially nutrient salts decomposed from organic materials and contained in sewage, then are absorbed by plants that grow in soil. The soil itself also seems to be a natural sieve, effectively filtering out most of the pollutants in sewage, namely SS, degradable organic pollutants, nutrient salts, and some pathogenic bacteria and viruses. The removal rate may exceed 90% for BOD, total nitrogen, SS and colon bacilli, and nearly 50-80% for phosphorus.

Table 5 Design features and expected performance for land treatment systems

Concepts	Treatment goals	Typical criteria				Effluent characteristics mg · l^{-1}	
		Climate needs	Vegetation	Area ha	Hydraulic Loading m^3 · m^{-2} · year^{-1}		
Slow rate	Secondary, or AWT	Warmer season	Yes	23-280	0.5-6	BOD	<2
						TSS	<1
						TN	<3
						TP	<0.1
						FC	0
Rapid in filtration	Secondary, or AWT, or groundwater recharge	None	No	3-23	6-125	BOD	5
						TSS	2
						TN	10
						TP	<1
						FC	10
Overland flow	Secondary, nitrogen removal	Warmer season	Yes	6-40	3-20	BOD	10
						TSS	10
						TN	<10
						TP	<6

AWT: Advanced Wastewater Treatment; FC:Fecal Coliform, numberper 100ml.

Land treatment systems (LTS) are defined as the controlled application of wastewater onto surface to achieve a designed degree of treatment through natural physical, chemical and biological processes within the plant-soil-water matrix (US. EPA 1981). There are five main types of LTSs, i.e. slow-rate infiltration (SR), rapid infiltration (RI), overland flow (OF), wetland (WL) and soil capillary (SC). Table 5 presents the typical design features and performance expectations for the three basic LTSs (Reed 1988). LTSs should be regarded as an ecological engineering which combines ecological principals and engineering techniques.

4) Stream purification process

The stream purification process with packed medium is one of the effective domestic wastewater treatment systems. The stream purification process strengthening the self-purification ability with large amount of biofilm attached on the packed media has been spotlighted to improve the water quality. Self-purification in the river; permeating treatment; purification facility using submerged biological film process with packed stone in the stream, the stream with packed string media (with packed wave-shaped plastic board media; charcoal and so on) are considered as an effective ecological approach to restore the polluted water in the stream. In this stream bacteria, fungi, protozoa and small metazoa, small animals such as Rotatoria, Oligochaeta and Tubellaria contribute well to water purification.

Many river banks in Japan were covered by concrete for flood control purpose before. But recently, Environment Agency and the Ministry of Construction have changed the old river banks into so called "multi-natural type" river front and river banks instead of three-side concrete blocks. Waste plastic, charcoal and stone are being used for stream purification processes.

Pilot scale and full scale stream purification processes have been operated in Japan, but there still have some problems to be overcome such as decrease of purification efficiency by clogging of packed media, occurrence of harmful insect and so on.

Table 6 shows the efficiency of purification facility using submerged biological film process with packed stone in some rivers in Japan. 50-80% removal of BOD was obtained. Further development of this system is being carried out.

Table 6 BOD removal of purification facility using submerged biological film process with packed stone in some rivers in Japan

Rivers	Discharge ($m^3 \cdot min.^{-1}$)	BOD ($mg \cdot l^{-1}$) Influent	Effluent
Nogawa	90,000	13	4
Kuwanou	70,000	20	5
Ohori	100,000	25	5
Hisade	40,000	30	10
Koukakuike	1,000	30	10
Hirase	10,000	20	5
Mitinoku Park	9,500	2	1
Arakawa	260,000	15	3

5) Artificial aeration of lakes

The most effective method of solving the problem of oxygen depletion in streams is to remove organic matters of discharged wastewater. The biological treatment should preferably take place at wastewater plants, not in the streams. However, if the streams have an accumulation of organic sludge, aeration may

Table 7 Ecotechnological methods applied in lake restoration

Method	Problem to Solve
Wetland system	Removal of nitrogen and phosphorus from nonpoint sources
Aeration with circulation	Depression of algae growth, reduce release of phosphorus and Fe from sediment; oxygen depletion in hypolimnion
Siphon of hypolimnion water	Removal of phosphorus and oxygen-poor water
Adding nitrate to sediment	Reduce release of phosphorus from sediment
Coverage of sediment	Eutrophication
Removal of upper sediment layer	Reduce release of phosphorus from sediment or remove toxic substances
Removal of phosphorus of algae from water	Eutrophication (reduce P/algae in water)
Decreased retention time	Reduce P and toxic substance concentration
Precipitation of phosphorus in lake	Reduce Phosphorus in water
Precipitation of phosphorus in inflowing water	Reduce Phosphorus input

be needed to accelerate the decomposition (oxidation) of the sludge. For lakes the problem is more complex. First of all, the oxygen depletion is most often caused by eutrophication, not by discharge of biological oxygen demand. Secondly, the high concentration of nutrients cannot be reduced rapidly, owing to the long retention time of water in lakes. Therefore artificial aeration has been used more for lakes than for streams and it has been used mainly to prevent anaerobic conditions at the sediment surface. The ecological methods applied in lake restoration methods are summarized in Table 7.

Intermitted artificial aerations have been practically used in many drinking-water reservoirs in Japan to solved the massive growth of planktonic algae, odor and taste problems, and other eutrophication problems. Reservoirs Sagami, Kamafusa, Shimonohara, Muroi, Sakuna and so on, start to introduce this techniques in the early of 1980s. Effective results have been obtained. The artificial aerations make water circulation, and have an inhibitory effect on algal growth due to light limitation, since it transports planktonic algae to greater depths. The more pronounced the coloration of the water of non-algal origin, the more the biological productivity will be inhibited by this means.

Our experience with ecotechnology and its possibilities is limited today. Although the results we do have look very promising, we need to integrate the application of ecotechnology much more in our pollution control and environmental planning in the future. This require a continuous development of ecology, applied ecology, ecological modeling, and ecological engineering. Ecotechnology offers us a very useful tool for better planning in the future. It is a real challenge to humankind to use this tool properly.

The application of ecotechnology and biotechnology for the restoration of water environment is very illustrative, because these methods have been widely applied to polluted water bodies. It can be clearly demonstrated that to achieve good results in water environmental management one must combine several methods: environmental technological as well as ecotechnological and biotechnological methods simultaneously. For example, pollution of lakes is a very complex problem and it can rarely be solved by the use of one (simple) method. Figure 1 shows the applications of ecotechnology and biotechnology to the restoration of water environment.

All the applications of technologies, whether of ecotechnology, biotechnology, chemical and environmentally technology, require quantification. Because ecosystems are complex systems, the quantification of their reactions becomes complex.

It is well-known fact that there are a lot of problems to be solved for environmental conservation using ecotechnology and biotechnology. Table 8 shows the subjects concerning the development of ecotechnology and biotechnology for the environmental conservation field.

Table 8 Subjects concerning the development of ecotechnology and biotechnology for the environmental conservation field.

1 Use of biomass and unused resources
- (1) cultivation by using specific algae and aquatic plant
- (2) technology for effective fertilization
- (3) feeding technology
- (4) technology for methane fermentation
- (5) technology for alcohol fermentation

2 Environmental purification and wastewater treatment
- (1) biological decomposition of organic substances
- (2) treatment of liquid waste
- (3) treatment and reuse of food and fish processing wastewater
- (4) improvement of biological removal of nitrogen and phosphorus
- (5) microbiological accumulation of heavy metal
- (6) treatment and effective reuse of sludge, solid-waste and live-stock waste
- (7) improvement of gray water
- (8) decreasing of the sludge from the wastewater treatment process
- (9) biological prevention of water bloom and red tide
- (10) development of microbial immobilization and bioreactor
- (11) development of biological desulfurization and deodorization
- (12) wastewater treatment by specific microorganism

3 Biosensor
- (1) development of environmental indicator organism and microorganism
- (2) measuring technology for BOD, ammonia, nitrite and nitrate nitrogen
- (3) measuring technology for respiration of microorganisms

3. The Role of Effective Organisms in the Restoration of Water Environment

In natural ecosystems, microorganisms play a major role in mineralizing various organic pollutants. Engineered biological wastewater treatment systems accelerate this ubiquitous microbial activity by

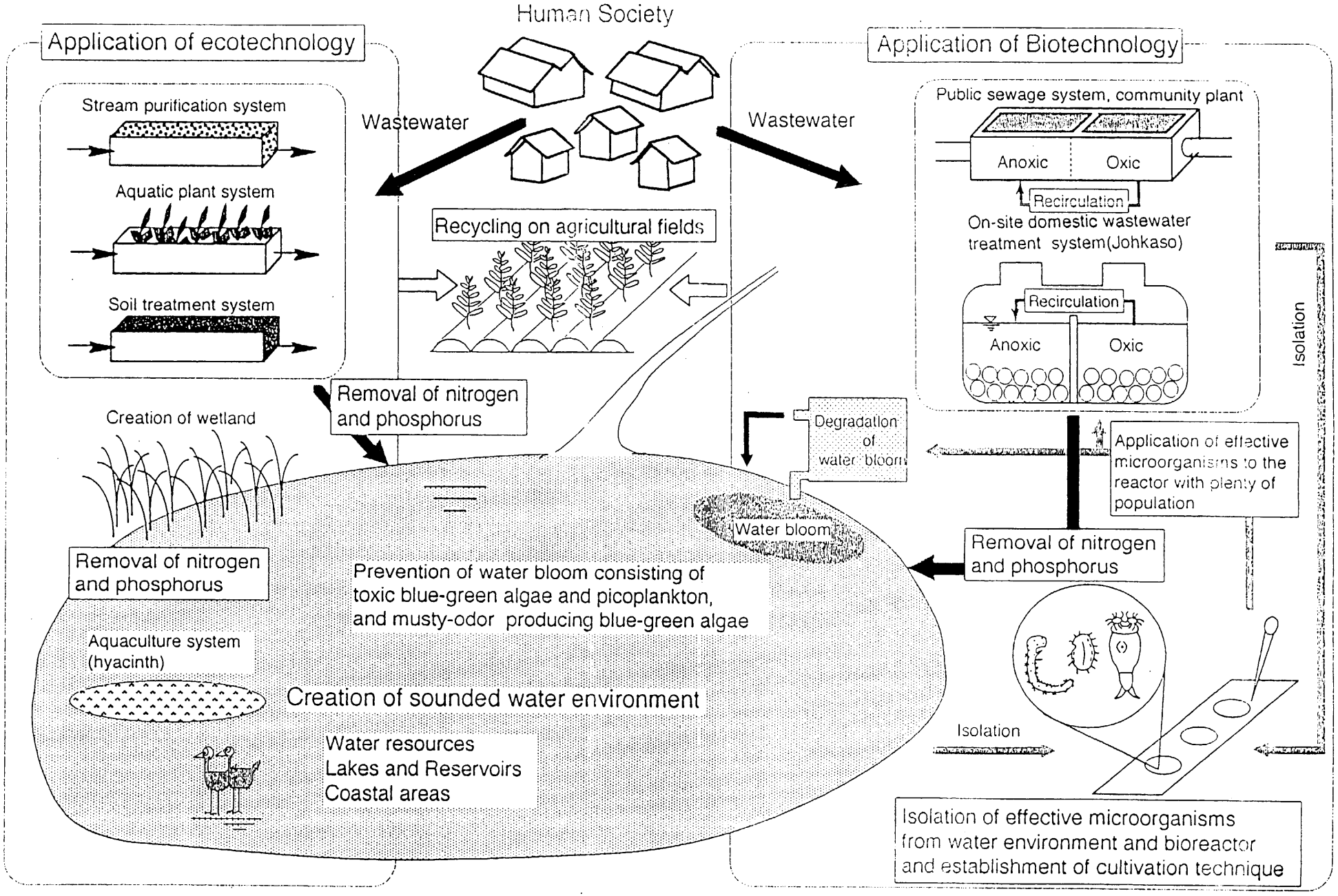

Figure 1 Application of ecotechnology and biotechnology to the restoration of water environment

providing a favorable artific ial environment. The microo rganisms retained in such sy stems may be in suspended growth form, as in the activ ated sludge process, or in th e attached growth form, as i n trickling filters and rotatin g biological contactors (RB C). Some treatment systems such as fluidized bed system s and activated sludge syste ms using substantial amount s of solid carriers contain bo th suspended and attached b iomass and can be called hy- brid growth systems. A poss ible general classification of biological growth systems is shown in Figure 2 (Tyagi 1990).

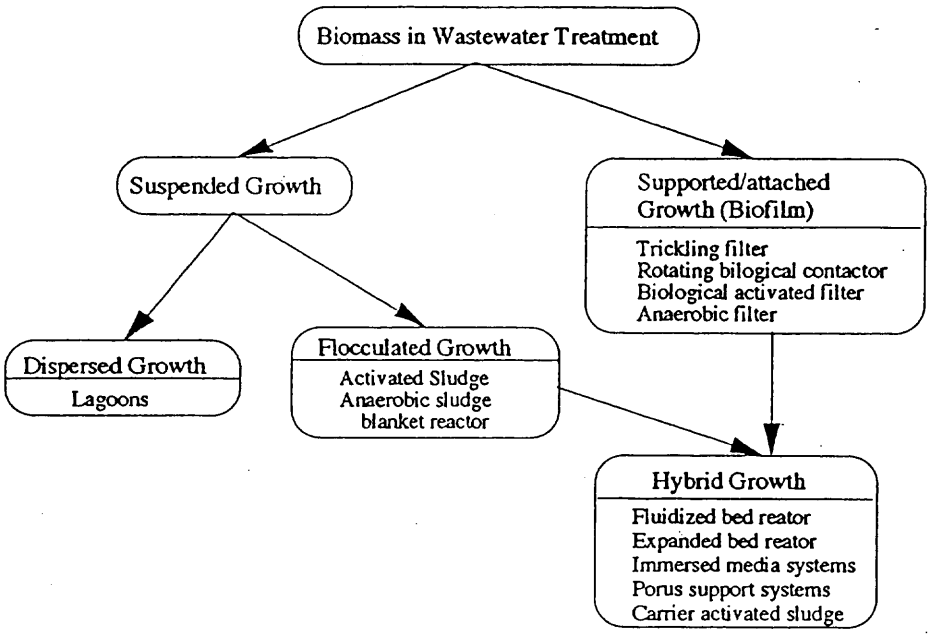

Figure 2 Systematics of biomass form in wastewater treatment systems

In biological wastewater treatment systems, substrate degradation rates per unit volume could be maximized by retaining the highest possible concentration of active biomass. The various means of increasing the active microbial concentration are (1) promoting the growth and activity of organisms in general, (2) fostering the growth of microorganisms capable of forming dense flocs or films, (3) minimization of loss/washout of microorganisms, and (4) utilization of genetically engineered organisms possessing higher than usual growth rate and/or substrate uptake rate and dense growth forms.

The growth and activity of microorganisms could be maximized by (1) enhancing the availability of substrates, nutrients, and electron acceptors to microorganisms, (2) providing optimum environmental conditions (temperature, pH, etc.), and (3) suppressing the inhibitory conditions. The density of microbial flocs or films can be increased by providing proper selection conditions (e.g., dissolved oxygen concentration and hydrodynamic conditions) for the organisms which possess dense growth characteristics. The loss or washout of microorganisms can be minimized by recycling biomass after effective separation from the effluent and/or by immobilizing them on solid surface. Utilization of engineered microorganisms, at present, is yet uncommon. Even if it would be applied to wastewater treatment, the effective use of such organisms would still depend on the means of the maintaining the biomass with the system.

In addition to obtaining rapid and efficient treatment, the goal is design wastewater treatment systems which are reliable, cost-effective, and simple to operate. A comparison of different systems could be based on these points.

If the physical and chemical parameters are maintained at optimum levels, then the limiting factor to degradation seems to be biological.

The following conditions are required for the facilities of biological treatment process;

1) getting stable and good quality water;

2) possible to remove nitrogen and phosphorus in addition to organic substances;

3) with small amount of excess sludge, and the sludge can be reused;

4) ease of operation with least work for maintenance;

5) cheap construction cost, long life and small plant space;

6) consuming little energy and chemicals;

7) the facilities are small and compact;

8) safety in sanitary, and without second pollution;

It is common to either large scale or small scale biological treatment process for these requirements. The anaerobic-aerobic activated sludge process is being treated as a popular treatment process due to its simultaneous removal of nitrogen and phosphorus. The common conventional biological treatment process has following characteristics:

1) the treated water is unstable;

2) it is difficulty to remove nitrogen an d phosphorus;

3) the amount of the sludge is large;

4) the consumption of the energy is gre at;

5) it is not easy to operate;

6) it is easy to cause the bulking proble m.

Table 9 The subjects expecting to be solved in biological treatment processes

1. Raising the concentration of useful microorganisms in the reactor
2. Improving the removal of effluent water quality (BOD, COD)
3. Improving the efficiency of nitrification and denitrification
4. Improving biological removal of phosphorus
5. Improving the decomposition of nondegradable organic substances
6. Promotion of flocculation
7. Control of bulking
8. Growth control of noxious microorganisms
9. Stabilization and improvement of anaerobic treatment process
10. Growth promotion of microanimal
11. Improving the efficiency at low temperature
12. Reuse of sludge

Because of these shortcomings, a lot of other technologies concerning biological treatment have been developed to apply to full scale or pilot plant experiments. These methods can be summarized as:

(1) submerged filter process; (2) rotating biological contactor process; (3) anaerobic filter process; (4) sequencing batch activated sludge process; (5) anaerobic-aerobic activated sludge process; (6) fluidized bed process; (7) biological filter process; (8) immobilized microorganisms process; (9) UASB (upflow anaerobic sludge blanket) process; and (10) fixed bed anaerobic digestion; (11) expanded bed granular activated carbon (GAC) process; (12) microorganism-attached activated carbon fluidized bed process

Of all of these methods, they have at least one characteristic like 1) letting biofilm attached on the supporting media; 2) using anaerobic microorganisms; 3) cyclic use of the anaerobic and aerobic reactors. First characteristic plays an important role in keeping high density of useful microorganisms in the reactor, second one save the energy consumption for the decomposition of organic matters, the other one supplies the requirement condition for the removal of nitrogen and phosphorus. How to keep the high concentration of useful microorganisms, and how to control the anaerobic or facultative bacteria in some part of processes are the key points for the development of these methods. Table 9 shows the concrete technological subjects expecting to be solved in biological treatment processes.

As for the first key point, the mixed culture system is more useful in wastewater treatment than pure culture system. For instance the pure culture using the genetically engineered microorganisms (GEMs), is possible to make a strong microorganism, but is not easy to treat with the domestic wastewater which concentration is low and the compositions are diverse. It is clear to find that the removal efficiency in mixed culture system is quite high, through examining the treated water by activated sludge process. That is because that the functions like mutualism, competition, predation and so forth are carried out in mixed culture system, while it is impossible in pure culture system. The process utilized a complex ecosystem composed of bacteria, fungi, protozoa and small metazoa. Bacteria degrade polluting organic materials to carbon dioxide and other small molecules, protozoa and small metazoa prey on the bacteria and, in turn, become prey for high species. Therefore, it is important to use these interactions in biological treatment processes. Although there are many merits in mixed culture system, the operation and control of microbial interactions have been still difficult by now. If the control of these coactions becomes possible, this will mean a great

development in biological treatment process. Further endeavors are needed to develop these processes.

In general, the operating conditions to control the phase of microorganisms in the reactor are as follows:

1) the concentrations and loadings of nutrients;

2) water temperature, pH and dissolved oxygen;

3) hydraulic and sludge retention time;

4) the habitat of microorganisms;

5) aeration, mixing and optical conditions;

6) the combination or separation of reactors.

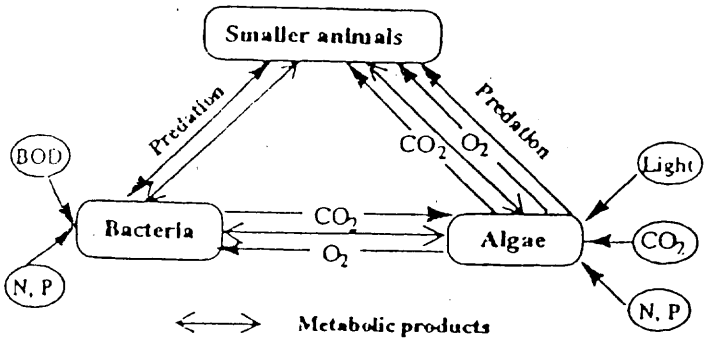

Figure 3 Interactions between bacteria, algae and smaller animals

In activated sludge process, some of the operating conditions are controlled by experiences. It is difficulty to hold specific microorganism artificially in the process.

It is well known that protozoa and micro-metazoa are useful in aerobic treatment process. Figure 3 shows the interactions between bacteria, algae and smaller animals. To improve the treatment efficiency, it is necessary to know the factors affecting the growth of protozoa and micro-metazoa.

The environmental conditions and results for the growth of protozoa and micro-metazoa such as *Vorticella microstoma*, *Philodina erythrophthaloma*, *Nais* sp., *Aeolosoma hemprichi* isolated from activated sludge process are shown in Table 10. It is clear that water temperature and pH are important factors for these microorganisms. The proper ranges for water temperature and pH are 20-30℃ and 5.6-7.7, respectively. Beside them, physical and chemical conditions like mixing strength, salt concentration are quite important for the growth and domination of specific microorganisms. The operating conditions such as (1) Sludge retention time (SRT); (2) Temperature; (3) pH; (4) Continuous inoculation and excess of microorganisms in the reactor; (5) Preventing the growth of noxious microorganisms are very important for the wastewater treatment process.

Table 10 The effect of environmental conditions on the growth of microorganisms

	Rotatoria	Oligochaeta				Protozoa
Items	*P. erythrophthalma*	*A. hemprichi*	*Pristina* sp.	*Nais* sp.	*Dero* sp.	*V. microstoma*
Water temp.(℃)	30	33	30	25	-	25
pH	6.7-7.7	6.0-7.7	6.0-7.7	6.0-7.7	-	6.6-7.5
Phosphate buffer solution (M)	<1/50	<1/375	<1/150	<1/375	<1/7,500	2/75-1/150
Intensity of mixing	strong	medium	weak	weak	weak	strong
Maximum growth rate (day $^{-1}$)	0.69	0.42	-	0.12	-	2.2
Food habit	wide	narrow	wide	wide	-	narrow

4. New technologies for Wastewater and Polluted Water Treatment

The development studies of new technologies and treatment methods in Japan (in our laboratory) may be summarized as follows.

1) Anaerobic and anoxic-oxic wastewater treatment technology

The treatment efficiency of the conventional activated sludge process is quite low if the wastewater contains low organic concentration. However, new developed anaerobic wastewater treatment

process can be both used for high and low organic wastewater, through returning the sludge to aeration tank and keeping high concentration of microorganisms in the process. Additionally, an equipment was set for removing the bubble attaching on the flocs from the solids-liquid separation, and the development of the anaerobic sludge filter was also made to raise the concentration of microorganisms. The sludge concentration can be raised more than 20,000mg · l^{-1} by this technology.

In UASB reactor, the feed wastewater is introduced in the bottom part of the reactor and moves upward through an active bed of biomass. The UASB technology was developed initially by Lettinga (1980), and was used primarily for the treatment of carbohydrate-rich wastewater in Netherlands. The UASB reactors are now successfully used all over the world to treat wastewaters from the food, beverage, and pulp and paper industries. The major advantage of the UASB design is the ability to obtain a high concentration of aggregating microorganisms (granules), which in turn are responsible for the high volumetric productivity. An important improvement of the original UASB design is the anaerobic hybrid reactor. In this design, the upper 20 to 30% of the reactor is filled with a floating material which maintains the biomass in the reactor. This material can be polyurethane (PU) foam, polymer balls, or randomized plastic rings. As the retained biomass participates actively in the biological process, the hybrid design is more productive and reliable compared to the standard UASB process. Other anaerobic filter processes are also being developed by using the biofilm attached on support media in the reactor, and raising the concentration of microorganisms.

To improve the removal of nitrogen, UASB-aerobic biological filter filled with ceramic media recirculation process was developed in our laboratory (Figure 4). Denitrification efficiency was improved by nitrification in aerobic biological filter combined. This process removes 98% and 70% of BOD and nitrogen respectively. This process was applied to treatment facility of beer company in Japan.

There are still a lot of problems to be solve to apply anaerobic filter process to wastewater treatment, such as HRT, BOD loading, the flow pattern of wastewater, the effect of temperature, the shape and packed ratio of media, the collection of gases, the scale of the facilities, and the drawing of sludge.

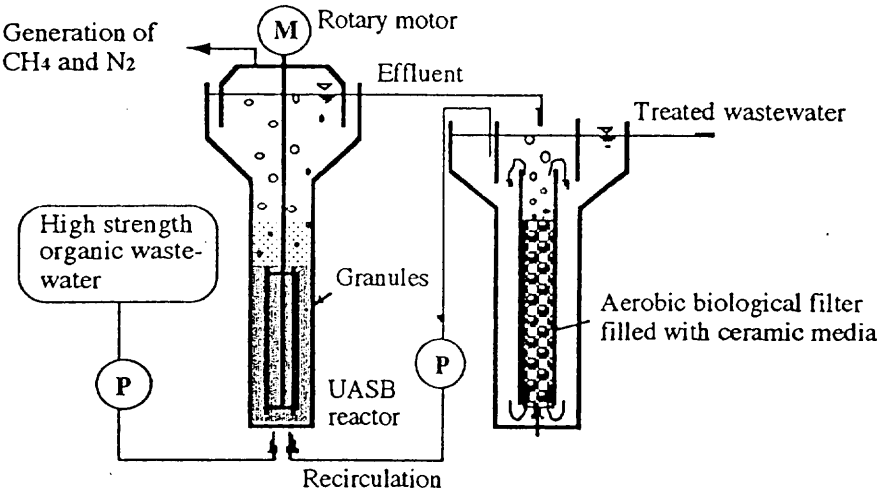

Figure 4 UASB-aerobic biological filter filled with ceramic media recirculation process which removes high strength organic substances and nitrogen

2) Processes for biological removal of nitrogen

On-site domestic wastewater treatment facilities called "Johkaso" is one of the effective processes to remove nitrogen biologically, and privately owned wastewater treatment system in Japan (Figure 5). Johkaso is different from septic tank in view point of treating domestic wastewater effectively using anaerobic and aerobic micro-organisms, and is required to achieve an effluent quality less than 10mg · L^{-1} both in BOD and T-N in advanced type. It is used in "individual treatment" intended for individual households and "collective treatment" intended for a community. Laws have made it mandatory for individual households or communities in an area where no sewerage system is in service but flush toilets are used, to install Johkaso to get night soil (black water) purified before being discharged into water systems. Among various domestic wastewater treatment facilities, the Johkaso should be designed to have any capacity to suit a specific need from small household use to large housing complex-like

community use according to the number of peop le involved. This flexibility in designing makes i t advantageous over other wastewater treatment systems.

There are two types of Johkaso : "night soil treat ment Johkaso" (N-type) that treats night soil onl y (untreated gray water directly discharged into water systems), and "domestic wastewater treat ment Johkaso" (D-type) that treats both night soi l and gray water from kitchen, bath and so on. T he Johkaso originally has been installed in a part of flush toilets at places where there was no sew erage system. Therefore, most of them installed so far are N-type. The number of registered Johk aso by size and type are shown that 6,899,391 (9 5.0%) are N-type out of 7,261,752 Johkasoes. D-type is 5.0% only in 1992. However, the ratio of D-type is growing rapidly as the total number of Johkasoes is increasing slowly. As untreated gray water poses a serious pollution problem in water systems, the spread of D-type and the inhibition of the install of N-type has become an urgent issue to keep clean water environment.

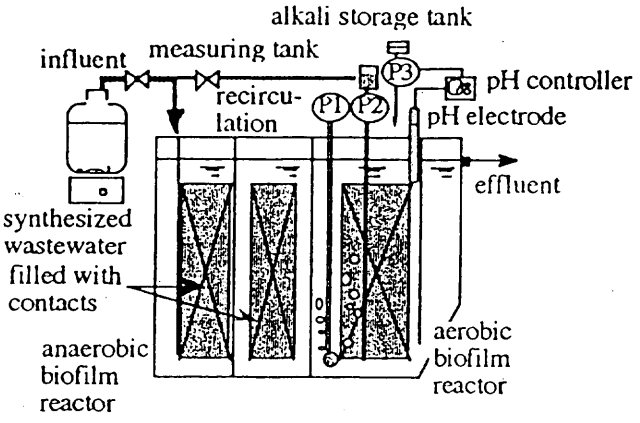

Figure 5 Experimental apparatus of Johkaso

P1 air pump for aeration
P2 air pump for recirculation
P3 perista pump

Nowadays, what is important particularly from the viewpoint of eutrophication control is the devel opment of D-type, especially small-scale one (less than 20 persons). In many installed small-scale D-type, it w as impossible to achieve stable nitrification, much less denitrification. It was reported that the spread of conv entional D-type caused more serious pollution in Lake Kasumigaura.

That is to say, it is greatly important to install an advan ced D-type (A-type) which can treat both BOD and nit rogen effectively. It is needless to say that paying atten- tion to regional characteristics is essential.

Anaerobic-aerobic recirculation biofilm process in D-t ype which can circulate treated water with nitrification from an aerobic tank to an anaerobic tank is drawing much attention as a promising biological nitrogen rem oval process. There are some advanced D-type to achi eve the removal rate of 70% and less than 10mg · l^{-1} i n total nitrogen. In some regions, D-type added soil tre nch (Figure 6) is applicable to remove nitrogen and p hosphorus. Figure 7 shows purification mechanisms of soil trench.

There is another problem. Gases; CO_2, CH_4 and N_2O ar e emitted through the wastewater treatment process. T hese gases are called greenhouse effect gas and could give rise to global warming. It is considered that the gr eenhouse effect per one molecule of CH_4 is 20-30 time s, and that of N_2O is 200-300 times, as large as that of CO_2. Therefore, to develop the technology that can su ppress especially N_2O emission through the wastewate r treatment process is regarded as important.

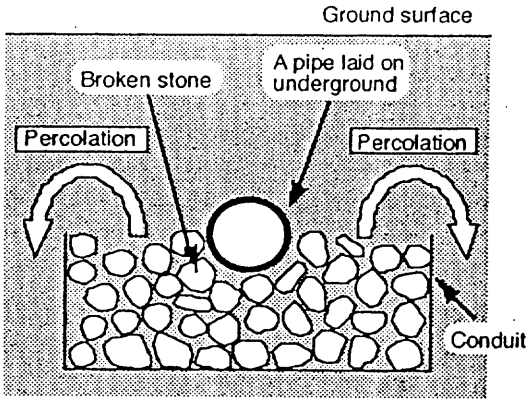

Figure 6 Soil trench system

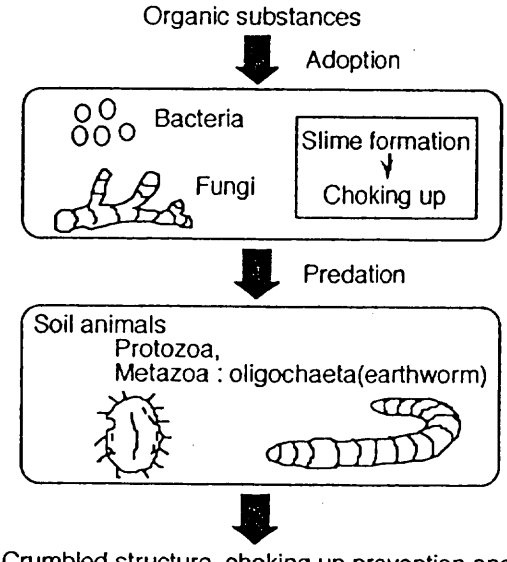

Figure 7 Purification mechanism of soil trench treatment process

Biological nitrogen removal process consists of nitrification and denitrification. Nitrification makes progress under aerobic condition for instance when aeration is done, while denitrification makes progress under anaerobic condition. N_2O is emitted through both of them, in case that treatment doesn't progress successfully. N_2O emission from nitrification-denitrification process is shown in Figure 8. However, the mechanism of it and the amount of N_2O emitted from wastewater treatment facilities are not clarified enough. In our institute, laboratory and full scale plant experiments are conducted so as to examine the factors involved in N_2O emission through the nitrification-denitrification process.

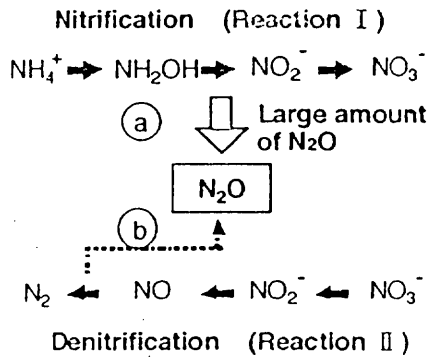

Figure 8 N_2O emission through biological nitrification-denitrification process (ⓐ≫ⓑ)

If the nitrification-denitrification (Reaction I → Reaction II) process is operated appropriately, N_2O emission from nitrification process can be controlled.

Through our studies, it was clarified as follows: applying anaerobic condition such as intermittent aeration or anaerobic tank to wastewater treatment process was very effective way to suppress the N_2O emission as well as to remove organic matters and nutrients from wastewater. Nitrification and denitrification make progress effectively under suitable combination of aerobic and anaerobic condition.

From reasons mentioned above, countermeasures for eutrophication caused by domestic wastewater must be executed with spread of advanced system such as A-type Johkaso which can remove BOD and nitrogen simultaneously in black and grey water making use of Japanese historical reflection.

3) Processes for biological removal of phosphorus

The processes for biological removal of phosphorus are divided into Anaerobic/Oxic (A/O) process which is a process for the removal of phosphorus only; and Anaerobic/Anoxic/Oxic (A2/O) process which is used for simultaneous removal of nitrogen and phosphorus. A2/O process is practically used in U.S., Europe and South Africa. A few of such process have been installed for full scale plants in Japan. In order to remove nitrogen and phosphorus simultaneously, following operations are needed:

(1) return of water from aerobic tank to anaerobic (anoxic) tank;

(2) keeping influent BOD more than 100mg · l^{-1};

(3) preparing enough capacity of aerobic tank for proper nitrification at low temperature.

In case of domestic wastewater treated by this process, the value of the nitrogen and phosphorus at effluent can be obtained less than 10mg · l^{-1} and 1 mg · l^{-1}, respectively.

4) Sequencing batch activated sludge process

This process is developed for the problem of bulking in small scale wastewater system. The principle of this system is to use the combination of aerobic and anaerobic (anoxic) cycle for simultaneous removal of nitrogen and phosphorus. It may be composed of one or more tanks. The single tank system is applicable for noncontinuous flow situations, especially for small rural towns where smaller wastewater flows occurs. Minimum operator input is required for satisfactory performance of the single tank system. The operation of multiple tank systems can be either simple with a minimum of operator input or complex, depending on flow and load variations and degree of treatment required.

5) The technology for the treatment of polluted water sources by the biofilm process

The pollution of water resources in Japan was considered a pressing social problem, and the

problem has caused difficulty in drawing raw water for water supply by conventional water treatment methods in water works plant. Therefore, biological treatment process and biological activated carbon treatment process have been introduced in water supply engineering as a pretreatment process. As an example (Sudo et al 1990), honeycomb biological treatment process has been practically used in Kasumigaura purification plant since 1985. The HRT of this process is only 2-3 hours, but the removals of algae, odor concentration and musty odorous compounds are as high as 55-93%, 50-81% and 50-60%, respectively. It is clear that this process is effective to algae and musty odorous compounds removal. However, the removal is changeable for different algae as shown in Table 11. Additionally, the removal of THM (trihalomethane) precursor is found to be 70 %. Massive growth of water blooms is frequently observed in Lake Kasumigaura, and the treated water had musty odor before introducing this pretreatment process. Since the pretreatment process was used, the musty odor complain from the residents was disappeared. There are still a lot of problems to be solved concerning the removal mechanism of algae and musty odor, the relationship among the species of algae, musty odor, water quality. Table 12 shows the dominant species of microanimal in biofilm. It is necessary to make clearly the operational conditions like the flow type, DO concentration in the reactor, the shape of the supporting media, the timing and frequency of backwash, the amount of sludge in the reactor. And the development of the more convenient and easier technologies to remove toxic algae and musty odor is also required.

Table 11 Removal of algae by submerged filter

Algae	Removal (%)
Synedra sp.	63-83
Melosira sp.	45-52
Oscillatoria sp.	40-78
Anabaena sp.	62-100
Myxosarcia sp.	38-51
Phormidium sp.	47-74
Aphanizomenon sp.	40-50
Microcystis sp.	35-100

Table 12 Dominant species of microanimal in biofilms

Ciliata	*Vorticella campanula*
	Vorticella convallaria
	Espistylis sp.
	Carchesium polypinum
	Zoothamnium aselli
	Trithigmostoma cucullulus
	Chilodonella fluviatilis
	Stentor igneus
	Coleps hirtus
	Didinium nasutum
Sarcodina	*Euglypha* sp.
	Difflugia sp.
Rotatoria	*Cephalodella* sp.
	Philodina sp.
Turbellaria	*Stenostomum* sp.
Oligochaeta	*Aeolosoma hemprichi*
	Nais sp.
Gastrotricha	*Chaetonotus* sp.
Tardigrada	*Macrobiotus macronyx*
Crustacea	*Paracyclops* sp.

6)Advanced water treatment technology using fluidized bed process with biological activated carbon (BAC)

This technology was developed to treat the polluted lake water by enhancing the biological activity of microorganisms attached on the surface of activated carbon. Real eutrophicated lake water was purified with pilot plant (working volume:110L) under HRT 1hr. This pilot plant removed 50% and 40% of TOC and SS respectively. It was found that there are many microorganisms , micro animals, protozoa and metazoa in BAC biofilms. These biofilms played an important role in removing polluted organic matters (TOC), THM, musty odors (Figure 9). Beside the physical and chemical reaction of activated carbon, the fluidized bed process with BAC built up an effective biological process, and improved the treatment efficiency. There are many water purification processes combined with BAC (Figure 10). Results of our study indicated that this process should

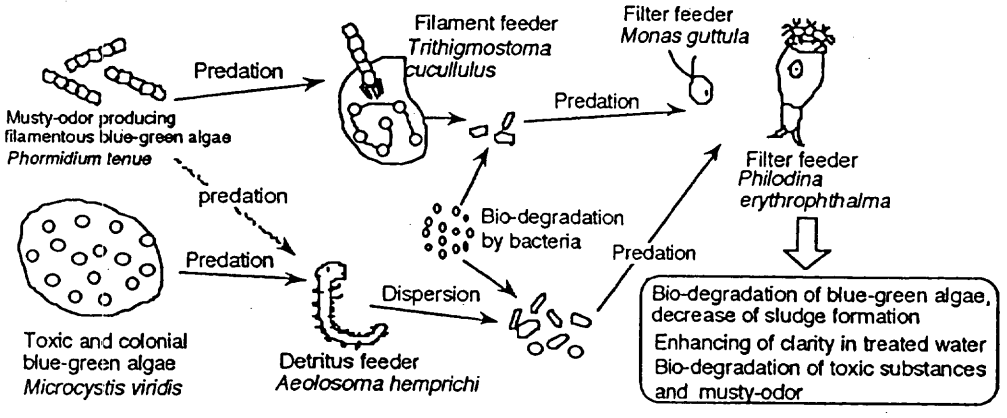

Figure 9 Role of microorganisms in biological treatment of polluted lake water

be an effective pretreatment process for advanced water treatment in water supply.

7)Treatment of landfill leachate using biotechnology

Most municipal and industrial wastes including sewage sludge are disposed in landfills. Leachate

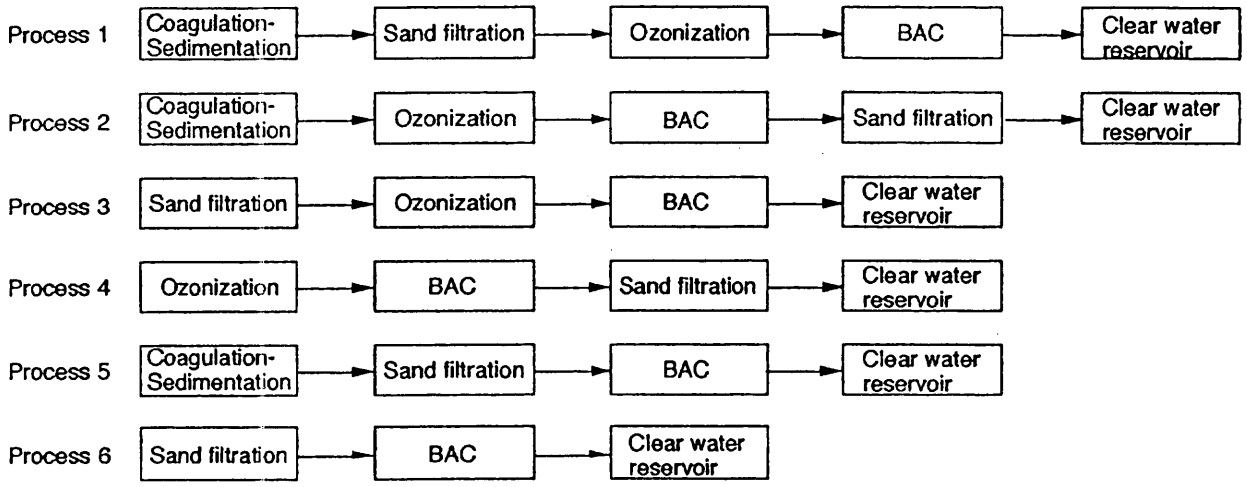

Figure 10 Water purification processes combined with BAC

from landfill of old age usually contain high concentrations of refractory organics and ammonium nitrogen which are potentially a major environmental hazard as surface and groundwater contamination. The landfill leachates exhibit a significantly low ratio of BOD to COD, indicating a low biodegradability. With increasing stringent requirement for the landfill leachate pollution control, it is necessary to treat the landfill leachate effectively and economically.Therefore the biological activated carbon fluidized bed (BACFB) process (Figure 11) was applied to treat the landfill leachate. The BACFB process removed about 60% and 70% of refractory organics and nitrogen, respectively, from the landfill leachate simultaneously and steadily over a more than 700 days of operation period without exchange of activated carbon. A mass balance on organics around the BACFB process revealed that more than 90% of the removed organics may be biodegraded. It was suggested that the BACFB process should be highly effective in biodegrading the refractory organics in the landfill leachate.

Beside above mentioned technologies, a lot of new developed technologies such as immobilized microorganisms process; expanded bed granular activated carbon (GAC) process; microorganism-attached activated carbon fluidized bed process; advanced water treatment process (Membrane filtration technology; Ozonization technique etc.) are being developed in Japan. Oxidation ditch and intermittent aeration process are also useful for small scale wastewater treatment. As for the improvements of nitrification, immobilized microorganisms treatment process with packed nitrifying bacteria are also practical.

The immobilized or adsorbed cell systems are used in certain traditional processes such as the production of vinegar. With the use of reactors containing immobilized cells, e.g., for the continuous production of alcohol, amino acids are already known. Compared to the immobilized enzymes, the im-

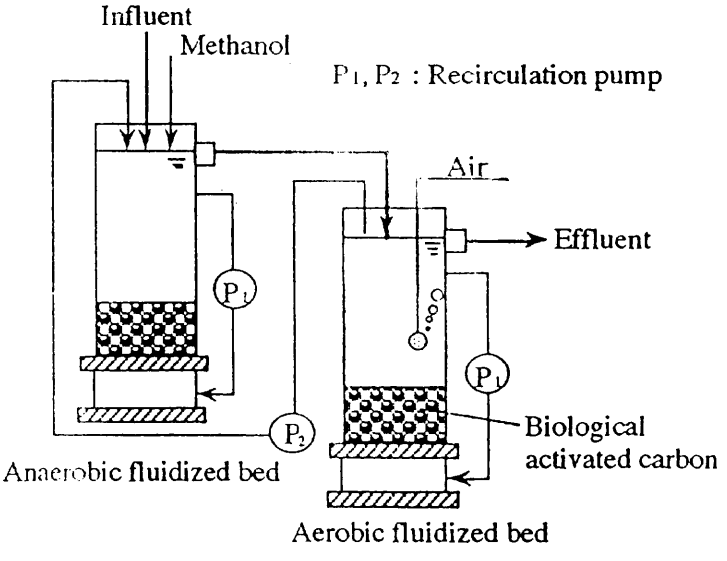

Figure 11 Schematic diagram of biological activated carbon fluidized bed process

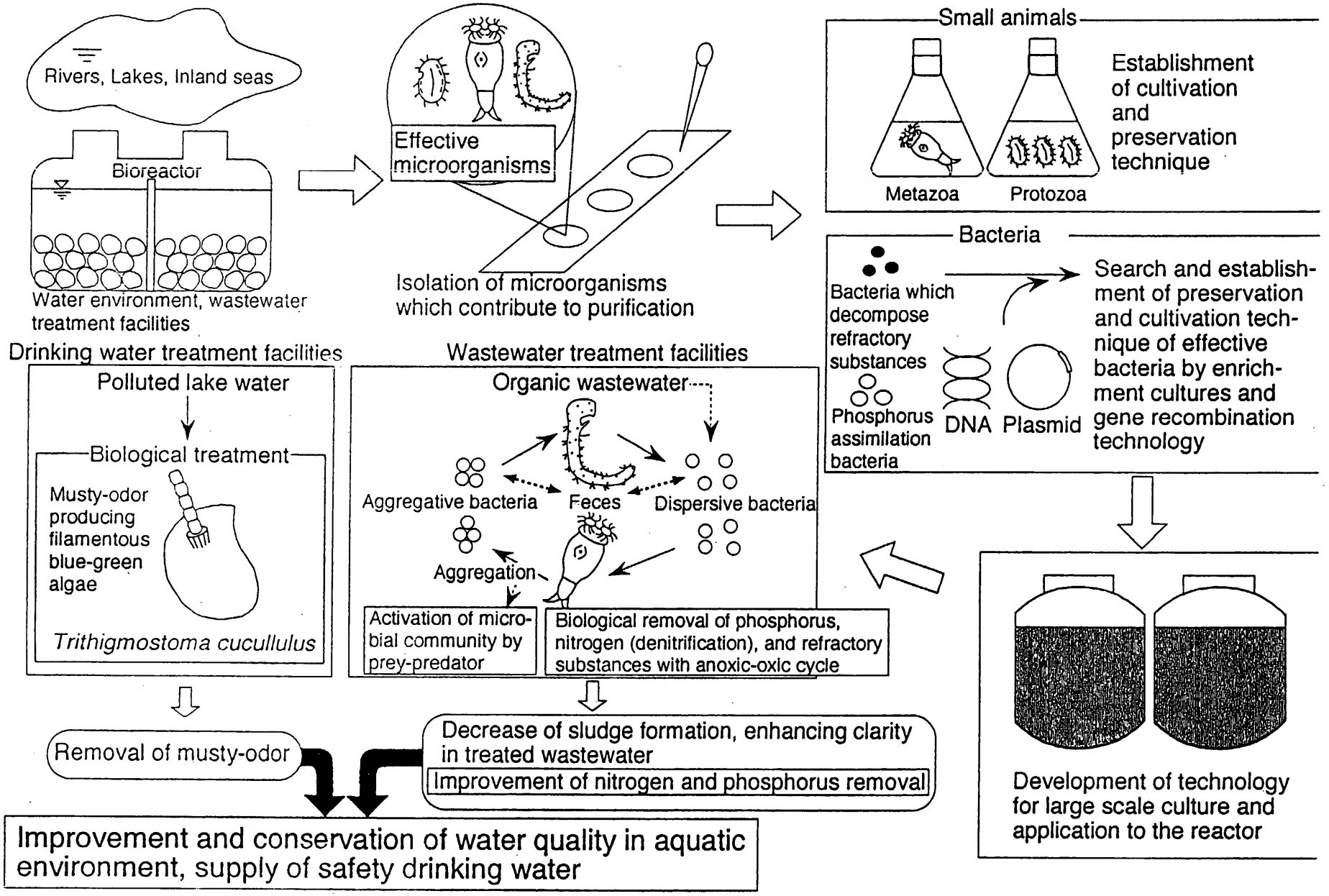

Figure 12 Application of effective microorganisms to restoration of water environment

mobilized cells present an advantage of the improved stability of the multienzymatic systems, added to the fact that no additional step of extraction and purification is needed. Immobilized cell anaerobic reactor, due to their capacity to retain biomass, are favored in terms of volume, microbial activity, and performance. Although most new reactors installed today use immobilized cell technology, numerous suspended biomass reactors are still in operation. However, the percentage of immobilized cell systems treating industrial wastewaters is continuously increasing.

The steps to the purification of water environment using effective microorganisms are indicated in Figure 12.

5. Estimation of Environmental Effects of GEMs

Originally, genetically engineered microorganisms (GEMs) were envisioned to be useful in the medical and industrial disciplines where GEM would be used to produce a specified chemical product which would then be isolated and used in a purified form (Ford 1993). Recently, the great potential of biotechnology for use in agriculture and for environmental applications has been realized. Genetically modified microbes are being developed to enhance waste-treatment technologies, bioremediate environmental pollutants, to serve as biological pest control agents and fertilizers, for use in regulating corrosion and biofouling in cooling systems and other liquid transport and delivery systems, and for other environmental applications (Ford 1993). GEMs are currently also being used to develop organisms capable of performing specific commercially desired tasks, including those of potential use in ecological engineering. GEMs will have such diverse ecotechnological applications as fixing nitrogen, ore leaching, and degrading hazardous wastes. If the introduction of useful microorganisms to wastewater treatment by GEMs becomes successful, it will be possible to get a more smaller reactor and lower cost wastewater treatment process. For example, the substances like PCB and trichloroethylene are difficult to decomposed, if the microorganisms which can decompose such substances are able to be created by GEMs, this will mean a great development in wastewater treatment field. However, despite this potential usefulness, there is a lack of development of adequate risk assessment methodologies for those GEMs that are deliberately introduced into the environment. Therefore, the Japanese Environment Agency has appealed that it is necessary to make a legal regulation for GEMs in the use at open systems since 1990. But the legal regulation is still under consideration. Although the guideline was determined in each Ministry, there is no concrete assessment method for the environmental effect of GEMs. It is still unable to use this technology in open system in Japan.

As the limitations of conventional ground water and soil cleanup technologies become more apparent, research into alternative cleanup technologies will intensify. Bioremediation is an especially attractive alternative because it is potentially less costly than conventional cleanup methods, it shows promise for reaching cleanup goals more quickly than pump and treat methods, and it results in less transfer of contaminants to other media. The most important principle of bioremediation is that microorganisms (mainly bacteria) can be used to destroy hazardous contaminants or transfer them to less harmful forms. The goal in bioremediation is to stimulate microorganisms with nutrients and other chemicals that will enable them to destroy the contaminants. The bioremediation systems in operation rely on microorganisms native to the contaminated sites, encouraging them to work by supplying them with the optimum levels of nutrients and other chemicals essential for their metabolism. Thus

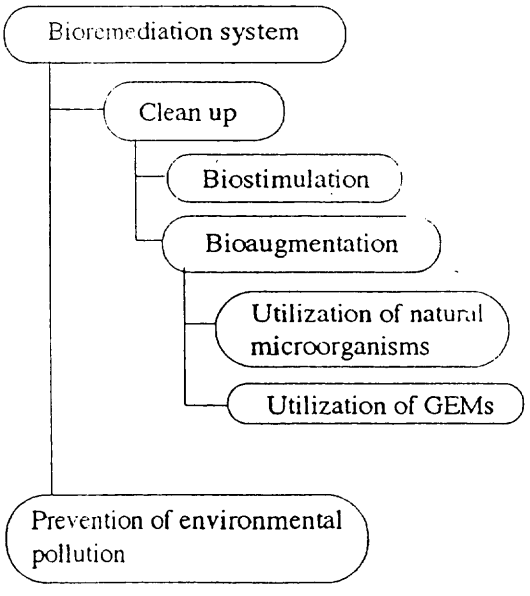

Figure 13 The concept of bioremediation systems

, today's bioremediation systems are limited by the capabilities of the native microbes. However, researches are currently investigating ways to augment contaminated sites with nonnative microbes including GEMs specially suited to degrading the contaminants of concern at particular sites. It is possible that this process, known as bioaugmentation, could expand the range of possibilities for future bioremediation systems (Wood et al 1993). The basic concept for bioremediation system is shown in Figure 13.

To prevent environmental damage from GEM release, future testing procedures must have a broad scope to ascertain realistically the probability of some damages before environmental or economical damage is incurred by either private or public factions. Ecological engineering studies, using microcosm, greenhouse, and field data, will generate basic ecological information concerning the fate of GEMs and their recombinant DNA in nature. Ecotechnological assessment such as microcosms and mesocosms, can be designed to evaluate adequately the potential for adverse effects prior to the actual release of the GEM. Microcosm-based tests examining critical functional attributes of ecosystem compartments will have general applicability to a variety of ecosystems.

Ecological microcosms are small ecosystems held in containers. Starting originally as a way to bring the beauty and complexity of nature into schoolrooms and living rooms the world over, these small "worlds" have become a major research tool. They are useful for studying the way ecosystems work and for the very practical purpose of determining what happens to toxic substances in ecosystems. Microcosms are important because they are a way to study whole, simplified ecosystems, and because they can be replicated for experimental studies at reasonable cost. There are aquaria, terraria, circulating streams, long tubes to represent deep waters, and microcosms large enough to include people. Ecological microcosms can be as small as a few milliliters or as large as an armory (Beyers et al, 1993).

Inamori et al (1990, 1991) examined the env

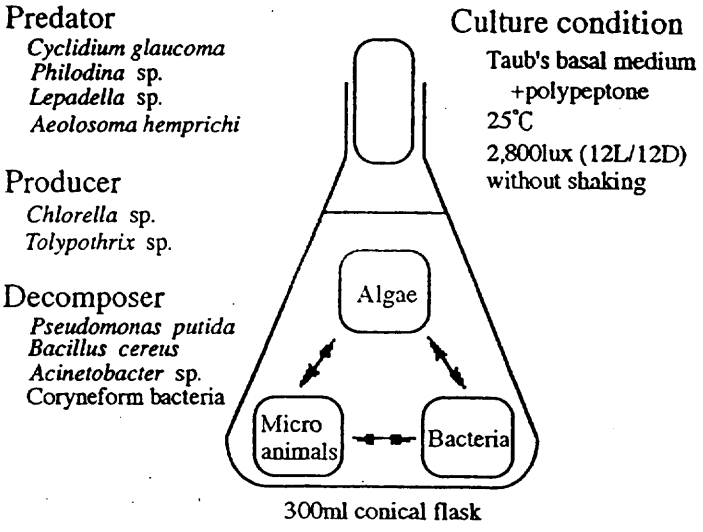

Figure 14 Outline of microcosm test used

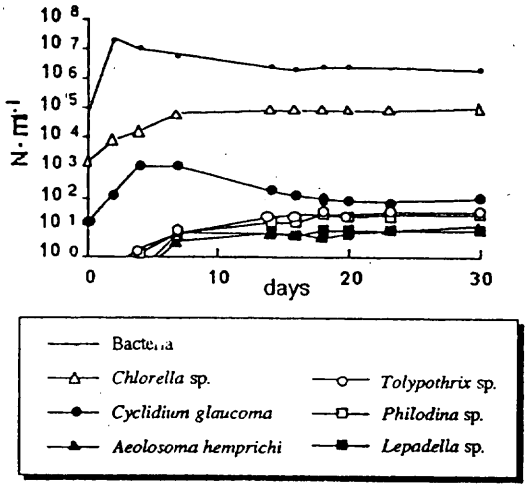

Figure 15 Growth curves of microorganisms in microcosm system

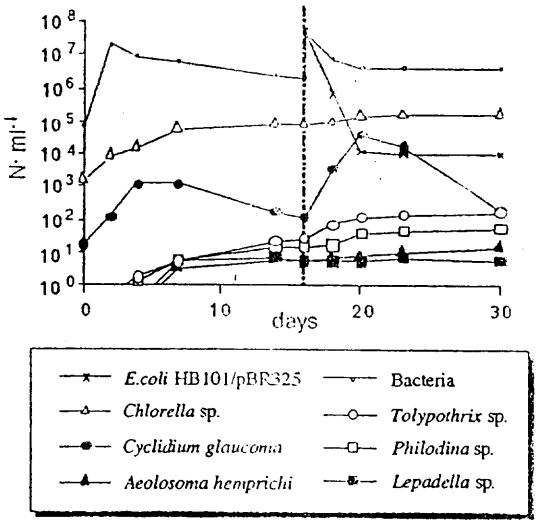

Figure 16 Growth curves of microorganisms in microcosm system inoculated with GEMs

ironmental effects of GEMs by using originally developed microcosm system(Figure 14). Figure 15 shows the phase of various microorganisms in the microcosm system. Stable ecosystem was consisted by bacteria, protozoa, algae, rotatoria, oligochaeta in this microcosm. The GEMs was incubated and inoculated to this microcosm (Figure 16). If the GEMs in microcosm system decreases remarkably or disappears, then it means no environmental effect of GEMs. The results showed that GEMs decreased transitory, and kept even density, the survival potential was quite low. Therefore, it may be concluded that advanced wastewater treatment processes using GEMs are expected in the near future. Further study is needed for ecological and environmental effect of recombinant DNA.

The process of environmental assessment of gene recombination microorganisms using microcosm is shown in Figure 17.

6. Summary

(1)The current state and effective application of ecotechnology and biotechnology to the restoration of water environment, and the prospect of the new technologies for biological water and wastewater treatment in Japan have been presented.

(2)As a cost-effective, energy-saving and less technique intensive innovation/alternative, ecotechnology and biotechnology may be more important and useful to water environmental conservation.

(3)Wetland system, aquatic plant system, land treatment system, stream purification system, and some biological wastewater treatment systems will be established in the near future.

(4)The technical development for the removal of nitrogen and phosphorus by using the combination of ecotechnology and biotechnology, and the efficiency promoting for the biological water and wastewater treatment must be carried out to prevent eutrophication.

(5)The genetically engineered microorganisms (GEMs) and bioremediation are expected to be used in the restoration of water environment in near future, although it is still not practical due to having the possibility to influence the ecosystems.

(6)Many studies, both science and engineering, are needed to develop an effective treatment system which provides suitable habitats of aquatic livings.

(7)Furthermore, the importance of international cooperative studies has been increased because the water pollution of international rivers and oceans become more serious problems and it is recognized that emission of green house effect gases from deteriorated water environment and wastewater treatment may cause global environmental problems.

To create and conserve the sound water environment, developed countries including Japan have a great responsibility to developing countries, and we believe that international cooperations among these countries would save our environment.

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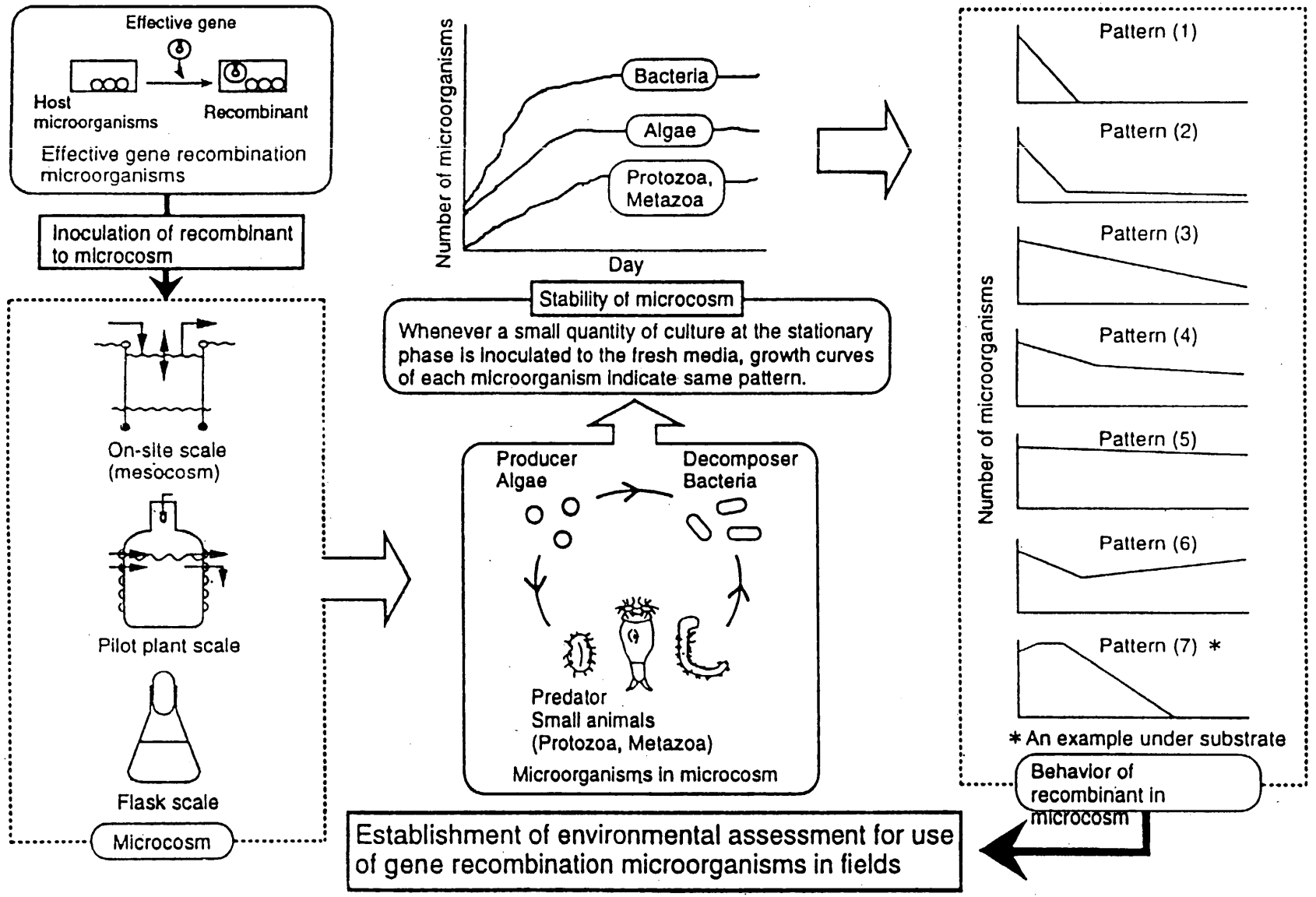

Figure 17 Environmental assessment of gene recombinanation microorganisms using microcosm

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WATER POLLUTION CONTROL IN THE RUSSIAN FEDERATION

The presentation overviews activities on environmental control in the Russian Federation; it briefly describes the present trends in changing quality of surface water. The author cites the basic data on control technologies and procedures focusing on introducing into practice the newly elaborated economic approaches, and also puts forward proposals on organizing control of surface water quality within the international ecomonitoring network.

1. STATE-OF-ART OF SURFACE WATER CONTROL IN THE RUSSIAN FEDERATION

The Russian government policy in the field of water protection is guided by the main principles of the «Lawon protecting the natural environment and «Water code of the Russian Federations It is implemented by coordinated efforts of several agencies State Committee for Environment Protection, Ministry of Natural Resources, State Committee for Hydrometeorology and Ministry of Health of.

The main objectives of the government ecological control of water bodies are detecting pollution sources, setting up standards for pollutants discharge with due account for total anthropogenic loads, supervising standards observance, and ecomonitoring.

Control Systems

Environmental observations in the Russian Federation are carried out by the State Ecomonitoring Service (SES) based on the units of the Russian State Committee for Environment Monitoring (Roscomhydromet).

To evaluate the present state, forecast changes in the environment pollution level in regions located at a distance over 100 km from sources of anthropogenic pollution (baseline regions) a system of integrated baseline monitoring has been created. Today it has over ten stations in biosphere reserves, four of which are located in the Asian Russia.

The results of observation of basic parameters of surface water and pollutants concentrations analyzed by atomic absorption spectroscopy, etc. have been disseminated in monthly and annual publications since 1973.

Alongside the federal, the regional ecological control systems are operating in Russia.

The Russian Federation State Committee for Environment Protection whose affiliation is the All-Russian Institute of Environment Protection (VNIIPriroda), control of surface water quality is carried out by a network of specialized inspections of State Ecological Control and Analysis (SIGEKA) operating in 89 subjects of the Federation. A network of specialized inspections is intended to perform the necessary and sufficient control of indicators of state-of-art of anthropogenic and technogenic pollution of air, water and soil.

Affiliated to the Republic (district and territory) committees (ministries) for environment protection are 244 analytical centers (SIGEKA) with about 2,000 employees including 1,600 chemists-analysts.

The total number of objects controlled by specialized inspections is 17,650 sources of water pollution.

The list of pollutants controlled by the system of State Committee for Environment Protection comprises 227 items including 64 pesticides.
Control over sources of the anthropogenic pollution of water bodies is carried out along 17-60 parameters.
The recent years have witnessed an improvement in the logistics of the analytical laboratories. Photocolorimetric and titrimetric methods are replaced by high production and more sensitive techniques, e.g. chromatography, atomic absorption, mass spectrometry, etc. Broadly used are modern instruments for fluorescent assay «Ftuorat» («Lumex» firm, St. Petersburg), atomic absorption spectrophotometers «Quant-AFA» («Kortek» firm, Moscow), portable analyzers for dissolved oxygen, petroleum products analyzers KN-2 (Novosibirsk), and solid electrode polarographers («AVA», St.Petersburg, «IVA», Tomsk), etc.
In 1997 several laboratories of the State Committee for Environment Protection located in the Asian Russia (Magadan, Irkutsk, Kemerovo, Tyumen, etc.) have received several million dollars worth of modern analytical equipment supplied within the framework of Gore-Chernomyrdin Commission under the Program for Import of Energy-Saving Technologies and Environmental Equipment. It will allow radically increasing the number and quality of assays, controlling a larger number of water pollution indicators, and creating a system for global ecomonitoring upon supplying the equipment for data processing and delivery.
The VNIIPriroda and Moscow Region Committee for Environment Protection of the State Committee for Environment Protection serve as a basis for the Federal Environmental Analytical Center that is being currently organized. It is capable of carrying out studies and control of all the presently known pollutants using the analytical equipment supplied within the framework of Gore-Chernomyrdin Commission under the Program for Import of Energy-Saving Technologies and Environmental Equipment (PIESTEE).

Methodological Support

Special attention is paid to standardizing the methods for water assay to ensure compatibility of results of laboratories affiliated to different organizations and agencies. For this purpose the authorized government bodies of water protection have signed an Agreement on creating a unified system of standards and methodologies for analytical control stipulating harmonized techniques for natural and waste water assay. These techniques have been certified by the metrological expertise of the State Committee for Standards. The Government Register of water assay techniques supervised by the State Committee for Environment Protection comprises 120 methods for evaluating with adequate precision and sensitivity the content in water of major mineral and organic pollutants.

Ecomonitoring of water basins is also in the focus of attention.

The R & D in analytical techniques are based on various optical methods:

- Laser fluorescent method offering a variety of sample preparation options to evaluate toxicants in the air, bottom sediments and water with the threshold level equal MAC and below;
- Nuclear absorption method with laser atomization of samples to evaluate heavy metals in soil and bottom sediments;
- Refractometric methods to control technological processes and water purity.

The developed methods and equipment are used on three levels of ecological control:

1. Automatic unmanned, relatively simple in operation and inexpensive testing instruments for continuous automatic control of the state of environment in selected points;
2. Mobile analytical equipment for operational detailed analysis of the emerged and progressing environmental pollution,
3. Laboratory instrumental and methodological complexes for in-depth analytical studies of pollution.

The degree of finalizing the above-mentioned R & D varies from working out methods to creating a prototype analytical instrument. Currently the scientists have elaborated the isotope spectral methods and designed equipment to control environmental impacts of nitrogen fertilizers use in agriculture (nitrites accumulation in agricultural products, natural and communal waste water pollution by nitrogen compounds), and to assay waste water from livestock breeding and industrial (pulp and paper) complexes.

The above-mentioned methods are intended for arbitration analysis of sophisticated samples and metrological certification of rapid assay sensor techniques.

A prototype isotope analyzer «Azot-15» has been prepared for laboratory tests at agrochemical stations. The threshold for nitrate detection is 4 mkg/kg in agricultural products and 0.1 mkg/ml in water.

A prototype automated refractometer has been prepared for continuous quality control of natural and waste water. Its operation is based on the principle of violation of total internal refraction. The analytical signal is related to the intensity of light passing along light guide. A refractometer can be mounted on both open water surface and pipelines. Measurements are taken continuously in an automated mode evaluating the concentration water-soluble substances affecting the medium refraction index. The range of detection is 0.01....70 mass%.

In view of a large variety of environmentally dangerous objects, and consequently a large number of characteristic spectral bands, variable size and remoteness of objects, it is practically impossible to design a universal optical observation instrument capable of detecting and reliably identifying a multitude of indications.

One should bear in mind that most environmentally dangerous objects should be continuously monitored in extreme climatic and temperature conditions. It was decided to work out a basic unitized design that could be adapted to solving any environmental mission on a short notice. The unit should be hermetically sealed and be capable of operating within a broad temperature range.

The prototype was based on the scheme and design on an optical communication receiver. Such communication system was developed, manufactured, tested and submitted to the customer. The device was adapted to meet the requirements for an optical observation system. An optomechanical unit comprises several functional components that could be modified, compute scaled and assembled on four Invar rods to meet the customer's demands.

The functional components are: input window (hermetic sealing, light separation wedge, meniscus or light filter are optional), meniscus unit, large mirror unit, small window unit, output optical unit, photo receiver unit, mounting, focusing and protection units. Today the basic design of all functional components has been

finalized, except for input optics and photo receiver. These units are responsible for picture quality correction and spectral selection. The parameters depend of the customer's requirements, hence the design and optics are adjusted to the specification.

The optical scheme of a TV channel comprises a vertical sealed window, meniscus, large spherical mirror, small spherical mirror, correcting system of lenses, and photo receiver.

The lens is designed so that the cells of basic optical components (large mirror, small mirror and meniscus) responsible for picture quality and stability, are mounted on four Invar rods with calibrated spacers. The large mirror unit is unadjusted and incorporates shutoff devices. The meniscus units is also unadjusted. The precision of the units mutual installation is ensured technologically. The small mirror unit has independent adjusting shifts along and across the optical axis, and a gradient around the center of curvature. The main unit is covered by a sealed cover with a sealed window and output optical unit at the front side. The sealed cover has a mounting device and an input for dry nitrogen filling. As mentioned above, the main optical unit consists of mirrors that are not modified depending on the spectral band or purpose of the device. Modified are the scheme and design of the optical output unit by using the appropriate materials selectively reflecting or transmitting holographic or absorption elements.

Specification

Entrance pupil diameter, mm	210
Field of view, grad	3
Diffusion disk diameter, mm	50
Relative aperture	1/3

The blueprints of the developed units are being input in the computer with the purpose of modifying the design to solve a specific task.

It can be stated that theoretical, designing and technological problems of creating optical observational systems for various ecological purposes both with and without spectral selection have been in principal solved. We hope that publication of these materials would help establish business contacts with the organizations interested in developing or supplying multipurpose optical instruments with spectral selection.

Biotesting methods are being broadly introduced in various Russian regions to timely and effectively evaluate the general toxicity of waters based on the reaction of test organisms without carrying out a full chemical analysis of water.

Mobile hydrochemical laboratories with rapid assay techniques are used for preliminary studies of water objects (screening).

Legal Support

The legal support of environment protection and human health against pollutants is regulated by legal acts on various levels. The most important are the Constitution of the Russian Federation, Fundamentals of the Russian Federation legislation on protecting population health (1993), RF Law «On the sanitary and epidemiological well-being of the population» (1991), RF Law «On protecting consumers' rights» (1992), RF Law «On protecting the natural environment (1991), RF Law «On ecological expertise» (1995), RF Law «On basic principles of town planning in the Russian Federation» (1992), Water Code of the Russian Federation (1995), RSFSR

Law «On protecting the atmospheric air» (1982). Certain aspects of environment protection and human health are reflected in the federal laws «Basic principles of forest legislation of the Russian federation^ «On the animal world», «On especially protected natural areas», «On continental shoal», etc.

The Administrative Code of the Russian Federation envisages administrative liability for various violations in the field of environment protection: exceeding the Maximum Allowable Concentrations (MAC) or provisionally agreed discharges of pollutants in the atmosphere; exceeding the standards of, maximum allowable negative physical impacts on the atmospheric air, discharge of pollutants into the atmosphere without permission by especially authorized government bodies.

The Criminal Code of the Russian Federation (1996) envisages criminal responsibility for environmental crimes.

The Constitution of the Russian Federation states that «universally acknowledged principles and standards of the international law and international agreements of the Russian Federation are part of its legal system. In the event an international agreement signed by the Russian Federation envisages the rules different from those stipulated by the law, the norms of the international agreement should be applied».

Among the most important international agreements ratified by Russia are the Convention on Long-Range Transboundary Pollution (1979) and Basel Convention on Control of Transboundary Transport of Hazardous Wastes and their Disposal (1989).

The basic regulatory and methodological documents on protecting the environment and population health against potentially hazardous chemicals are adopted by the USSR Ministry of Health and contain specific standards limiting the content of hazardous substances in natural objects, production and food raw materials, foodstuffs and industrial wastes.

In accordance with the RF Law «On protecting the natural environment the principal economic methods regulating environment protection are: cadasters of natural resources, ecological programs, payments for environment pollution, licensing and economic incentives. The above-mentioned methods constitute the economic mechanism of nature use and have a different degree of practical implementation. The most elaborated and operational since 1991 is the system of payments for environmental pollution. However with the changes taking place in the legislation on industrial relations it also requires improvement.

In accordance with the Constitution of the Russian Federation the issues of nature use, environment protection and ensuring ecological safety are jointly supervised by the Russian Federation and subjects of the Russian Federation. It implies that the subjects of the Russian Federation have a right to adopt lows and other regulatory and legal acts in the field that should not contradict the federal ones.

2. POLLUTION OF WATER OBJECTS IN THE RUSSIAN FEDERATION

Today only 1% of the surface water in Russia correspond to the first quality class. Over a half of drinking water supply networks should be renovated because they are sources of secondary pollution of drinking water. A growing number of control tests leaves no doubt that the problem of water quality control hardly be solved by traditional methods.

Anthropogenic pollution of Russian water bodies - oceans, seas and large lakes, takes places via several routes.

1. Pollutants enter water bodies directly from a source located on the water body, e.g. off-shore oil extracting platform or a shore-based factory.
2. Pollutants are transported in a large water body by waterways from the continent both from point and diffusion sources.
3. Atmospheric pollutants from home sources enter a water object via its surface.
4. Transboundary transport of atmospheric discharges induces additional pollution that in some cases exceeds the home pollution.
5. Prolonged pollution from bottom sediments should not be ignored that under favorable conditions in a water body could be not only long-term but also quite significant, e.g. pesticides.

Therefore, a control system should take into account all the above-mentioned routes of noxious substances entry in water bodies. One should also realize that atmospheric pollutants comprise not only sulphur and nitrogen oxides but heavy metals compounds. This is particularly vivid in regions with unauthorized combustion and processing of oil (e.g. Checehn Republic), and use of coal and crude oil as a fuel of technologically obsolete boilers. Hence evaluating air pollution by sulphur and nitrogen compounds one should take into account heavy metals as well.

Calculations by a meteorological synthesizing center «Vostok» under EMEP program (Moscow) carried out in 1995 on a semispheric model (on the Northern Hemisphere scale) of sulphur and nitrogen oxides, ammonia nitrogen fallouts during five years show that a major inflow of pollutants is directed from the European countries. An exchange between the European Russia and European countries is 1:10, while the Asian Russia is subject to a lesser impact.

In Western Siberia 76% of pollution sources are local ones due to the world's most powerful source of sulphur dioxide discharge - the Norilsk mining and metallurgic works.

A third part of sulphur oxide fallout in Eastern Siberia are due to foreign discharges. A considerable contribution is made by China (15%). The European countries account for 8%, Kazakhstan and Central Asia - 7%. The remaining 2.% is contributed by Mongolia, Southern and Northern Korea and Japan.

The rate of nitrogen oxide fallout in East Siberia from foreign sources is not significant. Ammonia nitrogen fallout from Asian countries in Eastern Siberia is about 70% with China contributed 64%.

Water pollution is far from limited by waste water that is being monitored and taken into account. An increasingly important role is played by dry and wet pollutant fallout from the atmosphere. The density of sulphur fallout in Russia varies from over 2.0 to 0.25 t/sq.km per annum. With the water bodies area of about 0.5 min sq.km the sulphur fallout on their surface is estimated at 500 thou. tons per annum. But sulphur precipitates on catchment areas and also on snow cover, and is transported to water bodies by snow welt and rain water. The same is true of other pollutants precipitated from the atmosphere.

The density of ammonia nitrogen fallout from the atmosphere is 0.3 t/sq.km or 5.5 min.t for Russia. Out of this amount 150 thou.t is precipitated directly on water bodies surface, and the rest on catchment areas. At the same time ammonia nitrogen discharges in Russian water bodies are estimated at 186 thou.t Hence the dry and

wet precipitation from the atmosphere on water bodies surface are almost equal the ammonia discharge with waste water.

Dry and wet precipitation could be referred to as area fallout (unlike point discharges with waste water) that play an increasingly important role in water pollution. Apart from atmospheric fallout it comprises fertilizers and pesticides transported from farm lands by snow melt and rain water. According to the available estimates the runoff is estimated from 30 to 50% of the total amount of fertilizers and pesticides. Thirdly, the focal points of water area pollution are formed at landfills and dumping sites of waste from livestock breeding farms.

An important factor of pollution of natural water bodies are artificial water reservoirs with large amount of organic matter and vegetation buried during their construction. Besides, water stagnation results in eutrophication and modification of water passing through reservoirs.

In the last years water quality has sharply deteriorated in the Ladoga and Onega lakes, the largest lakes in Europe. The main reason is that all large water bodies in the European Russia have become accumulators of pollutants precipitating from the atmosphere. About 25 thou.t of sulphur and 15 thou.t of ammonia nitrogen fall out on the Ladoga lake surface annually. The basins of the Ladoga and Onrga lakes are subject to regular impacts by acid rains. The Ladoga lake water is polluted by copper and manganese salts, phenols and organic compounds at concentrations above the allowable standards. Pesticides are common here. The Onega lake is polluted mostly by organic compounds and petroleum products.

The global unique nature of Lake Baikal is well-known. Despite the Government decisions its pollution continues, forests are cut in the water catchment area, industries grow on the rivers flowing in the lake. The surrounding industrial zones contribute to precipitation on the lake surface of 15 thou.t of sulphur and 5 thou.t of ammonia nitrogen per year. Particularly significant is the pollution of the southern part of the lake with concentration of major industries polluting the air and discharging waste water in the lake and in-flowing rivers.

Drastic changes of water quality have been reported on the Sea of Azov that used to be a valuable fishing area. Due to large removal of water from the Don and Kuban rivers the fresh water inflow has reduced by about 1/4, and the salt content in the sea water is growing. A considerable amount of pollutants is transported by river water. The Don and Kuban rivers carry 13 cub. km of waste water a year, 60% of water treatment plants are ineffective. A large portion of 250 thou.t of fertilizers and chemicals used in the Kuban river basin are washed in the Sea of Azov. Large asphixiation and hydrogen sulphide areas appear in the sea in summer.

The cities and resorts in the Krasnodar territory discharge about 160 min.cub.m of waste water in the Black Sea. Areas covered with an oil film are frequently reported here. In the last years showers wash down in the coastal zone large amounts of garbage and pollutants , organic and suspended matter increasing the *Escherichia coli* content in sea water. Pesticides have been detected in the Black Sea water, and mercury along the whole extent of the Krasnodar coast.

Main pollutants of the Arctic seas are oil, petroleum products, detergents, pesticides and heavy metals discharged by companies engaged in prospecting and exploitation of natural gas deposits, marine and river ships, depots of combustible and lubricant materials, cities, sea ports and villages located on the Arctic coast. Significant amount

of pollutants is transported by the North European Russian rivers and the Ob river in Western Siberia.

Biohydrochemical data show that surface water in the European Russia are subject to eutrophication and pollution by heavy metals, e.g. copper, zink, nickel, and also by pesicides and petroleum products.

Waterways in the Asian Russia are polluted mostly in industrial concentration sites, e.g. Rudnaya in the Maritime Territory, and densely populated areas.

Permanent pollution exceeding the allowable standards is reported in cities and villages located on the Pacific coast. The main reason is that most human settlements, including large cities Vladivostok, Magadan, Petropavlovsk Kamchatsky have practically no waste water treatment facilities.

Coastal marine zones accumulate pollutants precipitated from the atmosphere.

However, the issue of pollutants transport by large rives, e.g. the Amur with a large catchment area shared by several countries, is important in the context of each country's contribution to the total pollution. It implies not only controlled discharges but also atmospheric fallout in each country. It is easier to evaluate the pollution by rives crossing the countries borders, e.g. Razdolnaya (called Sui Fin He in China). Particular attention should be paid to the Selenga river with the catchment area beyond the Russian borders and pollutants flowing in Lake Baikal - an internationally protected object.

The best solution of controlling pollution of transbounddary waterways would be creating a protected area in the water catchment area, e.g. the Tumannya river (called Tumangan in China and Democratic Republic of Korea).

3. PROSPECTS OF IMPROVING THE SYSTEM OF SURFACE WATER QUALITY IN THE RUSSIAN FEDERATION

The most actual problem in the near future would be working out indicator means for rapid assay of drinking water quality and sources of industrial and drinking water supply with a system of indicator and evaluation scales. In this context the analytical methods will be used for arbitration purposes upon detecting toxic properties by biotesting methods.

Recently the world has witnessed a rapid development of the state of environment indication methods based on various biotest systems highly sensitive either to numerous toxicant classes (indicators of general toxicity of water operating in real time at water intake or discharge points) or selective sensitivity to individual chemicals (indicators of the presence of a specific substance or class of substances in a mixture).

Analysis of the recently published «Methodological recommendations on applying biotesting methods to evaluate water quality in industrial and drinking water systems' most recommended techniques are based on the visual count of cells or organisms exhibiting different reaction to an impact. These methods are labor and time consuming, and cannot be automated, i.e. not fully satisfying the requirements to be met by toxicity indicators, namely the timely indication of toxic properties in a water source or discharge.

The most prospective in terms of pollution indication are the methods based on registration of parameters of physical processes, since it allows automating the

technique, making it operational and objective. One of these methods is measuring the luminescence of living objects.

The ability of plants to luminescence under direct light impacts is well-known. In the recent years the plant luminescence was used for biotesting. The tests are noncontact, low-damage and allow diagnosing changes in the physiological status of plants under the impact of various factors. At the same time their use is complicated by objective difficulties in interpreting the results due to extremely sophisticated and variable luminescence mechanisms.

The sphere of application of this biotesting technique is limited to pollutants negatively affecting photosynthesis, particularly herbicides, heavy metals, unbalance concentrations of biogenic elements, UV, heat, etc.

Under a growing diversity of toxic substances we face a growing importance of searching for and developing new analytical test-systems for detecting environmental substances hazardous for human health (anthropotoxicants). Among them are biological analytical test-systems offering an integral assessment of the environmental situation. Unlike analytical chemical methods they are aimed at qualitative detection of specific substances, and allow characterizing the environmental pollution as a whole.

The present attempts to evaluate the state of environmental pollution, e.g. analyze air, water, soil for toxicants by differential methods of analytical chemistry, are expensive and time consuming, not coping with the rapidly changing environmental situation. Obviously, modern equipment for detecting pollutants should be capable of rapid integrated assessment of the state of environment, and be cost-effective. Such rapid assay should precede but not exclude chemical and analytical expertise to identify the chemical nature of a toxicant. Therefore integrated biotesting methods should be classified as initial, bearing the main load of preliminary investigations of environment objects. A spectrum of test-objects for modern biotesting is extremely broad. It comprises one-celled (microorganisms, yeast, protozoa) and multicellular organisms (fish, insects, mollusks), sub-cellular particles (mitochondria, chloroplasts) and, finally, bioplymers (ferments and polyferment systems). Extremely diverse are the analyzed functions used as indicators of toxic impacts of air, water and soil samples, e.g. vital activity, respiration, photosynthesis, contractibility, etc.

A detailed analysis has allowed formulating the basic requirements to a hypothetical test-system for biotesting pollutants and anthropotoxic components of the environment, namely:

1. A measuring technique for registering the test-system function should be based on a highly sensitive method capable of analyzing substances in nano- or microgram range of pollutants concentration;
2. The selected system should ensure a maximum broad and integral evaluation of a multitude of toxicants in the studied medium;
3. A test object should maintain functional activity for a long time,
4. The registered function used for characterization of a pollutant or medium toxicity should be suitable for qualitative evaluation of the environmental situation;
5. A technique for measuring toxicity should be simple in operation, rapid and replicable;

6. A measuring cycle should be performed at a specialized measuring instrument adapted for ecological expertise;
7. Components of a measuring systems (chemical reagents and instruments) should be inexpensive and easy-to-access.

Studies by the Research Institute of Physiology in St. Petersburg have shown that the closest to the ideal are bioanalytical test-systems based on such natural objects as leucocites of human peripheral blood or ferments of oxidaze-peroxidaze cycles. Such test-systems induce bio- and chemoluminescation that significantly decrease in the presence of various pollutants: heavy metal ions, products of incomplete combustion or oxidation, organic compounds, petroleum products, etc. Measuring luminescence by a luminometer allows qualitative assessment of environmental pollution.

Application of high-effective luminescent method is known in the ecological expertise practice. For example, reaction of luminescent microorganism to toxic agents by turning of their own luminescence was used in a commercial technology by the MICROBIX firm, USA. However the capabilities of the method are limited by the nature of a test-object that cannot be used to evaluate environmental pollution in a selected nano- and microgram range. The cell nature of the test-object selected by the firm significantly reduces high sensitivity of the luminometric method. By a joint effort a number of St. Petersburg research institutes have improved the ferment analytical biotesting system and created the EXPRESS-ECO-TEST instrument. The ferment ecotest technology more fully meets the above-mentioned demands. The test sensitivity in the nanogram range is ensured by a luminometric measuring technique. Evaluating a pollutant content in a studied sample is carried out both integrally and qualitatively. The instrument is simple in operation and characterized by rapid measurement (several minutes), long-term functional activity of test-objects, and easy-to-access raw materials to produce reagents.

Modern methods for studies and control of water pollution will be further improved and put into environmental control practice in the Russian Federation.

The existing set of control indicators cannot cover all the pollutants that have standard values in the Russian Federation. To increase the control system efficacy both the number of indicators and observation stations should be increased. Today it is complicated by economic constraints. To reduce expenses and improve the data quality Russia proposes an integrated use of bioassay, bioindication (for integrated assessment of water environment and biota capacity to neutralize pollutants), and also biosensor techniques for identifying nano-toxicants alongside absorption and spectroscopy methods. A network of observation stations should be based on a basin principle.

4. PROPOSALS ON ORGANIZING AN INTEGOVERNMENTAL NETWORK OF REGIONAL CONTROL AND MONITORING

To carry out a higher quality control of acidification and pollution of the environment in the existing conditions, the Russian part considers it expedient to organize a network of intergovernmental ecomonitoring. Recent studies have shown a correlation between human health and pollution of the air, water, soil and vegetation by heavy metals and organic toxicants. It has been stated that combustion of liquid and solid fuel at technologically imperfect installations results in environment pollution by heavy metals. Such interrelations are clearly traced at water catchment areas during an integrated analysis of pollution of different media and biota reaction. In this context the following aspects are of special importance:

- Creating a shared database on the existing observations of water, air and soil pollution in North East Asian countires,
- Intercalibration of analytical equipment and methods;
- Creating a unified coordinated observation system using the monitoring networks operating in each country;
- Working out proposals on regional standards for environment quality;
- Setting up observation stations at borders between the countries;
- Creating an intergovernmental Commission on monitoring in North East Asia;
- Working out an acceptable for all North East Asian countries liability for transboundary air and water pollution;
- Evaluating environment pollution and human health in small river basins being a major landscape and territorial unit;

Setting up the first station of integovernmental monitoring network at the Tumannya river basin shared by Russia, China and Democratic Republic of Korea. It is a concentration or the animal species listed in the Red Data Book, protected by three conventions and falling under the jurisdiction of two more nature conservation conventions.

(Session 2)

FOR THE 9th NORTH EAST ASIAN CONFERENCE ON THE ENVIRONMENTAL COOPERATION

THE CURRENT SITUATION OF WATER CONTAMINATION AND PURIFICATION IN MONGOIIA

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1. THE COUNTRY

The territory of Mongolia occupies 1.56 million km^2 in central Asia at an average elevation of 1,600 m above sea level, the highest point reaching an altitude of 4,653 m, and the lowest being 553 m above sea level. The climate is continental, with sharp contrasts and abrupt fluctuations in temperature. Precipitation is low. Sixty-five per cent of annual precipitation occurs in the summer; very little snow falls in the winter; spring is extremely dry and windy.

2. WATER RECOURCES

Some 1,200 lakes and 6,900 springs can be found in the country. The annual volume of water resources is estimated at 34.6 billion m^3, of which 28 consist in run-off water. Surface water resources are 22.0 km^3 and the ground water resources are 6.8 km^3. The territory of Mongolia divided into three large watersheds in the central and eastern Asia, namely:

- Northern Arctic Ocean Basin (AOB) (51 per cent of the precipitation and 20.5 per cent of the territory)
- Pacific Ocean Basin (POB) (37 per cent of the precipitation and 67 per cent of the territory)
- Central Asian Internal Drainage Basin (ADB) (12 per cent of the precipitation and 12.5 per cent of the territory)

The demand for water is increasing due to expanding industrial activity, and the problems of scarcity and contamination are becoming one of the environmental problems. Water

resources in Mongolia unevenly distribute in space and time. The water resources of the northern territory are sufficient for all water users. But in the Gobi and desert areas, where are no large or medium rivers, perennial lakes and oases, the most serious water deficit problems are occur. Water resources are amounting on the yearly basis to 24,000 cubic meters per capita and 19,000 per km^2. However, in semi-desert areas these figures decrease to 4,000 and 1,500 respectively.

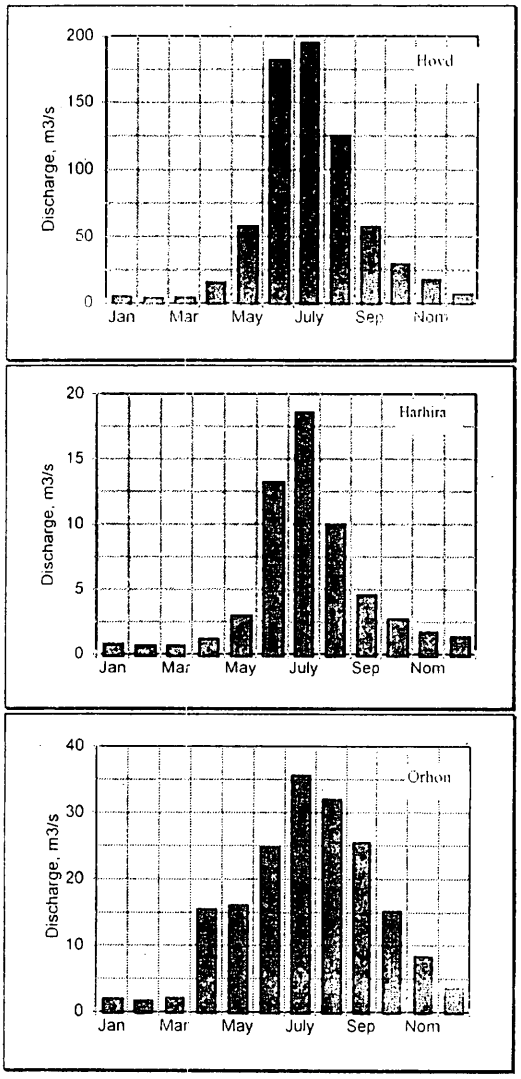

Figure 1. Annual variation of selected river in the different basins

The annual precipitation in Mongolia is 361 km^3 or 230 mm, and roughly 90 per cent of it lost to evapotranspiration, about 6 per cent is surface run-off. Most (95 per cent) of this surface run-off flows out of the country's territory.

There are four main climatic water regimes observed in the rivers of Mongolia. These are:

1. Winter low flow period which lasts approximately from December to April;
2. Spring runoff period due to snow melting which lasts approximately from April to June;
3. Summer runoff period due to rain, which lasts approximately from June to September
4. Warm season low water period, which follows after rainy season and lasts to the winter low flow period. However, this includes the short periods between floods due to rain.

3. WATER QUALITY

Water quality monitoring network

The systematic investigation of the quality of national surface waters was begun in 1946 by the National Hydrometeorological Board in Ulaanbaatar (recently Agency for Hydrometeorology and Environment Monitoring) and intended to provide baseline data on water quality in Mongolia. From then, until the end of 1970, although the number of sampling stations were increased from year to year, only a limited number of variables, such as dissolved salts, major ions, pH and hardness were carried out.

At the end of 1970, there was a shift in interest in water quality monitoring from major ions to nutrients, organic and inorganic pollutants. Also, a number of stations were

established in order to monitor the degree of water pollution in rivers flowing through provincial centers and industrial areas.

At present, surface water quality monitoring is carried out in laboratories on samples taken manually. The manual monitoring network comprises approximately 110 stations distributed throughout the national hydrological network. The main objectives of the monitoring are to gather information about the present state of the rivers or lakes and to control the quality of the surface waters. Particular attention has been paid on the parameters, which to be analyzed and the sampling frequency. For example, in settlement areas, the frequency of sampling is once a month and all possible parameters are analyzed. The rural area is monitored every two months, with selected parameters.

Any discharges of pollutants into natural waters (rivers, lakes, reservoirs, etc.) in excess of their self-purification capacities, qualifies as water pollution. When this occurs, the water can no longer be used for activities like drinking, swimming, etc. The principle source of water pollution in Mongolia can be classified as domestic sewage, industrial wastewater, agricultural and livestock wastewater. Industrial wastewater, which is generated by a variety of production activities, contains hazardous substances such as heavy metals. Unlike household effluents, the heavy metal concentrations in industrial wastewater are high, posing serious threats to the environment.

Mineralization of water depends on the level of the particular bed from sea level. Rivers of Altai, Hangai, Hentii Mountains are less mineralized which are around 50-100mg/l. The lower riverbed rivers are more mineralized because of the differing composition and quality of the land surface and minerals, lower rain and snowfall, and higher vaporization. The mineralization can be as high as 200-300 mg/l and during the dry season it can be even higher.

It was estimated that 31 percent of the population used piped water with an average consumption of 96 lpcd. 18 percent of the urban population using surface water, which is below standard and 45 percent of the water sources are below standards. In terms of mineral content about 80 percent of sources were acceptable according to local quality standards.

The river water quality

It is important to illustrate status of the river water's chemical composition and condition of quality through interpreting the row data of the river water's chemistry and quality to make them accessible to the users. By chemical monitoring, the river water quality is carried out such parameters as ammonium, nitrite, nitrate, phosphate, pH, oxidability or permanganate value, dissolved oxygen, BOD and some metals like iron, manganese, chromium and others in addition to basic chemical compositions.

As has been studied (P.Batima, 1997) the concentrations of water quality parameters in the rivers in Mongolia compared to the Maximum Acceptable Concentrations (MAC).

there was not observed any remarkable pollution. Nevertheless, ammonium concentrations are among the highest of the nutrients. There was not found a strong seasonality of water quality parameters in the river water. This allows us to make a conclusion that most of the rivers not yet affected by human activities. It not means that we are not polluting the rivers, but it is because only of the river's self-purification rate is higher due to their mountain origin.

The rivers are classified on the base of The Water Quality Index which evaluates the quality of water by parameters as ammonium, nitrate, phosphate, permanganate value and TSS (P.Batima, 1996).

The rivers in Arctic Ocean Basin are classified as acceptable. The quality of the river water is much better in Internal Drainage Basin, particularly rivers more than 50% of this area are 'clean'. The rivers in the Pacific Ocean Basin are mostly classified as acceptable; the quality is much less than the rivers in other two basins. It was also considered that the downstream of the provincial centers, river's water quality went down by 1 or 2 score points.

River water self-purification

Rivers are the natural collectors of rain runoff from drainage areas and sometimes receive direct or indirect discharges from industrial and domestic sources. Rivers are less sensitive receivers compared to lakes, as stratification does not exist, waters are aerated through their perpetual motion. Traditionally rivers in Mongolia have been the principal supplies of fresh water to population, agriculture, and industry. The presence of dissolved oxygen in river water is essential element for the aquatic life. Organic materials entering the river consume oxygen as they decompose.

In order to evaluate the self-purification of river the Streeter-Phelps model is used.

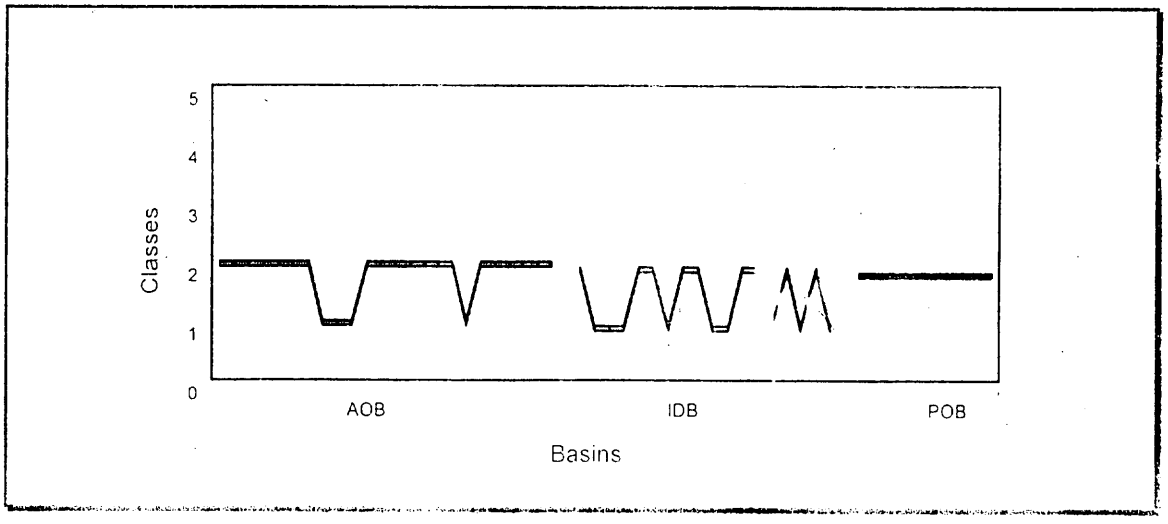

Figure 2. Graphical representation of water quality classes of the rivers in different basins

The result of self-purification some of the rivers running through province centers is given in the Table 1. It is clear that the distance of mixing and time conservation pollutants in the river are similar in those rivers. However the maximum possible concentrations of the BOD which can be discharged into the river are not quite same e.g. they differ from each other by tens of mg/l.

Table 1. Self-purification parameters of selected rivers.

River	BOD, mg/l	BOD load, kg/hr	Conservation time, day	Mixing distance, km
Selenge	65.1	5274	20	20
Ider	94.5	7573	15	10
Muren	73.5	1238	15	10
Orhon	14.1	2145	15	5
Haraa	46.6	5639	10	10
Eree	84.5	2415	15	10
Herlen	53.6	1671	15	10
Hovd	110.5	1651	15	10

From the result of this model it can be concluded that as the rivers in Mongolia takes their origin of mountainous, water of the rivers is cool and clear. Most of the rivers, especially in rural areas are not yet affected by human activities and we could suggest that the rivers have high carrying capacity or good self-purification rate.

4. WASTE WATER TREATMENT

The discharge of untreated or inadequately treated waste water into the environment is the basic type of pollution, deteriorating water quality. As the end of 1999, the nation's sewage treatment facilities were able to handle 39.8 % of all daily sewage generated nationwide. However as only 64.2 % of the country is served by sewage pipes and as treatment facilities are still using antiquated equipment, much sewage flows directly into rivers.

There are 120 wastewater treatment plants throughout Mongolia. There are difficulties with maintenance of worn equipment, high cost of maintenance and repairs.

According to 1995 statistics, the total discharge of waste water was 126.4 million cubic meters, of which 42 per cent come from sewage, 46 per cent from industry, and 12 per cent from rural areas. 65.6 per cent of total wastewater treated and about 43 million cubic meter wastewater discharged into the environment without any treatment, mostly into the surface water sources.

Water [illegible] in the largest reser[illegible] good because they are located in the relatively [illegible] upper reaches [illegible] rces located [illegible] the middle or lower

parts of river, which account for about 67 % of all potable water, constantly receive wastewater from nearby cities or production facilities.

Only 32.4 percent of water sources have protective sanitation zones. 70 cities were subject to potential industrial pollution, and at least 47 of these had no realistic prospect of relief from pollution.

Many settlement areas don't have sewage treatment facilities, and in some of them WWTP either doesn't work at all or are working much below their capacity.

Due to factors such as rapid population growth, urbanization and industrialization, the quality of both surface and ground water resources are deteriorating, especially around settlement areas. The principal sources of water pollution in Mongolia are industrial discharges, domestic effluents, run-off water of urban areas and run-of from agriculture areas.

The major cities and most aimag centers are served by sewerage systems. Associated sewage treatment plants provide mechanical and biological treatment in larger systems and primary settlement or pond systems in smaller ones. Most industrial wastewater is discharged to the public sewerage system. USAG (Ulaanbaatar water supply company) has an industrial pretreatment plant, but it does not function efficiently. USAG's treatment capacity was designed for 21,000 m^3 per day but today the plant treats only 13,000 m^3 a day. The leakage of the water supply network is real threat to the groundwater of this area and the Tuul River, one of the important rivers in Mongolia. USAG has no standby power generation, so that in the event of a power failure the entire raw domestic and industrial wastewater flow was diverted directly to the Tuul River. Untreated or not properly pretreated [illegible] industrial wastewater [illegible]

5. LEGISLATIVE FRAMEWORK

The Government policy on ecologically sustainable social and economic conditions is to be implemented through legislative documents, long-term programs, planing of activities, coordination and projects. During 1990-1[illegible] Parliament enacted package of laws and concepts regarding coordinating development with natural environment.

Institutions

Modern water management history in Mon[illegible] goes back more than 60 years. Due to economic reforms and structural changes, M[illegible] of Water Management was abolished in 1986. Most of the functions performed that ministry, were transferred to the Ministry of Nature and Environment. Since the end of 1987, the ministry of Nature and the Environment has [illegible] charge of water management policy before the [illegible] Water [illegible] and Mineral [illegible] and more

environment aimed at improvement of the level of proper use of water resources and wastewater treatment activities.

The NWPP defines the basic strategic trends on water sector and has three phases of its implementation (I phase up to 2000, II phase 2001 - 2005, III 2006 - 2010). Within the program the Cabinet established the National Water Committee, which in charge of organization, regulation and monitoring on the program implementation. National Water Committee has local coordinating sub-committees in each aimag (administrative unit).

International cooperation (implemented and ongoing projects in this field)

Since 1990 in Mongolia implemented (or ongoing) following projects, aimed to improve water service and purification activities:

Provincial towns basic urban services project
Rehabilitation of water supply facilities in Ulaanbaatar city
Ulaanbaatar service development project
Development of National water, sanitation and hygiene education programm for the 21st century
Improvement of water treatment equipment. And the quality and safety of water supply in the settlement areas are improving.

6. MAIN CHALLENGES EXISTING IN MONGOLIA

According to the Mongolian Environmental Action Plan, actions to improve water quality have the highest priority, because over half of the population of Mongolia is at immediate risk from water pollution. The primary cause is the poorly controlled disposal of wastewater from common treatment facilities and from industrial plants (such as those engaged in meat processing, pig farming, and wool and leather processing).

During last years, government spent limited fund for water sector, especially for wastewater abatement activities. However, there is very important to introduce market-oriented approaches for combating wastewater pollution. Main concept is implementation of the fee system on wastewater, and the revenue will be used much effectively for wastewater purification activities. Only by improving resource utilization efficiency, reduction of pollution emission and prevention from deterioration of the water resources we could achieve the environmental sustainable development.

Another source of pollution is solid waste, and it is one of the environmental problems face capital city Ulaanbaatar. According to the Ministry of NE 1996, approximately 900 000 m3 of solid waste are generated each year. There are three waste disposal sites located within 20-30 km of Ulaanbaatar that are polluting the land of city's and river

than 20 follow up Regulations on water management were initiated by the Ministry of Nature and Environment.

According to the Water law adopted in 1995, administrative authorities of all levels, from Parliament itself down to the local level, are given responsibilities and obligations in respect of water management.

Existing Standards

There are two types of water quality standards – Standard for classifying the degree of purity of surface water and its potential usage for different purposes, for specifying the quality of water to be used for a specific beneficial use and waste water standard.

1/ Government Resolution No.143/a/352 of 1989 presents "classification and surface water purity" where a surface water is classified into the following five purity grades:

Grade I	Highly Pure
Grade II	Pure
Grade III	Slightly Polluted
Grade IV	Polluted
Grade V	Severely Polluted

These purity grades are determined by several indices for oxygen condition, mineral composition, organic pollution, biological indices, toxic substances, and physical/sense. In addition, this standard also establishes water quality norms and requirements for water to be used for specific purposes, such as a community water supply, use in the food industry, recreational uses, and fish breeding.

2/ The Standard has two type of permissible maximum amount of pollution substances and its limit. Main purpose of this Standard is to set up permissible maximum amount of pollution substances and limits of wastewater discharge to the surface water and soil infiltration.

The wastewater discharge Standard parameters are identified by the water quality requirements of the rivers. In the Standard the total pollutant loads discharged from pollution sources should be controlled in concerning of the dilution capacity of the rivers and permissible contamination of discharge loads where determined.

The National Water Policy Program, 1999

This Program reflects overall related issues on water management activities including water resource, water quality, water uses and protection from deterioration and pollution of the water resources. The Program defined main and priority objectives as implementation of multi-stage activities on preventing from negative impacts on health of population by improving of water supply and quality, creation a economic and legislative

Tuul. In 1995, only 40% of the total solid waste in Ulaanbaatar, was properly disposed of; the rest was just dumped and is becoming a major source of soil and water pollution.

7. CONCLUSION

Water scarcity, the gap between human demand for and the availability of water in the required quantity and qualities, is the fundamental issue of the water supply in Mongolia.

Many users and communities are dependent on groundwater, the flow and availability of which are inherently more stable than of surface water.

At the present time water pollution is serious problem in Mongolia, especially in urban areas. Over half of the population of Mongolia at an immediate risk from urban air and water pollution and actions for reducing water pollution must include following issues: improving sewage and waste removal, improving and expanding wastewater treatment facilities including mitigation measures of most polluted rivers, and improving water quality monitoring.

The quality of water is concerning issue. Every group of users requires water of different quality, and total demand is increasing. There is very important to separate users by group: high quality drinking water must not used for industry and agriculture needs or for this reason there was not unnecessary treatment of water for purposes which do not require it.

Water quality degradation is an increasingly important issue. Water quality in Central and Northern part of Mongolia is heavily degraded, because of high population density, urbanization, comparatively high industrialization, and the general lack of pollution control facilities.

Based on the present data the most rivers in Mongolia are classified as "*clean*' and "*acceptable*".

Session 3

"Extension of Network of the Special Protected Areas and Capacity Building"

(Session 3)

Strengthen capability building of natural reserve and raise level of construction and management

Mr. Hongtao Yu

As the important content of sustainable development strategy, which is carried out in our province, the construction and management of natural reserve, has progressed rapidly. Under serious attention and wise leadership of all levels of government, and through the cooperation from all circles, great achievements have been gained: We have established natural protection net, with moderate size, complete type, rational distribution and relatively perfect management, which has performed important significance to the improvement of provincial ecological, and healthy development of economy and society as well.

1 Construction in nature reserve has been deeply developed

The nature reserve has gained great processes in recent 40 years since the first reserve Fenglin founded in 1958, by the end of 1999, the sum of all provincial nature reserve add up to 115,which covered 3 million hectares (6.60% of provincial territory), national 11, provincial 22, municipal 13, county 69.Among which, Zhalong nature reserve enters <<International main wetland namelist>>; Fenglin join in world human and ecology circle; Liangshui lists in national net. Different types of nature reserve are dispersed in Heilongjiang province, expect for ocean and desert, some particular types such as volcano ecology remaining in Wudalianchi, ancient biological fossil in Jiayin dinosaur, Xingkai lake pine in Xinkai lake, northeast black bee in Northeast black bee area, only existed in China. Others like Zhalong nature reserve, Honghe nature reserve has great influence on both inside and outside country. And the nature reserve's setting up make major ecological interests get better protection.

2 Management level in nature reserve has been improved continuously

This part will be divided into four points;

Firstly, management level becomes more scientific and rational. We finished the compilation of the development program for all provincial nature reserves (1998-2010). The program mainly focuses on construction and development of major ecological interests and nature reserve in key catchment. Also the nature reserve land plan has been entered in the provincial land general plan, which assure the reserve land usage.

At the mean time, the comprehensive management for the nature reserve has strengthened. With approval, provincial government nature reserve management office is established, which in charge of coordinating construction and management all over the province. Basically formed the new management system, i.e. government leaders take duty, all offices united control, and different departments coordinately manage.

And nature reserve building up has been gradually standard. First, according to relevant regulations, nature reserve's application and approval procedure has been specified. Second, the establishment of provincial nature reserve evaluation committee make it effective to create a new reserve or upgrade the reserve, their quality are correspondly improved. Third, the upgrade of reserve progresses rapidly,

national grade reserve up to 11 from 5 in 1995. Fourth, 2 inspection stations have been founded for capital construction, and "Sanjiang wetland propaganda and education center building" is put up. Last year, the EPB allocated 1.8 million RMB to Honghe, Wudalinachi, and northeast black bee nature reserve as construction subsidy fund. This year, the provincial government plan to allocate 1 million RMB as match funds to national investment, which is the first time in our province history.

Secondly, A good situation prevails on all circles participating the protection work. More and more social activities involved. Honghe nature reserve wouldn't widen it's areas without support of surrounding farms who correctly regard the protection word as key measures to keep the biology balance and guarantee the high production. Also this year, Jiansanjiang bureau issued documents to increase Honghe nature reserve area, which will reduce effect the outpace bring to.

Furthermore, the completion of GEF task i.e.<<Research for coordinately management in nature reserve>>, and being put into practice, also exerts a great influence in society. "Qiqihar red-crowned crane volunteer committee" founded in Zhalong nature reserve, making the action of protecting rare wild animals become the order of the day.

Thirdly, as the pilot project, the scientific research, propaganda and education has been spread. Nature reserve has been considered as scientific research base for both Heilongjiang and all the country. Lingshan nature reserve put stress on research work and become the scientific base of Northeast Forestry University; Fenglin nature reserve was appointed as UNDP pilot case: "China damp area forest sustainable manage zone" which has become the base of shenyang applied chemistry research building.

Nature reserve has great effect on society activity. As the laboratory base of Northeast Forestry University, Liangshui, maor mountain, sanjiang these three nature reserve are also live museum, wherethere people get close to nature, to learn it, to care about it, to love it .In 1998, students from 15 universities of Beijing areas constitute the observation group, specially paid visit to Honghe, Sanjiang nature reserve. After learning the relevant knowledge about wetland, they released investigation report, which has spread the influence of nature reserves.

Also, nature reserve has become pilot base for developing ecology tourism. For example, Zhalong nature reserve set the tourism scenery in test zone, which properly connected the ecology tourism with environment education. In Liangshui, Fenglin areas, professional tourism has been carried out. Ecology tourism's development not only benefit the reserves with income, and make up the shortage of operating expenses, moreover, it bring the nature's beauty to people, heighten our culture grade as well.

For the last point, legal system construction has made great progress. After <<Routines for China nature reserve>> was issued in 1994, <<Regulations for Heilongjiang nature reserve management >>also was released in 1996, which get <<routines>> more specific and feasible in our work. And our provincial government issued <<Decisions on enhancing wetland protection >> to specify the wetland type. All above documents will lay a foundation to manage the reserves in law way.

The level of executing the law has gradually upgraded, punish and correct some illegal cases, and involve the construction and management work in inspection activity of government. Besides, regular work was also reinforced.

Although we've achieved great gains with our work, there're still some problems needed to be resolved, such as: insufficient acknowledge of importance of nature reserve, investment channel not accessible, ineffective management and other bad influence on reserves etc.

3 Measurement to strengthen the capability building in nature reserve

First, organize and implement nature reserve program all over the province, then raise the level of construction and management. Second, go step further to deepen public's understanding of enterprises, put press on education, encourage people to join in nature reserve activity. Third, upgrade the degree of exerting law system, and enhance the nature reserve's management. Fourth, deepen the cooperation with international organization, as to the nature reserves, which is typical, representative, and notable abroad, try to get into international field. Thereby, we would play our active role in protecting global biology diversity.

(Session 3)

Policy on Nature Conservation and Special Protected Areas in Korea

At the 9th Northeast Asian Conference on Environment Cooperation.
26-28 August 2000. Mongolia

Mr. Chairman, Distinguished participants, ladies and gentlemen;

It gives me great pleasure to introduce the MOE's efforts for protecting and preserving the last remaining pockets of Green space and wetlands in Korea.

While the Republic of Korea has experienced rapid growth since its economic development started in the 1960s, its natural environment continues to deteriorate. High population density and urbanization are critical pressures on bio diversity. And industrialization and infrastructure(road and large dam, etc.) construction including land reclamation do serious damage to biodiversity.

In 1999, the amendment of Natural Environment Conservation act compelled to the MOE to establish the Basic Policy for Nature Conservation, which is the foundation of nature related policy of the country. It comprises the guidelines for government policies to conserve nature.

The protection of wildlife will be strengthened by designating ecosystem conservation areas, national parks, wetland conservation areas, protected islands and protection zones for birds. The purpose for designating these areas varies slightly according to the individual legal bases, however in general they are similar in that they function to conserve biodiversity and natural scenery.

1. Natural Conservation Strategy

In other to realize an environmentally sound Korean peninsula where humankind and nature coexist in harmony, the Ministry is implementing natural environment conservation policies under the following six principles: 1) conserve, manage, and

sustainable use nature to protect the public interest, 2) maintain harmony and balance between conservation and land use, 3) protect biodiversity, ecosystems, and beautiful natural scenery, 4) promote the participation of all citizens in conserving the natural environment as well as opportunities for sound use, 5) equitably distribute the expenses of conserving the natural environment, and 6) promote international cooperation for conserving the natural environment.

The Ministry of Environment, in consultation with related ministries, specialized institutions, and NGOs, established the National Strategy for the Conservation of Biological Diversity June 1999.

The chief contents of the National Strategy include measures for regular inspections and surveys of biodiversity, designation and management of protected areas, strengthening protection for protected species (those threatened with extinction, etc.), ex situ preservation, strengthening regulations on discharging toxic pollutants into the environment or damaging ecosystems, strengthening management of LMOs and alien species, and conserving and restoring damaged lands.

The strategy for the sustainable use of biodiversity illustrates the direction for conserving and sustainably using agricultural resources, mountain forest resources, marine resources, tourist and recreational resources, and genetic resources.

2. Protection of Wild Fauna and Flora

Following the Natural Environment Conservation Act, the Korean government has established and is currently implementing policies for the protection, designation, management, and conservation of wild fauna and flora. Penal regulations on illegal hunting and collection have also been strongly enforced.

The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) is an international effort for the protection of endangered wildlife through

regulation of its trade. In line with this, the Korean government now requires a government certificate for customs clearance.

3. Managing Ecosystem Conservation Areas

Since the enactment of the Natural Environment Conservation Act, the Ministry of Environment is managing Natural Ecosystem Conservation Areas to protect them from land-intensive development projects.

To properly protect natural ecosystems that are being rapidly destroyed as a consequence of numerous development projects, the Ministry of Environment has designated and manages "Natural Ecosystem Conservation Areas." Target areas include: 1) grade 1 regions according to the ecosystem map, 2) areas of great scientific research value due to their untouched ecosystems or abundant biodiversity, 3) regions that require conservation for scientific research or to maintain scenery because of their geological or topographical characteristics, 4) regions that serve as habitats or visiting grounds for endangered species or protected wildlife and where the need for conservation is recognized, and 5) regions that represent a great variety of ecosystems or are good examples of particular ecosystems.

Natural Ecosystem Conservation Areas are broken down into three categories according to their characteristics: Special Wildlife Protection Areas, Special Natural Ecosystem Protection Areas, and Marine Ecosystem Protection Areas. The table below lists the standards for designation.

<Criteria for the Designation of the Natural Ecosystem Conservation Area Name>

Name	Designation Standards
Special Wildlife Protection Area	Areas that must be conserved in order to protect endangered or protected wildlife

Special Natural Ecosystem Protection Area	Areas with exceptional ecosystems or abundant biodiversity, or regions with fragile ecosystems that would be difficult to restore if they were damaged
Special Marine Ecosystem Protection Area	Areas with exceptional marine ecosystems or abundant biodivisity

Ecosystems designated as conservation areas cover a total area of about 100 §′, a third of which is sea surface. Within these borders are an abundance of species. Nakdong River's estuary serves as visiting grounds for migratory birds. A virgin forest is located in Mt. Chiri's Simwon Valley.

The criteria for designating ecosystem conservation zones are as follows: I) zones classified as superior quality, ii) zones maintaining a primitive ecosystem, iii) zones that are unique in geology and geography, and are thus in need of natural conservation, iv) zones that are considered valuable as visiting grounds for endangered or protected wild life, and v) model zones that may represent biologically diverse ecosystems. Zones designated according to such criteria are shown in the table below.

<Current Status of Designated National Ecosystem Conservation Zones>

Designated Zones	Objectives	Location	Designation date
Estuary of the Nakdong River	Visiting grounds of migratory birds	Sa-ha-gu, Pusan (Ul-suk Island)	'89.3.10
Mt. Chiri	Virgin forest	Koo-rye County, Chollanam Province (Shim-won Valley)	'89.12.29
Mt. Tae-am	High moors	Inje County, Kangwon Province (Yong Marsh)	'89.12.29
Woopo Swamp	Wetlands	Changnyong County, Kyungsangnam Province	'97.7.26
Ulsan's Moojaechi Marsh	Marsh on Mt. Jungjok	Ulchu County, Ulsan	'98.12.31

4. National Parks

Natural parks were designated to protect ecosystems, beautiful natural scenery, cultural artifact, recreational resources, etc. They are classified into national parks, provincial parks, and county parks.

As of the end of 1998, there were a total of 71 natural parks in Korea covering an area of 7,528.830§′, 7.5% of the total land area. This consists of 4,814.956§′ of land (4.8% of the total land area) and 2,713.874§′ of marine environment (2.7%). There are 20 national parks, 22 provincial parks, and 29 county parks.

Twenty areas in Korea have been designated as national parks since the national parks system was first introduced: one as a national historical park (Kyong Ju), three as marine parks, one as a peninsular park, and the remaining fifteen as their scenic beauty, the national park offer cultural and historical assets, including various national treasures and Buddhist temples. As a top priority, we Koreans ale committed to preserving the ecosystems of the twenty national parks by effectively managing the parks' resources. In order to restore damaged areas and soundly and sustainably use the parks' natural and cultural resources, we plan to systematically promote education and public relations for visitors. We are currently developing eco-tourism programs that focus primarily on the national parks, including nature walks.

Furthermore, by stimulating exchanges with countries throughout the world, we will do our best to let the world know about Korea's national parks through diverse media, such as the internet and publications.

5. Wetland Conservation

Wetlands are treasure houses of biological diversity, providing habitats for diverse species of fauna and flora. They are extremely valuable natural assets that perform many environmental and socio-economic functions, including the purification of pollutants and flood mitigation.

In March 1997, Korea acceded to the international convention on protecting wetlands, the Ramsar Convention (Convention on Wetlands of International Importance, Especially as Waterfowl Habitats). Korea is participating in international efforts to preserve wetlands, e.g., designating wetlands in Yong on Mt. Taeam and Woopo Swamp as Ecosystem Conservation Areas and registering them as Ramsar sites as well as enacting the Wetlands Conservation Act in December 1998.

6. Preservation Measures for Uninhabited Islands

In order to manage ecosystems of uninhabited islands effectively, the Special Act relating to the Conservation of Island Ecosystems such as Tokdo was enacted in December 1997 for research and data collection on uninhabited islands.

Nationwide research on uninhabited island ecosystems has also been conducted since 1998. Expansion of the research programs on a yearly basis is expected. Based on these results, uninhabited islands with the healthiest ecosystems will be designated and managed as protected islands.

7. Protection and Management Policies for Habitats of Migratory Birds

It is essential that habitats are not damaged and natural ecosystems are appropriately conserved. Based on the nationwide yearly survey on the natural environment, the Ministry of Environment has been designating and managing ecosystem conservation areas that are considered valuable as visiting grounds for migratory birds.

Currently, the government has designated and managed 34.2§′ of the lower area of the Nakdong River in Pusan, and 8.5§′ of the Woopo Swamp in Kyungsangnam Province as visiting grounds for migratory birds. As for Seoul, the government has designated 0.24§′ of the Bahm Island region and is in the process of implementing plans on ecosystem conservation.

As for major habitats of migratory birds, the government has designated protection zones in which, for example, people's entrance during the breeding season is limited. Currently 757 sites (1,340§´) have been designated and managed as protection zones for birds.

Asia-Pacific countries have had many achievements, including the adoption of the Kushio Initiative in 1994, establishment of Conservation Strategies on Migratory Waterfowls of the Asia-Pacific Region in 1996, and the creation of networks for major waterfowl habitats as well as bilateral agreements.

In 1994, Korea and Russia signed the Agreement on the Protection of Migratory Birds in Korea and Russia. Japan and Korea have also been holding annual meetings since 1996 for cooperation on migratory birds.

Other efforts for protecting migratory birds within the Asia-Pacific region include Korea's accedence to the Ramsar Agreement in 1997 and participation in cooperative networks working to protect cranes, longbills and ducks.

The Hooded crane is one migratory bird found throughout northeast Asia, especially in Izumi, Japan. To increase the range of the bird's habitat and help preserve migrating routes, the city of Sunchon held an international symposium in February 2000 to develop measures for the protection of Hooded crane and its habitat, in part by expanding its habitat around Sunchon.

8. Strategy for protected Areas

As I mentioned before, there are many kinds of special protected areas in Korea. The protected areas include Ecosystem Conservation Areas, Natural Parks, Natural Monument Protection Areas, and Birds & Mammals Protection Areas, etc.

In other to expand the protected areas, the ministry has already spent around 4 million USD to nationalize some Ecosystem Conservation areas so Far. In addition to

acquiring protected areas, various economic incentive measures for the local residents will be introduced to lower the resistance for designating protected areas.

As all of you may be aware, the Demilitarized Zone between the South and the North Korea, and its neighboring areas have a unique ecosystem. Even though this areas are not legal protected areas, we are trying to conserve the ecosystem of these areas.

At the same time, the ministry is trying to strengthen the management of existing protected areas. The ministry has made a rule called *management agreement for biodiversity*. The rules applies to especially sensitive or important protected areas. For example, the ministry will contract with farmers to reduce their uses of pesticides and fertilizers or to follow traditional farming techniques in order to conserve the ecosystem of specific areas.

9. Korea's CASE : Actions to Preserve the Dong River

Along with related organizations, Kangwon Province and Youngwol, Chungsun and Pyoungchang Counties, the Ministry of Environment has prepared environmental preservation measures for the river to minimize the aesthetic and ecological impact of tourism on the area. These measures include the following.

A. Devise Protective Measures for wildlife

Regulate or ban the capture of fish, animals, and plants and prevent habitat damage by prohibiting tourist entry into some sensitive habitats of wild flora and fauna, especially those of endangered species.

B. Strengthen Pollution Prevention Activities

Create twenty-two local environmental groups to report illegal activities such as waste dumping and degrading the natural landscape. These groups will also carry out

environmental clean-up activities in zones designated appropriate for pollution prevention measures.

C. Prohibit Rafting in the Upper Dong River

Prohibit rafting within the water resources protection zone in Chungsun extending from Woonchi-Ri to Maha-Ri.

D. Formulate an Agency to Regulate Activities that Threaten the Natural Environment

Organize an agency consisting of 4-5 members to regulate activities that generate pollution or compromise the natural environment.

E. Close Some Sections of Mountain Paths, Extend Public Campaigns, and Prohibit Camping and Cooking within the Area

(Session 3)

Current situation of protected areas and ecotourism development in protected areas

The 9th Northeast Asian Conference on Environmental Cooperation
July 26-28,2000/Ulaanbaatar, Mongolia

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1 INTRODUCTION

Japanese archipelago stretches from the sub-tropical to sub-arctic zone running parallel to the eastern rim of the Eurasian Continent consists of four main islands and more than 3,900 smaller islands whose area cover almost 378 thousand square kilometers.

Forest areas cover 67 percent of the total land areas and agricultural lands also cover 14 percent. Because of mountainous topographical nature of lands, a large part of Japan is still decorated with beautiful primitive and secondary forests. Brown bears, black bears, and Japanese deer trot in forests, and golden eagles, cranes and herons glide in blue sky.

Japanese flora is very abundant and more than 6,000 species of higher plants were identified due to diversity of climatic conditions and geographical features.

Due to diverse variety of flora and wildlife habitats, rather large number of mammals, birds, reptiles, insects, etc. are observed even in Japanese archipelago. 188 species (including subspecies) of mammals, 665 birds, 59 amphibians, 87reptiles, 200 freshwater fish and more than 100 thousand of insect species were already identified.

For the conservation of the natural environment of Japan, there are four categories of Protected Areas in Japan, which are Natural Parks, Nature Conservation Areas, Wildlife Protection Areas and Natural Habitat Conservation Areas for Endangered Species.

2 PROTECTED AREAS IN JAPAN

2.1 Natural Parks

The legal basis of Natural Parks is the Natural Parks Law. The Law aims to conserve scenic areas and their ecosystems, to promote their utilization, and to contribute to the health, recreation and environmental education of the people. In compliance with this law, natural parks are categorized following 3 parks.

National Parks

The place of greatest and national-level natural scenic beauty and ecosystems, worthy of the names of the national scenic and out-standing ecosystems in Japan.

Quasi-National Parks

The place of great natural scenic beauty at the district-level and next to the National Parks.

Prefectural National Parks

The place of prefectural- level importance and designated by the prefectural governors concerned.

Type	No. of parks	Park area(ha)	Percentage to land area (%)
National Parks	28	2,047,408	5.42
Quasi-national Parks	55	1,339,347	3.54
Prefectural Natural Parks	304	1,948,687	5.16
Total	387	5,335,442	14.12

2.2 Nature Conservation Areas

Legal basis of Nature Conservation Areas is the Nature Conservation Law. The Law is a general law that stipulates basic policies of natural conservation. In compliance with this law, nature conservation areas are categorized following 3 areas.

Wilderness Areas

Area that preserves its original characteristics without any influence of human activities.

Nature Conservation Areas

Natural area that preserves its valuable natural environment, as:

(a)alpine and sub-alpine vegetation
(b)valuable natural forests
(c)typical landscape, geology and natural phenomena
(d)river, lake, marsh, and sea coast
(e)marine area
(f)habitats of plants and wildlife preserving a natural environment comparable (a)-(e)

Prefectural Nature Conservation Areas

Area that preserves a natural environment almost equivalent to a Nature Conservation Area, but does not include marine areas.

Type	No. of areas	Areas(ha)
Wilderness Areas	5	5,631
Nature Conservation Areas	10	21,593
Prefectural Nature Conservation Areas	516	73,413

2.3 Wildlife Protection Areas

Legal basis of Wildlife Protection Areas is the Wildlife Protection and Hunting Law. This Law aims to protect and increase wildlife, to control pest and prevent the danger caused by hunting, through the execution of wildlife protection projects and effectuation of hunting for the purpose of the improvement of living environment and contribution to the promotion of agriculture, forestry and fisheries.

The Director-General of the Environment Agency or the prefectural governor, when he deems it necessary for protection and reproduction of wildlife, may establish the Wildlife Protection Area for a duration not exceeding twenty years. Wildlife Protection Areas are established to protect and to promote the reproduction of birds and mammals, and the hunting of wildlife is prohibited within such areas.

54 National Wildlife Protection Areas (480,000ha) and 3,665 Prefectural Wildlife Protection Areas (2.96 million ha) had been established, giving a total of 3.44 million ha, accounting for 9% of the national land area.

2.4 Natural Habitat Conservation Areas for Endangered Species.

Legal basis of Natural Habitat Conservation Areas for Endangered

Species is the Law for Conservation of Endangered Species of Wild Fauna and Flora. Recognizing that species of wild fauna and flora are important components of ecosystems, as well as having essential value for humanity, the Laws for the Conservation of Endangered Species of Wild Fauna and Flora aims to ensure the conservation of natural surroundings for present and future generations.

For the purposes of ensuring the conservation of National Endangered Species, the natural habitats of National Endangered Species are designation by the Director-General of the Environment Agency as Natural Habitat Conservation Areas for Endangered Species.

5 Natural Habitat Conservation Areas have been designated, and are being managed through operations such as patrols and surveys on state of living and breeding.

3 MANAGEMENT OF NATIONAL PARKS

To conserve outstanding ecosystems and scenic beauty, many activities liable to deteriorate natural environment, are prohibited without prior permissions and licenses from the Director-General of the Environment Agency or the Prefectural Governor concerned. Permissions are issued in accordance with the "Guideline to Assess on Various Development Activities in National Parks Areas" elaborated by the Environment Agency.

To promote and encourage the beautification and cleaning-up in popular and major areas in the parks where many visitors visit, voluntary groups consisting of local governments, concessionaires, scientists, local peoples and others have been established and organized. In order to encourage various beautification activities undertaken by more than 40 groups established, one quarter of necessary budget for their programs has been subsidized by the Environment Agency, one quarter by prefectural government, and one quarter by municipality authorities concerned, and one quarter by local businesses concerned. Also some private funds help financially to conduct such activities. Especially to support non-governmental activities for the nature conservation, funds play very important role.

To promote the wise-use of National Parks, licenses and permissions for the provision of facilities for park visitors are allotted to local public bodies and private bodies in compliance with the utilization planning of the Parks. Public facilities can provided by the Environment Agency and Prefectural Governors with financial assistance of the Environment Agency. In accordance with Natural Parks Law, private bodies can get license from the Environment Agency in order to operate hotels, inns, skiing hills, and other facilities fir visitors in National Parks. This licensing scheme has contributed the local economic development and provided a authorities has also been issued in many National Parks.

To promote appropriate utilization of the natural resources in National Parks and meet increasing people's desire for communicating with nature, various interpretive services are provided based at interpretive facilities such as visitor centers.

To mange the Protected Areas appropriately, it is crucial to enhance the co-operation among the National Government, Prefectural Governor, Municipality Authorities, local people and private sectors. Especially in Japan, where protected areas can be established even on private-owned land, it is essential to gain public support and to maintain good public relationship.

4 ECOTOURISM DEVELOPMENT OF PROTECTED AREAS

4.1 The Thinking Behind Ecotourism

Conventional tourism, by involving traveling around, has utilized and used up natural resources. By bringing many people to a certain place, mass tourism has been good for local economies, but has in many cases been detrimental to the natural environment.

By contrast, the idea behind ecotourism is to make sustainable use of the natural environment, thereby leading to the continued economic development of localities. The purposes are summarized as follows.

(1) Contribute to preserving the local natural environment and culture
(2) Contribute to vitalizing the local economy
(3) Bring a due measure of profit to tourism and other related industries
(4) Raise the environmental consciousness of local citizens and tour participants

Following are some ecotour activities that people might engage in:

Type of activity	Specific activities
Interaction with wildlife	Watching wildlife, whale watching, flora and fauna study tours, flora observations, nature observations
Experiencing the environment	Spelunking; going to see waterfalls, volcanoes, and hot springs
Encounter with traditional culture	Visiting archeological sites, learning traditional crafts
Activities on land	Trekking, hiking, walking, mountain climbing,

	camping, photo tours
Activities at sea	Snorkeling, canoeing, scuba diving, rafting
Participatory experiences	Experiencing the life of traditional Tohoku mountaineers, agriculture, commercial fishing, or forestry; workshops

4.2 Ecotourism in Japan

Japan has some places that are ahead in ecotourism, such as Iriomote Island in Okinawa Prefecture, and Yakushima Island in Kagoshima Prefecture. Henceforth it will be important that the use of designated protected areas for tourism be changed to ecotours that do not use up the resources, and which at the same time bring about the sustainable use of resources.

Area	Ecotour activities
Kushiro wetland (Hokkaido)	Trekking, camping, canoeing
Ogasawara (Bonin) Islands (Metropolitan Tokyo)	Whale watching
Yakushima Island (Kagoshima Prefecture)	Trekking, learning natural history
Iriomote Island (Okinawa Prefecture)	Trekking, kayaking, observing wildlife

Yambaru region, which is being considered for designation as a new national park, in Okinawa Prefecture, there is an idea under consideration to provide for both local economic development and nature conservation by combining ecotourism and designation of protected areas.

(Session 3)

Ministry of Protection of the Environment and Natural Resources Russian Federation

All-Russian Research Institute for Nature Protection

9th Northeast Asian Conference on Environmental Cooperation

July 26-28, 2000
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Session 3: Extension of Network of the Special Protected Areas and Capacity Building

The long tradition of nature conservation in Russia has produced a protected area system that is unique in the world. The state nature reserves and national parks form the basis of a network of specially protected nature areas of Russia.

Today this network comprises 99 zapovedniks* and 35 national parks, accounting for about 2% of the entire area of Russia. A developed network of specially protected areas is a guarantee of the preservation of Russia's nature diversity. Under Russian conditions such areas are primarily zapovedniks.

Zapovedniks

A zapovednik - this original Russian term is also used in technical English - is a strict nature reserve (IUCN Category I**) organized as a giant open-air research institution.
The federal system of state zapovedniks has been developing over 80 years into the present globally unique and important network.

Zapovedniks is a Russian traditional form of territorial nature conservation, whereas the practice of the establishment of national parks has been derived from foreign experience.
Zapovedniks are established where representative samples of nature have been retained, and where there are specially vulnerable nature features, primarily rare species of plants and animals. Russian zapovedniks are fairly representative of the nature ecosystems of different landscape zones of the country and preserve the populationp and habitats of virtually all the rare plants and animals listed in the Red Data Book.

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* 20% of which are located in the Far East. Out of the 35 wetlands protected under the Ramsar Convention, 7 are located in the FER.

** In protected areas of IUCN Category I, activities are prohibited, except for scientific and research activity. Regular research activities and monitoring are undertaken concerning wildlife, vegetation and ecosystems in all protected areas of IUCN Category I.
Hundreds of protected areas have been established in North-East Asian subregion for biodiversity and natural resources conservation. Russia, only in Primorskyi, Kamchatka, Sakhalin and Amur provinces, has established 330 protected areas (IUCN categories 1-4).

The main difference of russian zapovedniks from specially protected areas of other countries lies in their having research departments and in totality forming a network research institutions of the same type, covering the entire territory of Russia according to a particular system. Systematic (annual) inventories and evaluations (so called Chronicles of Nature) allow follow up on the positive and negative changes occurring in protected areas. Research in zapovedniks is conducted throughout the year in accordance with co-ordinated programs, which make it possible to resolve various ecological problems.

Today an increasingly notable contribution to the conservation of nature diversity of Russia is made by national parks.

National parks

In the early 1980-ties when the international experience in nature conservation was thoroughly examined in the former USSR, the first national parks were created. The national parks combine protection of scenic landscapes and their wildlife with ecotourism and environmental education.

Apart from protecting landscape and biological diversity, they fulfilled an important mission of environmental education. The above-described categories of specially protected areas are subordinate to the federal government, have their own management and operate as nature conservation, scientific research and environmental enlightenment educational.

The most widespread categories among the regional reserves are preserves/refugesand natural monuments.

State Natural Game Reserves (Zakazniks) and Natural Monuments

In the period from 1960-ties to 1980-ties new categories of SPA's were actively developed including state natural game reserves (zakazniks) and natural monuments that are subordinate both to federal and regional authorities. These are the most numerous SPA's in Russia totalling 15,000 (according to VNIIPriroda data). Unlike zapovedniks and some parts of natural parks (rest areas), economic activities usually continue in these protected areas. These activities are strictly regulated by legal acts adopted on the federal or regional level for an individual SPA's.

Sate natural game reserves (zakazniks) are created to protect both individual species (of flora and fauna) and ecosystems as a whole.

Natural monuments are established to protect primarily unique point objects of particular importance for protecting biodiversity, geological environment, environmental education purposes, etc.

Nature parks (Prirodny parks)

Upon the first Russia law on SPA's was adopted in 1995 a new category of territorial nature conservation appeared - *natural parks*. Unlike national parks they are owned by the subjects of the Russian Federation, they not necessarily carry out scientific and research functions, and their areas may be used for recreation purposes on a large scale. (Fig.1). Such parks have been established in the Bryansk and Kamchatka regions, in the Maritime Province and Sakha Republic.

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System plan for protected areas

The current prospective (up to the year 2005) scheme for siting and promoting the network of zapovedniks and national parks was adopted by the Russian Federation Government in 1994. It envisages creating over 100 zapovedniks and national parks.

State of the art

Maintaining and developing the system of specially protected areas (SPA's) is one of the priority trends of the state environmental policy in the Russian Federation. In accordance with the Russian Federation legislation the SPA's are considered as national heritage objects.

Protected areas in the Russia are established according to the Law of the Russian Federation "On Environmental Protection" (19.12.1991), and regulations about state nature reserves in the RSFSR (Governmental Act of 18.12.1991). Important legislation and regulatory acts on SPA's creation and operation have been adopted recently.

Adopted in 1995, the «Federal Law on the Particularly Strongly Protected Natural Territories» (PPNT) has given an impetus to the development of regional networks of projected areas. It has sanctioned the establishment of new PPNT types and categories of regional importance, including the protection of rivers, water bodies, shores, parklands, natural and historical landscapes, etc. This has strongly extended the potentials of the Federation's subjects for the organization of new protected areas of varying status.[1]
The guidelines for promoting federal game reserves (zakazniks) were adopted and enforced by the Russian Federation State Committee for Environmental Protection.

The schemes for promoting SPA's in individual regions of the Russian Federation are developed and adopted by local administrations of the Russian Federation subjects independently from the federal schemes.

Under the current Russian practice of nature conservation the networks of federal and regional SPA's exist and develop largely autonomously.

According to the VNIIPriroda data the regional SPA's vary from 16 to 1,000 at an average of 170 SPA's per one subject of the Russian Federation

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[1] This has demanded to perform a revision of the existing regional PPNT.
In 1996, the All-Russian Research Institute for Nature Conservation began to carry out a project for accumulation of complete and reliable regional information about protected natural areas as a part of the federal natural heritage. Together with the Department of Nature Reserve Management of the Federal State Committee for Ecology, the Institute has launched a contest for the best work concerning an inventory of the natural heritage protected in the regional subjects of the Russian Federation. The contest financed the work done in the regions as well as the winners' prizes. Here we gratefully acknowledge the financial support of the German Union for Environmental Protection, the «ESTI-MAP» Company, the «ECUR» Charity Environmental Fund, and the «Coca-Cola» Company. Certain support was also rendered by the BINA-RT Advertising Agency, the Actual Biology Fund, the Moscow Agency of the International Union for Nature Conservation, and the Center for Wildlife Protection.
Inventory of the regional and local PPNT has covered Russia's 81 regions (of 89) and it can considered as acceptable for 66 regions. The results of the survey have allowed to incorporate in the database information on about 15,000 particularly strongly protected natural territories of regional and local importance. Their total area amounts to about 95 million ha.

Management

Regretfully the existing practice of state management of the SPA's of the federal importance - zapovedniks, national parks and natural game reserves (zakazniks) - is far from perfect in modern Russia.
The Zapovedniks (Strict Nature Reserves) are managed on a national level. Other Protected Areas have provincial management. Several sanctuaries are managed on the federal level.
A regional or local status of reserves is often vaguely delimited. Numerous standard juridic documents of the creation of a PPNT fail to conform to current legislation and are to be updated.

Financing of protected areas

In line with the existing legislation and practice of nature conservation Russian zapovedniks and national parks are financed from the following sources:

1) Federal budget of the Russian Federation including the Federal target-oriented program for government support of state zapovedniks and natural parks (up to the year 2000);
2) Federal ecological foundation;
3) Budgets of the Russian Federation subjects;
4) Regional ecological foundations;
5) Local (regional, municipal) budgets and extra-budgetary sources;
6) Donations (grants) by organizations and private persons;
7) SPA's own funds (Fig.2).

The most reliable financial sources actually used by other categories of SPA's (excluding zapovedniks and national parks) are budgets of the Russian Federation subjects, regional ecological foundations, district and municipal budgets and extra-budgetary funds, grants and donations by Russian and foreign sponsors and own resources (product sales, fines, recreational activities, etc.).

Because of the overall crisis situation in Russian economy, SPA's financial situation is extremely difficult. For example, the state budgeting reduced over 20 fold in 1995 as compared to 1990. In October 1995 the President of the Russian Federation approved the Federal Target-oriented Program of Government Support to State Natural Zapovedniks and National Parks up to the year 2000. It contained an Action Plan on overcoming the crisis situation with SPA's. Regretfully the program is being partially fulfilled, and the SPA's network hardly operates without state support.

International experience shows that only full-scale state budgeting can uphold and maintain the areas similar to Russian zapovedniks. Irregular and insufficient financing of the unique network of Russian SPA's during the last seven years has damaged its foundation. Active use of extra budgetary sources could remedy the existing situation.

Financing of Zapovedniks

In 1990 the ratio of financing the zapovedniks network from the state budget was 90%. Since 1992 the inflation rate has become avalanche-like, and impoverishment of zapovedniks has reached the disastrous level. Starting from 1993 the money was allocated from the Federal and regional ecological funds. In 1994 this type of financing amounted to 9% of the total budgeting.

Adoption of the Federal target-oriented program has contributed to a more stable financing of zapovedniks. The program envisaged a broader network of zapovedniks and national parks, protecting the typical and unique natural ecosystems, preserving the natural and cultural heritage, a more effective social security of the zapovedniks and national parks employees. Upon the program completion a federal SPA's network shall cover all natural zones in Russia to promote fulfilling Russian obligations under the Convention on Biological Diversity.

Despite the program implementation financing zapovedniks from the state budget remains insufficient, and the budgets of individual zapovedniks are largely dependent on other sources. For example, in 1995 the ratio of extra budgetary sources in 30 zapovedniks varied from 34% to 79%, in 17 zapovedniks from 20% to 30%, and in 11 zapovedniks from 10% to 20%. Extra budgetary financing of other zapovedniks was less than 10%. It should be noted that some of the latter zapovedniks were recently created and could not find extra budgetary sources at such a short notice (Stepanitsky, Mazmanyants, 1997).

Financing of Natural Parks

The overall situation in financing the Russian natural parks was as follows:
Total expenditures - 72.13 million Rubles (~ US $ 12.02 million) including:

- from the Federal budget - 48% (capital investments - 2%; operational costs - 98%);
- from the subjects of the Russian Federation - 10% (ecological funds - 18%; regional budgets - 82%);
- national parks' own funds - 42% (product sales - 33%; recreational activities - 14%; fines - 2%; other - 51%) (Fig.3).

Financing by the State Committee for Environmental Protection

The economic mechanism of regulating environmental protection is closely related to the system of payment for adverse impacts on the environment and operation of government ecological funds.

The principle authority in regulating environment protection activities in Russia is the State Committee of the Russian Federation for Environmental Protection (Goskomecologiya). Therefore analysis of its budgeting could reveal general economic trends in the field of SPA's.

In 1997 the Goskomecologiya coordinated 11 federal target-oriented programs in the field of environment protection and nature conservation, including the Federal target-oriented program to support zapovedniks and national parks (FCP).

The 1999 Federal budget allocations for "Environment Ptotection" total 105,30 million Rubles (~ US 1, 755 million) of capital investments for nature conservation activities to be covered by all sources of financing. This sum includes 342 million Rubles from the federal budget (federal investments) which is 30% of the 1998 total expenditures and 20% of the 1997 total expenditures. In 1997 the federal budget remained the major source of funding the zapovednik network that covered 70% of all operational costs.

A comparison of the 1999 federal budget with the 1997 and 1998 budgets shows positive trends in the environment protection domain, however the allocated funds are obviously insufficient to solve the current problems.

Given the deficit funding and a need to ensure a temporal ranging of investments, special attention is paid to a comprehensive environmental and economic substantiation of land allotment for specially protected natural areas. The most complicated methodological and practical aspect is the economic evaluation of the results of protecting biodiversity. The results of protecting biodiversity in SPO's could be classified as follows:

1. Supporting economic development through a sustainable use of natural resources, tourism, recreation and creating labor opportunities;
2. Maintaining the natural equilibrium by protecting genetic and biological diversity;
3. Providing the opportunities for scientific research, ecomonitoring and education.

The above classification underlies a qualitative assessment of the results of biodiversity protection, namely: benefits from the direct and indirect use of nature resources today and in future, and also the effect of biodiversity existence (Solovieva, 1995).

Summarized annual results of environmental activities in relation to relevant capital investments could be used as an indicator of the overall economic effectiveness of environmental capital investments. Statistical data do not often differentiate capital investments, but using some parameters allowed us to evaluate the effectiveness of the 1993 in kind expenditures in Russia as a whole and in individual protected natural areas (Fig.4).

Cost Effectiveness in Selected SPA's of Federal Subordination (1993)

Name of SPA	Area, ha	Costs, million Rubles	Effectiveness, million Ruble/ha
Baikalski	165 724	79.6	2 082
Taimyrski	1 348 708	8	168 559
Greater Arctic	4 169 222	8	521 153
Kurilsky	65 365	59.2	1 104

It is clear from the above Table that the indicators of cost effectiveness vary considerably in different Russian zapovedniks. The benefits per one unit of expenditures are largely dependent on natural conditions and geographical location the zapovedniks.

In summary, a far from complete analysis of financing and effectiveness of capital investments in Russian protected areas allows us to conclude that protecting natural ecosystems based on a territorial principle in the economic recession in Russia is impossible without assistance from the international community. The unique system of nature reserves - zapovedniks - created by several generations of Russian scientists and practical workers is a universal heritage and therefore should be a concern of environmentalists the world over.

Transboundary protected areas

Actively participating in the Convention on Biological Diversity, the Ramsar Convention and the bilateral Mygratory Bird Agreements, the governments of the six countries developed national strategies and action plans, the integral part of which are bilateral and multilateral projects, which include transboundary nature reserves, national parks, landscape natural reserves, monuments of nature and other objects of ecological tourism. Creating a joint nature reserve on Lake Khanka has demonstrated the countries' desire to cooperate in this field.

As the example of Environmental Cooperation in the Northeast Asian Region we would like to consider the Project Profiles for the Tumen River Area Development Programme.

The Project Profiles for the Tumen River Area Development Programme prepared by the Tumen Secretariat on behalf of China, Democratic People's Republic of Korea, Mongolia, Republic of Korea and the Russian Federation in March 1999 and supported by the United Nations Development Programme. The project profiles draw from Sector Action Plans, formulated by Working Groups of the five member countries of the Tumen Programme. The project profiles have the following main topics: Investment Facilitation, Transportation, Tourism, Protection of the Environment, Other Sectors.

As to the Tourism Sector:

Tourism helps generate good will and understanding among neighbouring countries.
The Tumen Programme supports a Working Group on Tourism. The Working Group includes representatives from National Tourism Organisations (NTOs) at both national and local levels. International agencies with an interest in tourism are also included in the Working Group: the World Tourism Organisation (WTO), the Pacific Asia Travel Association (PATA), and the United Nations Educational, Scientific and Cultural Organisation (UNESCO). Commercial representatives from the tourism industry are invited to participate as observers.

The Tourism Action Plan comprises six programmes:

1. Identifying Tourism Resources and Joint Tourism Development Planning
2. Promoting International Investment in Tourism
3. Joint Tourism Marketing Project
4. Facilitating the Development of Tourism Products
5. Facilitation of Travel
6. Training and Technical Exchanges

In conclusion it can be stated that Russia actively supports the idea of expanding cooperation between the North Eastern Asian countries in the field of extension of network of the Special Protected Areas. We consider that co-operation of neighbouring statee would help protect unique biological landscapes and bioresources of the Far East for future generations.

(Session 3)

FOR THE 9TH NORTH EAST ASIAN CONFERENCE ON ENVIRONMENTAL COOPERATION

THE CURRENT SITUATION AND MAIN ISSUES IN PROTECTED AREAS OF MONGOLIA

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PROTECTED AREAS STATUS IN THE NORTH EAST ASIAN COUNTRIES

The number and extent of the North East Asian network of protected areas have increased rapidly. The countries of the region are now covered by 820 legislated protected areas. This network accounts for 5.1 % of the whole land surface of the North-East Asian countries (Table 1).

Table 1. Summary of the protected areas by the North East Asian Countries

Country	Area (km^2)	No.	Area protected (km^2)	% land area protected
China	9,597,000	463	580,665	6.05
D.P.R. of Korea	122,310	2	578	0.47
Japan	369,700	80	27,582	7.46
Mongolia	1,565,500	48*	205,305	13.1
R. of Korea	98,445	28	6,937	7.05
Russian Federation	17,075,400	199	655,367	3.84
Total	**28,828,355**	**820**	1,476,437	

Source: World Conservation Monitoring Centre, 1996
*Special Protected Areas of Mongolia, 2000

STATUS OF PROTECTED AREAS AND MAIN ISSUES EXISTING IN MONGOLIA

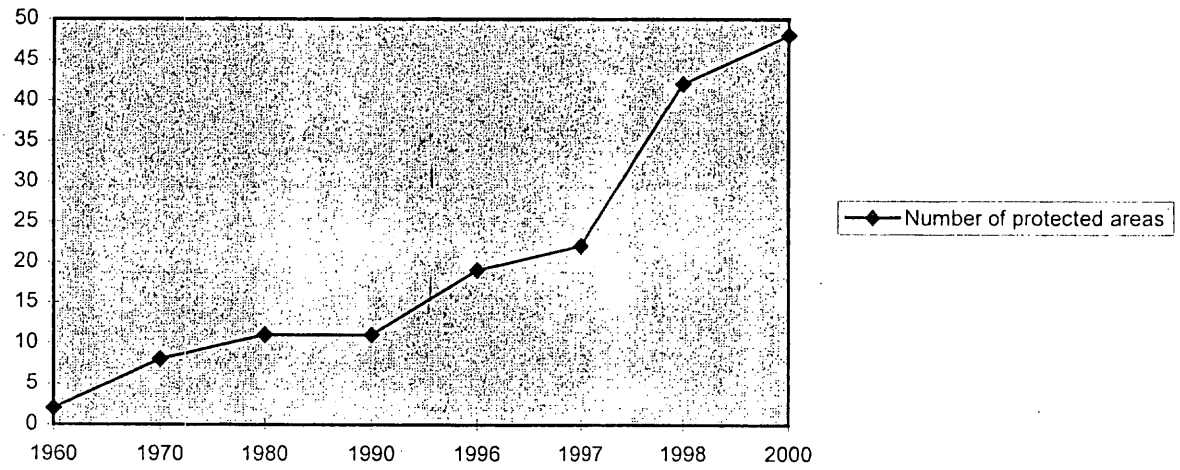
From ancient times to the present day, Mongolian people have followed an old and amazing tradition in the protection and worship of nature, pristine landscapes, wildlife and their habitats. A great example of Mongolians' respect for nature is reflected in the environmental regulations in the Code of Chinggis Kaan's " ikh

Zasag" and in many others laws and regulations of the 16th century such as the Code of Oirods and "Khalkha Regulation". There were 14 mountains recognised as sacred including Bogdkhan Mountain, Khan Khentii, Khugnukhan, Jargaltkhaan, Bayan, Suman Ulaan and Tuvkhunkhaan, where hunting, cultivation and logging were completely restricted. This fact shows many early protected areas were established for aesthetic or customs reasons.

The Government of Mongolia has been implemented many measures in expanding its protected areas network and improving their management. For instance " Law on Special Protected Areas" (1994) and "Law on Bufferzones of Special Protected Areas (1997), were adopted. The Parliament approved " The National Program on Special Protected Areas" in 1998 and its Implementation Plan for 1998-2005 adopted by the Government in 1999.

Today, special protected areas of Mongolia encompass 20.5 million hectares covering 48 areas of 124 soums and districts of 19 aimags and the capital, roughly 13.1% of the whole country's territory. During the last 10 years the number of protected areas increased more than three times (Figure 1).

Figure 1: Trends of the growth of protected areas in Mongolia



According to the Mongolian Law on Special Protected Areas (1994), areas under protection are to be classified under the four categories:

- Strictly Protected Areas
- National Conservation Parks
- Nature Reserves
- Monuments

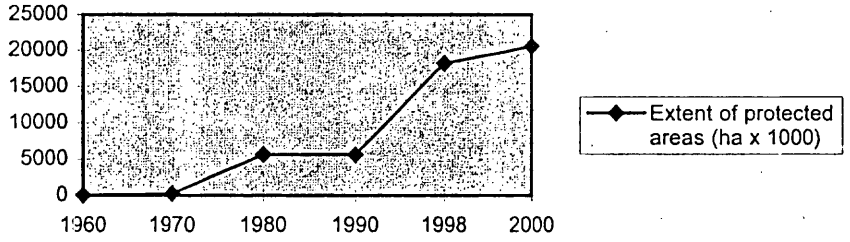
The number and extent of the protected areas of Mongolia are shown inTable 2.

Table 2. Network of Special Protected Areas of Mongolia

No.	Classification and name of state special protected areas	Area's size (ha)	Year of protection
Strictly Protected Areas 10,494,283 (51.1%)			
1	Great Cobi	5,311,730	1975
2	Hkukh Cerkhiin nuruu	65,920	1977
3	Bogdkhan uul	41,651	1978
4	Khasagt Khairkhan	27,448	1965
5	Khan Khentii	1,227,074	1992
6	Numrug	311,205	1992
7	Dornod Mongol	570,374	1992
8	Mongol Daguur	103,016	1992
9	Otgontenger	95,510	1992
10	Uvs nuur basin	712,545	1993
11	Small Gobi	1,839,176	1996
12	Khoridol Saridag	188,634	1997
National Conservation Parks 8,133,420 (39.6%)			
1	Khuvsgul	838,070	1992
2	Khorgo-Terkhiin tsagaan nuur	77,267	1995
3	Gobi Gurvansaikhan	2,694,737	1993
4	Gorkhi Terelj	293,168	1993
5	Altai tavan bogd	636,161	1996
6	Khangain nuruu	888,455	1996
7	Khar us nuur	850,272	1997
8	Noyon khangai	59,088	1998
9	Khustain nuruu	50,620	1993
10	Khan Khukhii Khayrgas nuur	553,350	2000
11	Sylkhemiin nuruu	140,080	2000
12	Tsambagarav uul	110,960	2000
13	Tarvagatain nuruu	525,440	2000
14	Onon-Balj	415,752	2000
Nature Reserves 1,823,580 (8.9%)			
1	Nagalkhaan	3,076	1995
2	Batkhaan	218,501	1995
3	Lkhachinvandad	58,800	1995
4	Bulgangol	7,654	1995
5	Ugtam	46,160	1993
6	Sharga Mankhan	390,071	1993
7	Zagyn us	273,606	1996
8	Alagkhairkhain	36,400	1996
9	Burkhanbuudai uul	52,110	1996
10	Ergelyn zoo	60,910	1996
11	Ikh nart	43,740	1996
12	Khugnukhaan	46,990	1997

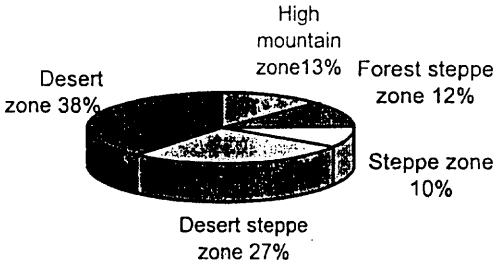
13	Toson khulstai	469,928	1998
14	Khar yamaat	50,594	1998
15	Yakhi nuur	251,388	1998
16	Develyn aral	10,300	2000
Monuments 79,305 (0.4%)			
1	Bulgan uul	1,840	1995
2	Uran Togoo Tulga uul	5,800	1995
3	Eej khairkhan	22,475	1995
4	Khuisyn naiman nuur	11,500	1992
5	Ganga nuur	32,860	1993
6	Suikhent	4,830	1996
Total size of protected areas 20,530,588 (100%)			

Figure 2: Coverage of protected areas in Mongolia



This information indicates that Mongolia has been made a major expansion of protected areas in the last 10 years.

Figure 3 Percentage of protected areas in natural zones



As shown above, the areas representing fragile and sensitive Gobi nature with extreme climate and rare wildlife and plant species have been taken under special protection.

Protected areas of Mongolia



The financing of Protected Areas consist of the sources: state central and local budget; income from traveling, tourism and other activities and services; donations and aid from citizens, economic entities and organizations; income from compensation for damage caused by persons who violate the law.

The annual budget of one park administration is approximately 10 million tugrigs or US$12.2 thousand (Table 3).

Table 3. Budgeted expense

Year	1996	1997	1998	1999
All park administrations level				
In million tugrigs	61.9	92.6	119.9	139.5
In thousand US$	115.7	116.2	143.1	139.5
Per park administrations				
In million tugrigs	6.2	9.3	10.9	12.7
In thousand US$	11.6	11.6	13.0	12.7

With regard to taking areas under protection and maintaining their protection at the appropriate level, a requirement was raised to create zones with the purpose of providing sustainable socio-economic development, to show support in improving living conditions of local community, and to strengthen protection of a given area. Accordingly, in 1997 the Parliament passed a Law of Mongolia on Special Protected areas' Bufferzones.

The buffer zone council, which consists of representatives from the local government, local community, and protected area's administration are responsible for coordinating those activities carried out on the bufferzone territory.

Currently, bufferzones are established in 6 of those 12 strictly protected areas and 5 of 14 national parks, and cover 10 million hectares of area.

International cooperation in the field of protected areas has been widened and its scopes have been extended from year to year.

Protected areas with special natural, historical,cultural and scientific significance and which play an important role in providing the ecological balance of Mongolian and global regions have been included in the list of the World Heritage and MAB. For example The Great Gobi SPA in 1991, the Bogdkhan Uul SPA in 1996; and Uvs Lake Basin SPA in 1997 were respectively included in the list of the MAB of UNESCO. The orientation is to gradually include several areas in the list of the World Heritage. These included Uvs Lake basin, the ancient desert layer of Gobi Gurvan saikhan, part "A" of the Great Gobi Strictly Protected Area (SPA), Khuvsgul Lake together with the area of reindeer people of the shaman religious. Also some areas were recorded in the list of the Ramsar site. Examples are Mongol Daguur SPA, Terkhyn Tsagaan Lake, Ugii Lake, Lakes' valley, Khar Us Nuur, Airag lake.

Also, in cooperation with neighboring countries, there has been established the joint protected areas that cross two or three borders, and special attention has been paid to jointly protect migratory animals. An agreement was made between the ministries of three countries in 1994, including "Mongol Daguur" SPA of Mongolia, "Daurii" SPA of Russia, and "Dalai Nuur" SPA of China.

An agreement proposal regarding the joint protection of lake basin SPA and Khuvsgul NP together with the protected areas along the Russian border has been developed and discussed at the respective level of both sides.

Several projects have been implemented with technical assistance of foreign and international organizations in the field of protected areas. For examples, we can mention the project "Eastern Mongolian Biodiversity Conservation and Sustainable Livelihood Options" with financial support from the UNDP and GEF, "Nature Conservation and Bufferzone Development" of the German Technical Cooperation (GTZ), "Strengthening the Khuvsgul NP Management" with financial support of the USAID and the WWF project on surrounding area of the Altai Sayan mountain range.

Tourism is rapidly growing in many countries. In Costa Rica, about $U12 million is spent annually to maintain the national parks but foreign exchange generated in 1991 was more than $U330 million with 500,000 overseas visitors, park-generated tourism is the second largest industry in the country (IUCN, 1998).

In 1997 Mongolia received approximately 80 thousand frontier arrivals. Among those 23 thousand were leisure purpose, 60 thousand business purpose visits mainly from China (33 thousand) and Russia (9 thousand) (Table 4). About 11,000 Japanese tourists visited Mongolia in 1997 making up an increase of 30% in the number of Japanese tourists since 1990 (JICA, 1999).

Table 4. Frontier Arrivals in Mongolia

Country/Region	1990	1995	1996	1997
Americas	900	4,322	3;834	5,019
Japan	1,700	8,976	9,504	11,077
China	0	47,721	30,478	32,531
Korea of Rep	0	2,561	3,537	3,294
East Asia/Pacific	100	1,857	1,214	2,654
South Asia, Africa & Middle East	0	810	464	585
Russian fed	124,000	28,390	8,502	8,708
Central/East Europe	8,800	1,441	1,755	2,538
Germany	1,200	3,502	2,782	3,339
Other Europe	700	8,854	8,761	11,238
Total	**137,400**	**108,434**	**70,831**	**80,983**

Source: Japan International Cooperation Agency (JICA), 1999

Tourism in Mongolia is mainly concentrated in special protected areas, particularly in national parks. Currently, 47 tourist camps manage their activities inside protected area. 14 of those camps operate their activities in Bogdkhan SPA, 16 in Gorkhi-Terelj NP, 8 in Khuvsgul NP, 3 in Gobigurvansaikhan NP, 3 in Khangai Nuruu NP, and 3 in Khugnukhan NR.

Main challenges existing in Mongolia's protected areas are:

- **Expand protected areas network and establish more transboundary protected areas**

Mongolia needs to establish more protected areas in order to implement the international conventions which Mongolia has joined including the "Convention on Biological Diversity" and "Convention Ramsar" .

According to the National Protected Areas Program, the coverage of special protected areas of Mongolia will be increased by 15% in 2000, 20% in 2005, and by 2020 years it will be increased no less than 30%.

The former President of Mongolia, Mr. P.Ochirbat supported the movement " Our Living World-2000" initiated by WWF by expressing in his essay and informing the whole 30% of the total area of Mongolia or 46.9 million hectares would be taken under state special protection.

Mongolia can be divided into 5 natural zones and belts: High mountain and taiga, Forest steppe, Steppe, Desert steppe and Desert zone. Currently, 16.7 % of protected areas belongs to the high mountain and taiga zone, 13% to the forest steppe zone, 6.8 % to the steppe zone, and 13.2% to the desert steppe zone and 50.3% belongs to the desert zone.

As shown above, the state protected area network generally includes those areas with extreme climate and particular fragile ecosystems such as the Gobi region.

As well as, it can be said that Mongolia still has gaps of protected area coverage in the grassland ecosystem.

According to the scientists, there is a data stating that about 40% of the endangered wildlife and plants of Mongolia have been taken under the state protection.

- **Changes needed for the current management system**

In Mongolia protected areas are generally managed by the Environmental Protection Agency of government. The other countries experiences have shown that private sector and NGO's play important role in the management of protected areas. For example, in Japan the company Amway Japan Limited (AJL) established the Amwya Nature Centre which has assisted a wide range of nature conservation projects in Japan (Matsukura,1996). Another example is an increasing number of protected areas are being managed by the private sector in South Africa. NGOs have made important contribution to protected areas management. For instance, the Wild Bird Society of Japan and the National Parks Association are active in managing of protected areas. Example of NGO involvement in Mongolia include the Khustain nuruu National Conservation Park is being managed by the MACNE since 1998.

Therefore the current management system, mechanisms, laws and policies to the relevant to the protected areas should be reformed.

- **Encourage local community around the protected areas involvement in the natural resource management**

One of the major challenges facing protected areas in Mongolia is the effective involvement of local people in protected areas and buffer zone management. Community participation in the natural resource management is one of the effective solutions to this. The CAMPFIRE program in Zimbabwe provides such example. One of the key principles of CAMPFIRE is local participation by the benefiting communities. This principle accepts that decentralization and devolution are key policy instruments to enable local people to decide on what to do with their wildlife resources. They could for example determine the purchase prices of wildlife, participate in the selection of the safari operators and also contribute to sustainable quota setting.

One major constraint in the way of community based conservation is a weak policy base for it in the country.

- **Increase capacity building for protected areas managers**

The protected area management is quite new in Mongolia.Therefore, there is an urgent need to improve the skills of protected areas managers. 79.9% of specialists who work in special protected areas are people professionally qualified in the field of nature and ecology. However, protected area managers are needed communication, financial and tourism management skills.

- **Lack of funds**

The long existing problem of lack of funds has troubled the protected areas and it will be hopeless to ask state investments on the management of strictly protected areas in distant future. As the territory of protected areas has been widening , the amount of financing required for conducting management to improve their protection has been increasing from year to year. In 1999, the Protected Area Bureau has received a fund equal to $US139.5 thousand from the state budget which was used to finance 11 park administrations responsible for protected areas.

Most of the above budget allotted to the Protected Areas park administrations by the state budget goes for paying employees' wages and is not enough to cover other operational expenses.

- **Strengthen international cooperation**

International cooperation is an important way to improve protected areas management of Mongolia in various aspects, by providing, for example experience in management, knowledge, skills, technologies and funds. Therefore wide range of international cooperation of protected areas should be encouraged.

- **Promote Public Awareness Program**

Ecological education is one of the key functions of protected areas. Protected areas are to be used for the improvement of knowledge and humanity's relationship with natural world, through popularization, information and educational programs.

In order to resolve the above mentioned problems of Mongolia's protected areas the following measures should be undertaken:

- To develop a national system plan for protected areas
- To establish transboundary protected areas
- To establish cooperation mechanism of protected areas at regional level
- To extend involvement private sector and NGOs in protected area management
- To develop and implement Community based Natural Resource Management Program
- To develop training program for protected area staff and managers within the region
- To establish exchange program between protected areas of the region
- To identify possible financial sources at national, regional and international
- To develop sustainable tourism in protected areas
- To create a regional ecological education center

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Session 4

"Review and Future of the Northeast Asian Environmental Cooperation"

(Session 4)

Comments on NEAC' Past and Future

Mr. Jing Guo
International Department,
SEPA of P. R. CHINA

NEAC has held its ninth conference since the first one has happened in Japan nine years ago. In the past nine years, NEAC became a welcome event among participating countries, because of its flexible topics and dialogue style which is in a not such a formal way. We really need NEAC to exchange the new progress on environment in each participating country.

From the past of the conference, we conclude that NEAC has gained the following positive progress:

-Becoming a forum successfully for participating countries and organizations to discuss broad issues of almost each aspects on environmental area.

-Providing a good opportunity for each member to exchange their experience and progress on environment in each country. The country like China has learned a lot by those exchanges from other members. The

experiences in the other countries have been beneficial for domestic environment work in the way or another.

-Since NEAC is the first regional dialogue forum in Northeast Asia among the environmental agencies, the conference has greatly increased the understanding on environmental policy carried out by different countries.

-The other very important role NEAC has taken is that it is like a catalyst, to start a new idea, to promote a new action. In my sense, the three countries' officials discussed tripartite environment ministers meeting among Japan, Korea and China during NEAC meeting in the very early stage. This year, the second tripartite environment minister meeting has been held in Beijing. I believe we could expect more idea being initiated in the future like this.

-The other characteristic of NEAC is that the meeting brings the people not only from national authority but also from local environmental agencies together to discuss environmental issues. That makes the meeting a good chance for local officials to share their experiences from each other. We would happy to see more and more people from different entities to be involved in the process.

Prospects on NEAC Meeting:

Next, I would like to put forward our expecting to NEAC in the future.

First, China would like NEAC to keep current policy dialogue function among member countries. Each member has obtained a lot by these dialogues; it is obviously a right direction.

Second, it is time to identify the priority policy area to NEAC. We would like to propose that NEAC could try to identify one or two priority policy areas in next NEAC meeting, and give these policies a following up discussion in the another coming meeting. In doing so, we may be able to compare the different policy impacts in different countries. In this way, we could make NEAC more effective.

Third, it seem to us that more people from different areas should be involved in NEAC, such as policy research scientists, people from industry and private sectors, also people from non profit or non government institutes.

Fourth, we would like to suggest the participating countries and organizations to consider using Internet to distribute NEAC's activities and achievements. This is important since we do believe the cooperation on environment in Northeast Asia will benefit the people in this region. It could be helpful to post people what we are doing here and what we are going to do in the future.

Thanks.

(Session 4)

Environmental Cooperation in North-east Asia: Review and Prospects

Presented by LEE Chang Heum,
Deputy Director of International Affairs Division,
Ministry of Environment, Republic of Korea

First of all, I would like to express my sincere thanks for having the opportunity to present an audience of such an important issue. I'd now like to briefly mention the status of environmental cooperation in Northeast Asia and offer a brief analysis of its future prospects, especially as it applied to NEAC

Last NEAC and NEASPEC meeting, it was emphasized that the linkages between environmental cooperation initiatives should be strengthened. However, in my perspective, we do not take any concrete action. At this point, I take note that NEAC will play a leading role for enhancing linkage for its characteristic as a policy forum.

Under this prerequisite, I would like to explain the present mechanism and strategy of environmental cooperation in Northeast Asia, and lastly suggest objective and roles of NEAC.

1. Overview of the Mechanism for Environmental Cooperation in Northeast Asia

Since 1992, Japanese and Korea government and International Organization, such as UNEP and ESCAP have initiated several multilateral programme and conference. The first Northeast Asian Conference on Environmental Cooperation(NEAC) has been held in Niigata 1992. This meeting has made a role of policy dialogue forum to exchange policy and information and shared a view on environmental problems among governmental officials, experts in Northeast Asia.

The first meeting of senior officials (SOM) on Environmental Cooperation in Northeast Asia held in Seoul in 1993. In 1994, in its second meeting, member countries identified its three priority areas are as follows; energy and air pollution, ecosystem

management and capacity building. In the 6th meeting held in Seoul, they adopted vision statement on environmental cooperation in Northeast Asia and agreed to establish core fund. They also identified the Northeast Asian Center for Environmental Data and Training.

In recent, the initiative of TEMM is a significant progress in environmental cooperation. In the 2nd meeting held in Beijing this year, three ministers reaffirmed TEMM as a important forum for fostering regional environmental cooperation and sustainable development. The ministers also expressed their wishes to implement concrete project style cooperation among their three countries and agreed concrete nine project.

Joint Research Project on long-range Air Pollutants in China, Japan, and Korea(LTP) and Acid Deposition Monitoring Network in East Asia (EANET) are carrying out modeling and monitoring of air pollutants. And in the 5th meeting of the Action Plan for the Protection, Management and Development of the Marine and Coastal Environment of the Northeast Pacific Region(NOWPAP) held in Incheon, Republic of Korea, the establishment of secretariat and the future work of the NOWPAP were discussed.

2. Limits of Environment Cooperation in Northeast Asia

Arguably the greatest problem is that a regional consensus on environmental cooperation has not been formed among Northeast Asian countries. Environmental cooperation in Northeast Asia is focusing on a strategic approach. Even though a certain framework and vision statement for environment cooperation in Northeast Asia has been adopted as part of certain programs, it is not clear to me that all the nation and especially their environment agencies, has actually built a common consensus on these principles and vision for environmental cooperation in Northeast Asia.

The second problem is that policy linkages between each program are insufficient. At present, a number of frameworks, such as TEMM, NEASPEC, NOWPAP and NEAC,

are operating separately in this region. We do not find any input and linkage mechanism within these boundaries of cooperation

Third, until now, a special measure for securing a budget and concrete projects has not been taken. Recent achievements in the framework of TEMM and NEASPEC are just initial stage.

Fourth, we do not have governing body to synthesize and enhance a synergy effect among the many cooperation activities in Northeast Asia..

3. Strategy for development of Environment Cooperation.

For the development of environmental cooperation in this region, in my perspective, the first step is to set up principles for environmental cooperation. In the process of building mutual understanding and principles, various stakeholders, such as experts, citizens, environmentalists as well as governmental officials, should jointly participate. To facilitate this, I believe that NEAC should continue and further strengthen its role as a policy forum.

The second step is to develop and strengthen each program's roles and functions. Even if TEMM focuses on the three countries of which it is presently composed, it could be organized as a supreme organization by securing other countries' involvement in future. NEASPEC would continue in its present role as high-level officials' policy dialogue to address institutional and financial issues at the inter governmental level. NEAC would serve as a policy forum to exchange national policy and information, to enhance public awareness and help facilitate cooperation between NGOs, local governments, and environment agencies.

Third, to enhance linkages between each program, it is possible that NEAC can play its role as an interim review meeting for other meeting such as TEMM and NEASPEC. And it is also recommended to hold an expert group meeting within NEAC's Framework.

4. Suggestion on the objective and roles of NEAC

A. Objective

(1) As environmental degradation accelerates throughout the region, and as it becomes clear that lasting solutions require increased involvement from local governments, the private sector and the public, the main objective of NEAC should be to promote free discussion and policy exchange, and to enable access to useful, accurate information at all levels.

(2) Through these activities, NEAC is aimed at contributing to effectively cope with domestic and regional and global environmental problems, such as air pollution, nature conservation, and water and waste management, and to ultimately lower pollution throughout North-east Asia.

B. Roles

(3) The NEAC should play several roles. Through the NEAC Mechanism the participation of various stakeholders can be enhanced. These include environmental institutions, local governments, and NGOs as well as relevant government ministries and agencies.

(4) Since it is largely a forum for maintaining an open policy dialogue, it serves as a basic foundation for other environmental programs. Its ties to other conferences and programs such as TEMM and NEASPEC should therefore be strengthened. To this end, host countries will present information and results generated through NEAC at the following TEMM and NEASPEC meetings. The host country will take measures to share NEAC's outcomes, such as publishing and reporting the presentation documents and agreed results.

(5) Considering the timing of conferences of similar programs, it is possible to promote various measures for providing TEMM and NEASPEC chances for holding interim reviews and expert group meetings in specific areas, such as transboundary air pollution, nature conservation and bio-diversity, within NEAC's framework.

C. Participating and Hosting Countries

(6) Six Northeast Asian Countries--China, D.P.R. of Korea, Japan, Mongolia, the Republic of Korea, and Russia--will join this conference as member countries.

(7) Member countries would host NEAC meetings in turns. However, in case of special circumstances the venue can be changed by the conference participants.

(8) The host country would cover the expenses of two participants from each member country.

D. Agenda and Activities

(9) It is recognized that review activities are very important to examine the progress of domestic and regional measures according to outcomes of previous meeting.

(10) The conference consists of four sessions. Each session's agenda will include various environmental issues in Northeast Asia, and would be adopted in the previous meeting. In order to provide a policy basis for other environmental programs, approval items and ongoing projects of other environmental mechanisms can be considered in the process of selecting the agenda of NEAC meetings.

(11) In collaboration with local governments and private organizations, host countries can organize special activities, such as public symposia and exhibitions.

Framework on the objective and roles of NEAC

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(Session 4)

NEAC—Achievements and Future Prospects—

Tomoko Iwaya

Office of Overseas Environmental Cooperation

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1. Introduction

Next year is the 10th anniversary of NEAC. Here at the 9th conference, it is significant for us to review NEAC's achievements in the past decade, identify its present status, and discuss its future in the next decade, among a variety of participants from national governments, local governments, international organizations and research institutes.

2. Major Regional Initiatives for Environmental Cooperation in North-East Asia

2.1. History of cooperation

Environmental degradation is not limited to a specific country, but spreads over boundaries. Therefore, regional cooperation among nations is indispensable to solve trans-boundary issues. Activated policy dialogs among countries after the end of the Cold War, have also accelerated regional environmental cooperation.

Now let me start with an overview of environmental cooperation in Asia and the Pacific, especially in Northeast Asia.

<ESCAP Ministerial Conference>

The kickoff meeting was the ESCAP Ministerial Conference on Environment and Development in Asia and the Pacific in 1985, which was held in Bangkok, Thailand. This conference has been held every five years and has contributed to environmental policy dialog at the ministerial level.

<ECO ASIA>

In 1991, the first Environment Congress for Asia and the Pacific (ECO ASIA) was held in Tokyo, Japan. In 1992, it proposed an environmental protection strategy for the Asia–Pacific region to the United Nations Conference on Environment and Development (UNCED). ECO ASIA has been held every year and attended by environment ministers of member nations and representatives of international organizations. ECO ASIA has also contributed to environmental policy dialog.

<NEAC>

In 1992, the first Northeast Asia Conference on Environmental Cooperation (NEAC) was held in Niigata Prefecture, Japan, as a forum for exchanging views and policy dialog among environmental experts. The participants of NEAC include national and local government officials, administrators of international organizations, and environmental specialists from research institutes and NGOs. NEAC succeeded the Japan – South Korea Environmental Symposium, which was formed in 1988. Thereafter China joined the symposium with the cooperation of UNEP, and the then Soviet Union and Mongolia joined as an observer status.

<NEASPEC>

In 1993, the North-East Asian Subregional Program on Environmental Cooperation (NEASPEC) was launched at the first meeting of senior officials in the region. The meetings of senior officials, which have been held every year,

have promoted the Program of NEASPEC through the endorsement of projects mainly related to air pollution issue and the preparation of the Sub-regional Center in Korea.

<NOWPAP>

In 1994, the Northwest Pacific Action Plan (NOWPAP) was adopted by four countries to follow the Northeast Pacific Regional Sea Program under UNEP's initiative, and to promote environmental cooperation for the protection of the marine and coastal environment.

<EANET>

In 1998, the Acid Deposition Monitoring Network in East Asia (EANET) joined by 10 countries, started its preparatory phase activities. The objective of this network is to carry out monitoring of acid deposition by harmonized methodology, and thus to create a common understanding of the state of acid deposition. It is scheduled to evaluate the results of its preparatory phase activities in the middle of the year 2000, and to hold a discussion toward its formal establishment.

<TEMM>

In 1999, the first Tripartite Environment Ministers Meeting (TEMM) among China, Japan and Korea was held in Seoul, South Korea. The second TEMM held at Beijing in February this year, announced the Ministers' wishes to have concrete project-style cooperation and to develop projects, in particular, of raising consciousness of environmental community, fresh water pollution and land-based marine pollution prevention and cooperation in the field of environmental industry.

The above-mentioned history does not cover all the frameworks in the region, but clearly shows that environmental cooperation in Northeast Asia has

made steady and definite progress.

2.2. Classification of Regional Initiatives and Position of NEAC

Next I would like to classify the above-mentioned regional initiatives according to their characteristics and make clear the position of the NEAC.

<Inter-governmental Frameworks>

The first category is an inter-governmental framework to consolidate regional cooperation on common environmental issues. The EANET, NEASPEC and NOWPAP correspond to this category for example.

<Regional Cooperation Projects>

The second category is a framework for creating and promoting regional cooperation projects on common environmental issues. The NEASPEC is a typical case in this category. The TEMM has showed its evolution from dialog at the first meeting into project-oriented framework at the second meeting.

<Policy dialogs>

The third category is a framework for promoting policy dialog, which contributes to sharing common understandings and to facilitating other frameworks. The ESCAP Ministerial Conference, ECO ASIA and TEMM are good cases to promote dialog at ministerial level.

<Position of NEAC>

Then the question is in what category the NEAC would be classified? The NEAC is basically an opportunity to promote policy dialog in such a way that the dialog is extended to the level of local governments, NGOs and etc as well as central government. Typically, the last NEAC meeting mainly

discussed the issues on local initiatives in regional cooperation under the participation of local governments in each country.

3. Evaluation of NEAC Achievements

Now let me step into the evaluation on the NEAC's achievements in the past decade.

<Pioneer of Policy Dialog>

First, NEAC was a pioneer of environmental policy dialog in North-East Asia. There had been no significant regional frameworks until the first NEAC was held in 1992. Therefore, NEAC was a kickoff event to provide a milestone for the formation of other frameworks in North-East Asian environment cooperation.

<Promoting Dialog among a variety of Entities>

Second, NEAC has promoted policy dialog among a variety of entities. In the past decade, NEAC has facilitated the participation of local governments, international organizations, research institutes and NGOs as well as central governments, and has provided the opportunities for discussing such appropriate agenda as "the Role of Major Groups Including Local Governments and NGOs to Assist Agenda 21" at the 4th Meeting and "Environment Conservation Initiatives of National and Local Authorities and Reflection of those Initiatives in Environmental Cooperation" at the last Meeting. It is only NEAC that has played such a role and it has contributed to sharing views and enhancing mutual understandings at various levels in North-East Asia.

<Promoting Dialog in Broad and Foresighted Issues>

Third, NEAC has promoted policy dialog in broad and foresighted

environmental issues. In the past decade, NEAC has covered the following issues, for example,

- Common Specific Issues: Prevention of Air Pollution (1992), Ground Water Preservation and Management (1998), Preserving Migratory Birds and Their Habitats (1998), Solid Waste Management and the Prevention of Illegal Trans-Boundary Movements of Wastes (1996), etc,
- Global Environmental Issues: Countries' Viewpoints and Measures on the Framework Convention on Climate Change (1995),
- Environmental Policy Methods: Market-Based Policy Measures for Environment Management (1993),
- Information Technology: Practical Use of the Internet in Environmental Cooperation (1999).

In this way, NEAC has timely planted "seeds" in its agenda setting and has produced "fruits" of communication in foresighted environmental issues.

4. Suggestions for the Future of NEAC

Lastly I would like to present two suggestions for the future of NEAC in the upcoming decade. The question is how to develop the NEAC roles in North-East Asia based on its past achievements.

<Facilitating Partnerships at Various Levels>

First, NEAC should take a role to facilitate the establishment and consolidation of the regional partnerships at such various levels as central and local governments, research institutes and NGOs, by extending activating its existing activity of dialog.

For instance, local governments have much experience in such resident-oriented measures as spatial planning and monitoring. NGOs are

engaged in such grass-root activities as afforestation and environmental education. It is significant for local governments and NGOs in North-East Asia to share common experiences and address common issues jointly. In this context, NEAC could be a catalyst for local governments and /or NGOs to take such partnerships in the region. To be more specific, NEAC may provide such side-events as workshop and symposium among local governments and/ or NGOs in the region.

<Inputting NEAC Outcomes to Other Frameworks>

Second, NEAC should positively input its outcomes into other frameworks' activities in North-East Asia. As I mentioned before, NEAC has so far been successful in its expert dialog under appropriate agenda setting. It is, therefore, high time to utilize outcomes of dialog to more concrete projects or more binding agreements.

One way is for NEAC itself to jump up to another type of framework like project-oriented one. It would, however, cause nothing but overlapping frameworks. Therefore, it is more efficient and realistic way for NEAC to be linked with other project-oriented frameworks like NEASPEC. Here I would like to focus on NEASPEC as a linking target.

Then the next question is how the linkage between NEAC and NEASPEC could be materialized and how the input from NEAC to NEASPEC could be institutionalized. There seem to be several options for the linkage. Here I would like to show two examples of options for discussion.

The first option is that NEAC would be identified as some expert meeting in the framework of NEASPEC. This is an example of direct linkage in the sense that NEAC would be merged in NEASPEC.

The second option is that NEAC would accompany a back-to-back

meeting of NEASPEC. This is a case of indirect linkage because they would keep their organizational independence.

These options need to be carefully examined through comprehensive consideration on the effectiveness of input, the independence of framework, the consistency of membership, etc.

I have just outlined NEAC achievements and made a rough sketch on the future of NEAC so far. I do hope for further analysis and discussion on this important issue in order to make sure the development of NEAC in the upcoming decade. Thanks a lot for your listening.

HISTORY of COOPERATION



1985 ***ESCAP Ministerial Conference***

1991 ***ECO ASIA***

"Environmental Congress for Asia and the Pacific"

1992 ***NEAC***

"Northeast Asian Conference on Environmental Cooperation"

1993 ***NEASPEC***

"North-East Asian Subregional Program of Environmental Cooperation"

1994 ***NOWPAP***

"Action Plan for the Protection, Management, and Development of Marine and Coastal Environment of the Northwest Pacific Region"

1998 ***EANET***

Preparatory phase of
"Acid Deposition Monitoring Network in East Asia"

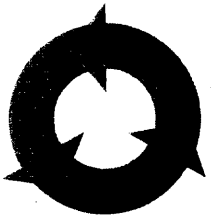
1999 ***TEMM***

"Tripartite Environment Ministers Meeting"



CLASSIFICATION based on Major Activities of Regional Initiatives

Inter-governmental Frameworks	NOWPAP	NEASPEC
Regional Cooperation Projects	NEASPEC	TEMM
Policy Dialogs	NEAC	TEMM



EVALUATION of NEAC Achievements

- *Pioneer of Policy Dialog*
- *Promoting Dialogs in broad and foresighted issues*



- *Promoting Dialogs among a variety of Entities*

the Future of NEAC



Facilitating Partnerships at Various Levels

★Central and Local Governments,
★Research Institutes,
★International Organizations,
★NGOs

Inputting NEAC Outcomes to Other Frameworks

Linkage with NEASPEC

1 Direct Linkage

~ NEAC as an expert meeting of NEASPEC ~

2 Indirect Linkage

~ NEAC accompanying a back-to-back meeting of NEASPEC ~

(Session 4)

Review and Future of Northeast Asian Environmental Cooperation

The Ninth Northeast Asian Conference on Environmental Cooperation
26-28 July, 2000 / Ulaanbaatar, Mongolia
Presented by Eldev- Ochiryn ERDENEBAT
Senior officer, Department of International Cooperation ,
Ministry of Nature and Environment

1. Introduction

The Northeast Asian Conference on Environmental Co-operation (NEAC) has been held 8 times and at last meeting in Maizuru city, Japan it was suggested that at the next meeting in Ulaanbaatar, Mongolia participating countries need to review NEAC activities and consider future direction.

II. Overview of environmental cooperation in Northeast Asia.

To achieve the goal of sustainable development in the 21st century it is necessary to strengthen the regional and sub-regional cooperation by reinforcing the existing environmental cooperation network, and implementing of new joint activities in the field of environment protection.
Table 1 shows Institutional development for Northeast Asian Environmental cooperation.

Table 1

Institutional development for Northeast Asian Environmental Cooperation

Intergovernmental	Interagency	Non-governmental
Senior officials Meeting on Environmental Cooperation in Northeast Asia - First Meeting: Seoul,	Northeast Asian Conference on Environmental Co-operation -First Meeting: Niigata,	- Seoul Symposium: UNCED and Prospect on the Environmental regime in the 21st Century, Seoul, September, 1992

February 1993 - Second Meeting: Beijing, November 1994 - Third Meeting: Ulaanbaatar, September, 1996 - Fourth Meeting: Moscow, January 1998 - Fifth Meeting: Kobe, February 1999	Japan, October, 1992 -Second Meeting: Seoul, Korea, September, 1993 -Third Meeting: Hyogo, Japan, October, 1994 -Fourth Meeting: Pusan, Korea, September, 1995 -Fifth Meeting: Beijing, China, 1996 - Sixth Meeting: Niigata, Japan, October, 1997 -Seventh Meeting: Cheju, Korea, October, 1998 -Eighth Meeting: Maizuru, Japan, October, 1999 -Ninth Meeting: Ulaanbaatar, Mongolia, July, 2000	- Symposium on Northeast Asia Environmental Cooperation, Irkutsk, August 1993 Northeast Asia and North Pacific Environmental Forum - Fairbanks, Alaska, USA, 1994 - Kushiro, Japan, 1995 Khabarovsk, Russia,1997
Northwest Pacific Action Programme (NOWPAP) -First Experts Meeting: Vladivostok, October, 1991 -Second Experts Meeting: Beijing, October, 1992 -Third Experts Meeting: Bangkok, November, 1993 -First Intergovernmental Meeting: Seoul, September, 1994 Second Intergovernmental Meeting: Tokyo, November, 1996 Third Intergovernmental Meeting: Vladivostok, April, 1998 Forth Intergovernmental Meeting: Beijing, April, 1999	Environmental Congress for Asia and the Pacific (Eco-Asia)	
East Asia Acid Deposition Monitoring Network -Yokohama, March, 1998		

From here we can see multilateral environmental cooperation which has been created since 1990s and have served as a forum for environmental cooperation. Besides this there are several bilateral cooperation:

China – Korea Agreement on Environmental Cooperation

Korea - Japan Agreement on Cooperation in the field of Environmental Protection

Japan – China Agreement on Cooperation in the field of Environmental Protection

Korea – Russian Agreement on Environmental Cooperation

Mongolia - China Agreement on Environmental Cooperation

Mongolia - Russia Agreement on Environmental Cooperation

Russia – Japan Agreement on Environmental Cooperation

III. Regarding the NEAC

Within the cooperative framework there have been organized international symposiums and conferences on environmental issues in this region. Among them the Northeast Asian Conference on Environmental cooperation plays an important role for exchanging information and experiences on environmental policies and management between the countries in the region. Since it launched in 1992, the Conference has been organized annually, and each time hosted by different country of the region. This year for the first time Mongolia is hosting the 9th Northeast Asian Conference on Environmental Cooperation with kind financial assistance from Government of Japan.

Table 2 shows history of NEAC meeting, subjects that has been discussed and major outcomes.

One of major achievements of NEAC is that it has facilitated involvement of central and local government, research institutes, NGO's, private sector and international organizations to be together and consider environment problem of the region. It also gives chance to be timely informed of each other's latest development on environmental policies.

IV. Future of NEAC

Some suggestions for the future of NEAC.

- We would like to keep current policy and function of NEAC as it is.

- There is a need to identify NEAC's priority areas. For example in case of Mongolia we have pressing problem such as air pollution in the big cities, desertification.

- NEAC gives chance to the participating countries meet annually and freely exchange opinions, get latest information about environmental activities which is very important. It should be further strengthened.

- As I mentioned earlier there is a lot of activities going on in this region, such as the NEASPEC, Tumen River Development Programme, Acid Deposition Monitoring Network in East Asia, Environmental Congress for Asia and the Pacific (ECOASIA) etc. and there is no linkage between them, therefore it's good if NEAC can consider it.

- In the first meeting in Niigata, Japan, it was generally agreed that the Northeast Asian Conference on Environmental Cooperation should be held regularly, in the principle on an annual basis, preferably hosted each time by different countries in the region. Past activities showed that country like Mongolia due to financial situation can't organize such kind of meeting and bear expenses. Today's Conference is a good example of collaboration.

- At the last meeting in Maizury, Japan there was suggestion to use Internet during the preparatory work to the NEAC-9. It was successfully implemented. We had very good connection with Japan and all documents were received via e-mail. It should be strengthened further.

Table 1. Northeast Asian Conference on Environmental Cooperation

Year of Initiating and place	Participating countries	Subjects discussed	Outcome
First meeting: Niigata, Japan, October, 1992	China, Republic of Korea, Japan, Mongolia, Russia, United nations bodies: UNEP, UNDP, ESCAP	- Air pollution -Water pollution -Waste management -Nature conservation	- Set up an information sharing and exchange network, to conduct joint surveys and monitoring activities including on acid rain, coastal and inland water pollution and biodiversity, and to carry out collaborative research and training program in some of the specific subject areas.
Second meeting: Seoul, Korea, September 1993	China, Republic of Korea, Japan, Mongolia, Russia, United nations bodies: UNEP, UNDP, ESCAP, The United Nations University (UNU)	-Market-based policy measures for environmental management -Pollution measuring methods including criteria and units, and its inter-calibration -Exploration of the joint research topic and its implementation -Classification of hazardous wastes -Experiences and roles of the local government in the NEA environmental cooperation	Participants expressed the need for an expansion of various exchanges of manpower, information, experiences, and technology in the environmental area, in order to enhance the mutual understanding among the countries that will ultimately contribute to the improvement of the regional environment.
Third meeting: Hyogo, Japan, September, 1994	China, Republic of Korea, Japan, Mongolia, Russia, United nations bodies: ESCAP	-Sustainable cities -Conservation of biological diversity -Strengthening cooperation	Discussions covered the preparation and implementation of environmental protection policies in each country and the promotion of sustainable development in the region. The Conference acknowledged the need for an integrated regional strategy as well as national strategies for achieving sustainable development. Two cooperative activities were proposed at this conference: - The preparation of a report on Urban Sustaiability for the Northeast Asian region, in close cooperation with international agencies, such as the UN - The creation of a directory of contacts in central governments, institutes and relevant agencies

			who are working in the field of environment in this region.
Forth meeting: Pusan, Korea, September, 1995	China, Republic of Korea, Japan, Mongolia, Russia, United nations bodies: UNEP, UNDP, ESCAP	-Roles of local governments and NGOs -Cooperative measures on the trans-boundary movement of pollutant -Viewpoint & measures on the framework convention on climate change -Experience and measures on toxic chemicals management -Urban environmental problems	- Participants concluded that concrete measures for regional environmental cooperation on issues of common interest were necessary. Specifically, participants acknowledged the merits of formulation an Action Plan of the conference which would entail the mutual exchange of annual reports, environmental laws, statistics, and so on.
Firth meeting: Beijing, China, October, 1996	China, Republic of Korea, Japan, Mongolia, Russia, United nations bodies: UNDP, WHO, WB	-The recent development of environmental policies, legislation and management in each participating country in the context of pursuing sustainable development -Solid waste management and the prevention of illegal trans-boundary movement of wastes -Cleaner production technologies and integrated pollution control -Global environmental issues: climate change, bio-diversity	- Korean delegation proposed to establish Northeast Asian Climate research Center - Russian delegation proposed to develop possibilities for the creation of regional programmes and projects on the items discussed.
Sixth meeting: Niigata, Japan, October, 1997	China, Republic of Korea, Japan, Mongolia, United nations bodies: UNEP, UNDP, ESCAP	-Acid rain -Wide range water pollution control -Biodiversity conservation -Cleaner production	- Among the activities to promote regional cooperation, two programs were recognized as effective efforts in harmonizing existing activities in the region: Acid deposition monitoring network in East Asia, advocated by Japan, and Expert Meeting for Long-range Transboundary Air pollutants in Northeast Asia, organized by the Republic of Korea.
Seventh meeting: Cheju, Korea, 1998		-Coordination for preserving migratory birds and their habitats -Ground water preservation and management -The development and application of sustainable development indicators -Hazardous air pollutant management	At the session on Cooperation for the Preservation of migratory Birds and Their Habitats, special mention was made of the recent successes in transboundary regional protection and the need for similar projects in the future. The participating countries recognized the importance of Korean proposals for fostering international cooperation for the conservation of migratory birds, including the development of a regional agreement on the conservation of migratory

			birds and their habitats and the establishment of a committee for this purpose.
Eighth meeting: Maizuru, Japan, 1999		-Environmental conservation administration measures by local authorities -Environmental cooperation initiatives by local authorities -Aimed at addressing climate change problems: domestic policy measures and steps of environmental administration bodies themselves as consumer and executor -Practical use of internet in environmental cooperation	The participants agreed to discuss on the next meeting in Ulaanbaatar, "Review and future of Northeast Asian Environmental cooperation"

Ministry of Protection of the Environment and Natural Resources Russian Federation

All-Russian Research Institute for Nature Protection

9th Northeast Asian Conference on Environmental Cooperation

July 26-28, 2000
Ulaanbaatar, Mongolia

Review and Future of the Northeast Asian Environmental Cooperation

I would like to take the occasion to repeat principal position, which was pointed in the keynote speech that since the start and till present days the Northeast Asian Conference on Environmental Conference played very considerable role for strengthening our efforts in the field of environment protection and promoting sustainable development in the region.

The beginning of new millenium and the threshold of the 10th Conference give a good inspiration to consider our past and make priorities for the future.

To summarize the principal directions of our work, first of all, I need to stress the importance of exchanging the information. The presented materials, which contained the experience of different countries, help to find out cases of successful practice and to build a potential in future. To bear in mind that one never knows where the most interesting solution may arise, I would like to say, that the interesting and useful solutions come in the most cases during meeting and conference between people form different points of views, different countries and different traditions.

Also the idea of the Conference of changing place of meeting seems to be very fruitful. It serves as a good basis for better understanding and gives a good lesson of local practice and methods for environmental protection. But I need to point that still Russian territory was neglected and we need to improve it in the nearest future.

It is well known that the most environmental problems go far beyond national boundaries and become international in nature. The international efforts and initiatives in the field of environmental protection very often are the crucial

points for achievement results. Pooling of financial and technical resources among Northeast Asia countries is a quite effective way in seeking practical methods to common environmental problems.

The necessity of cooperation in the way of building sustainability in the region was stressed in the Conference almost in every considered issue. Among the main trends there are: exchange of information in different field of environmental protection, including environmental legislation, creating clean production, air pollution control, water pollution control and water supply, air pollutant management and biodiversity conservation and so on. The different ideas and practical ways of cooperation were presented in every topic. Also we held some special session, concentrated on the cooperation initiatives, as example, environmental cooperation initiatives of local authorities, cooperation in protection of migratory bird species and their habitats in Northern Asia etc.

In spite that the plenty of proposals and methods for cooperation were discussed in the Conference, there were not so many of them realized in practice. Several of the successful examples of cooperation belong to the field of territorial protection. Now the main worldwide using principle for territorial conservation is the development of the network of protected areas. This is a one of the unique way to conserve the species, which need a huge territory for survival, to conserve migrating species and to save diversity of widely dispersed but rare species.

Taking it into account, Russia is developing the network of the territory for biodiversity protection in the Northearst Asia. Today some of these areas are included to the Ramsar list and also to the Ramsar network for migrating species and special program under Wetlands International in Asia is in progress. It means that international cooperation in the field of migrating species protection begins. But, the examples of successful project in the field of network building are still not enough for supporting sustainable ecosystems in the region and for providing the protection of rare and endangered species.

We are just mentioned in the session "Extension of Network of the Special Protected Areas and Capacity Building" about several transboundary protected area projects. They are could serve as a model for development another projects. Taking into account, that in-situ conservation is the most sufficient way for protection of rare and endangered species, we would like again to outline the very strong necessity of international cooperation for protection the Siberian tiger, Fareastern leopard and Snow leopard. Especially, urgent joint measures in the field of establishing the protected area still are needed to protect the Fareastern leopard.

A new promising project for biodiversity conservation in transboundary area is an establishment of international zapovednik "Dauriya" including participation of three neighboring countries: China, Mongolia and Russia. It helps to conserve rare and endangered species at this territory and strengthening efforts to support sustainable ecosystem.

Apart from global problems concerning the nature conservation in this region there are many problems of local significant, which must be solved in the framework of bilateral agreements between neighboring countries on the base of common benefits.

For example the nature conservation in the Primorsky Region and Khabarovsky Kray in Russia is impossible without active participation of China. We have a good examples of our cooperation with China also on use of Russian technologies in southern provinces of China.

The following directions are determined as priorities in the field of China-Russia cooperation: organisation, research and maintenance of strictly protected natural territories, being of joint interest for China and Russia; development and realisation of the joint programme on the protection, rehabilitation and introduction into nature of the Przevalski Horse; the increase of effectiveness of use of the resources of energy by exchange of experience and technologies; monitoring and regulation of the pollution of surface water, including transboundary water streams and international lakes based on watershed approach; biotesting and bioindicative investigations of anthropogenous environmental impact assessment; application of space means for investigation and solution of regional ecological problems; control of radioactive pollution; technical cooperation in field of assessment of influences on environment, ecological expertises and development of normatives; ecological-informative provision of projects in nature protection. Some of them have received a successful implementation in practice, the other is elaborating, but several fields still have no realizations.

We are hope also to fruitful results, which would be gained within the framework of cooperation according to the general agreement between Nanjing Institute of Environmental Sciences of SEPA (China) and All-Russian Research Institute of Nature Protection (Russia). This agreement implies widely exchanged views on nature conservation and biodiversity, pesticide environmental impact assessment and management, agricultural waste disposal and comprehensive utilization, eco-monitoring, library exchange, waste treatment techniques; trial waste treatment techniques; strengthen exchange and visit of scholars between two institutes.

We suppose that the increasing of cooperation between Northeast Asia countries serve our interests. Stronger and closer cooperation in the field of environmental protection will support a more sustainable growth of the region.

NEAC have contributed a lot to the promotion of environmental cooperation in the region. In the Conferences the list of priorities in different fields of environmental protection was prepared. Some of Conference recommendations were successfully implemented in practice. But in some fields there are not so many examples of collaboration as would be appropriate. Therefore we need to elaborate some measures for reinforcement our efforts and way for making our proposals more efficient. The one of possible way for providing effectiveness in our work to give attention for the topics which were studied at previous Conference and make special review for their development and implementation.

Other principal component for strengthening of our efforts is more actively highlight opportunities for partnership with the donor organizations. Unfortunately, the modern practical works of international sponsor organizations are not coordinated well enough and their activities come by parallel lines. It is very useful start to coordinate the works of these bodies as in national as in international levels to stop spending means in parallel works.

In resume I would like to say that it is clear that the Conference gives an impetus for initiating the joint environmental projects on local as well as on regional levels. In present time the Conference has a very good prospect to enlarge it's effects in future.

Source: http://www.theodora.com/maps

Whither NEAC ?

An Overview of the Past, Present and Future of Environmental Cooperation in Northeast Asia

Presented at:
The 9th Northeast Asian Conference on Environmental Cooperation (NEAC)
26-28 July, 2000, Ulaanbaatar, Mongolia

Kazu KATO
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and

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Research Associate, Environmental Governance Project, IGES

A Historical Perspective

- Globalization of environmental problems, perceptions and policy responses

  as evidenced by the 1972 Stockholm Conference (UNCHE) . UNEP created within the UN system

- The need for regional cooperation increasingly recognized, even prior to the Stockholm Conference, to address issues of common concern, particularly concerning the conservation and management of internationally shared natural resources

  e. g. international waters and semi-enclosed seas
  fisheries
  migratory birds and animals

- Regional approaches promoted by UNEP

  e. g. Establishment of Regional Offices within UNEP
  Institutional support to UN Regional Economic Commissions, including ESCAP
  Regional Seas Programme

- Paradigm shift from "environmental protection" to "sustainable development"

  World Conservation Strategy (1980)
  WCED (the Brundtland Commission) report (1987)

- The Rio Earth Summit (UNCED 1992)

  Agenda 21 calls for global partnership and enhanced cooperation at regional and subregional levels.

Regional Environmental Programmes in the Asia-Pacific Region

I. The Region As a Whole: the RAP for ESSD

- The 1st Ministerial Conference of ESCAP on Environment and Development held in 1985, releases the 1st State of the Environment report for Asia and the Pacific.
- The 2nd Ministerial Conference adopts a "Regional Strategy for ESSD."
- Regional Action Programme 1996-2000 adopted by the 3rd Ministerial Conference.
- The 4th MCED (to be held in Kitakyushu, Japan in early September 2000) is expected to adopt a revised RAP, 2001-2005, emphasizing its ownership by member countries while calling for further regional cooperation and subregional delivery.

II. Subregional Environmental Programmes

Southeast Asia

- ASEAN Sub-regional Environmental Programme (ASEP I~III, 1977~1992) and subsequent Strategic Plans of Action on Environment. Coordinated by the ASEAN Senior Officials on the Environment (ASOEN) and at various levels of government, serviced by the ASEAN secretariat.
- ASEAN Agreement on the Conservation of Nature and Natural Resources (1985, has not entered into force)
- Cooperation Plan on Transfrontier Pollution (1995), and Regional Haze Action Plan (1997)
- East Asian Sea Action Plan (1981~ , revised in 1994)
- The Mekong River Commission (MRC) revived and the Agreement on Cooperation for Sustainable Development of the Mekong River Basin signed in 1996

The South Pacific

- South Pacific Regional Environmental Programme (SPREP) and the South Pacific Action Plan on Marine Environment adopted in 1982
- Noumea Convention for the Conservation of Natural Resources and the Environment (1986)
- SPREP as an international organization established in 1992 (came into being in 1995)
- Revised Action Plans, and a new Strategy document being prepared for adoption later this year (2000)

South Asia

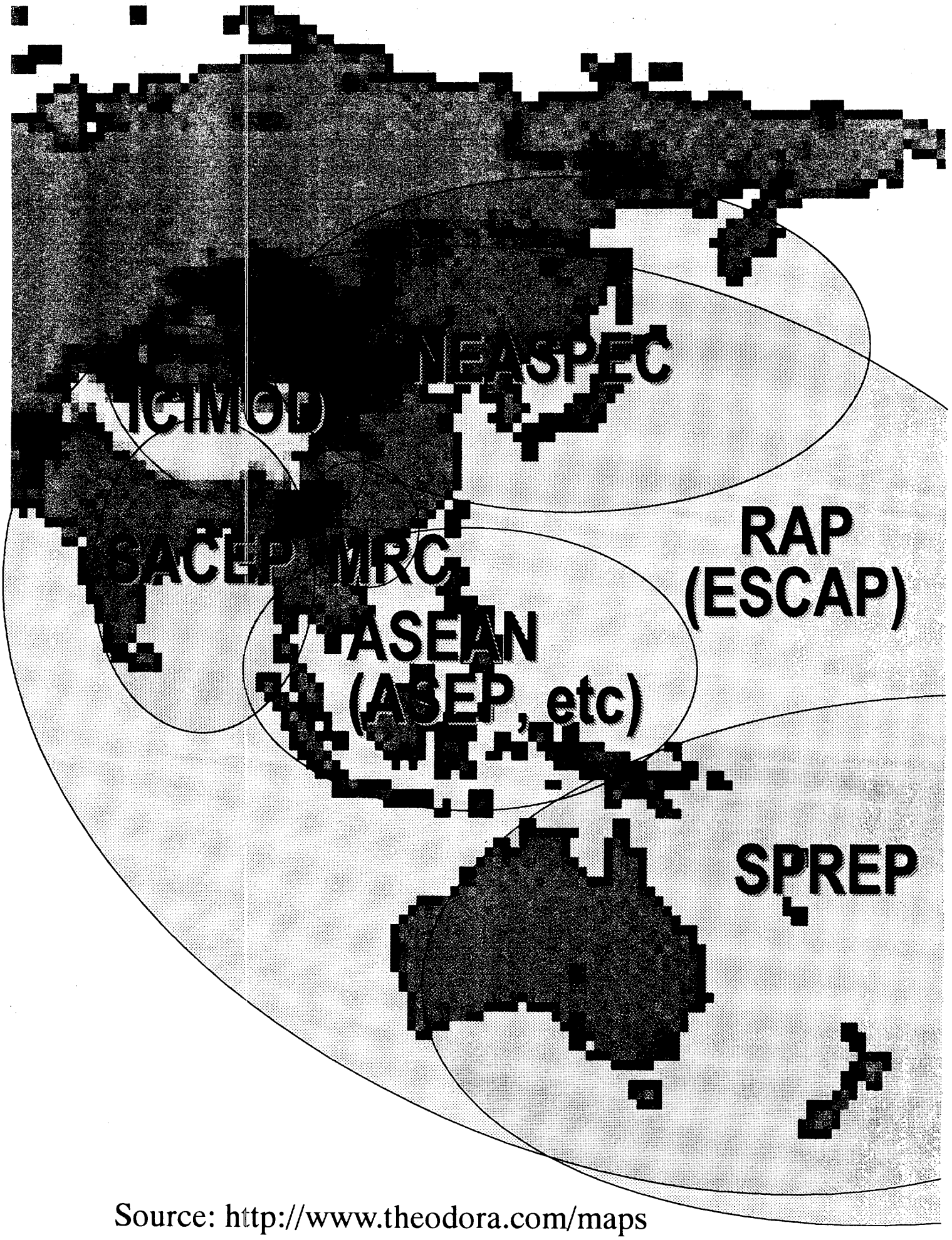
- South Asia Co-operative Environment Programme (SACEP) established in 1981
- South Asian Seas Action Plan (1995)
- Male Declaration on Prevention and Control of Air Pollution and its Likely Transboundary Effects (1998)

Hindu Kush/Himalayas

- International Center for Integrated Mountain Development (ICIMOD) established in 1983
- Initial work programmes, followed by core programmes and regional collaborative programmes

Central Asia

- International Fund for the Aral Sea (IFAS)



Source: http://www.theodora.com/maps

Environmental Cooperation in Northeast Asia

- The burgeoning (almost bursting) emergence of multilateral as well as bilateral programmes and forums, in the post-UNCED period

- At different levels of international and national governance, with a multiple layer of actors and participants

- With different geographical and thematic /issue coverage

- With different institutional arrangements (if at all)

I. Cooperation At the Subregional Level

A. Intergovernmental Programmes and Forums

Northeast Asian Conference on Environmental Cooperation (NEAC)

- An outgrowth of the Japan-ROK Environmental Symposium held since 1988, NEAC was first organized and hosted by Japan in 1992, and continues to be held annually in different participating countries, largely funded by the Environment Agency of Japan (EAJ).
- Has turned into a forum for exchange of information and policy dialogue on a wide range of topics among environmental authorities of national and local governments and other experts, often held in conjunction with a symposium open to the public.

Northeast Asian Subregional Programme on Environmental Cooperation (NEASPEC)

- The establishment of NEASPEC agreed at the 1st Meeting of Senior Officials (SOM) on Environmental Cooperation in Northeast Asia held in Seoul, ROK in 1993. Since then, holding highly formal meetings through diplomatic channels every one or two years, serviced by the ESCAP secretariat.
- The framework NEASPEC adopted at the 3rd SOM, held in 1996 in Mongolia
- 3 priority areas identified (energy and air pollution, ecosystem management, and capacity building), and a number of projects carried out with funding from ADB.
- Moving toward a more permanent structure with the establishment of a core fund, strongly promoted by ROK.

Action Plan for the Protection, Management and Development of the Marine and Coastal Environment of the Northwest Pacific Region (NOWPAP)

- The latest addition (1994) to the Regional Seas Programme of UNEP, and still in the formative stages of institutional structure, specific action plans and projects.

Tripartite Environment Ministers Meeting (TEMM)

- Building on existing bilateral agreements for environmental cooperation between China, ROK and Japan, elevated in 1999 to a trilateral ministerial meeting on a regular (annual) basis, with possibilities to carry out agreed cooperative projects.
- Priority areas: a) raising awareness and the sense of "environmental community" among the 3 countries; b) global environmental issues such as biodiversity and climate change; c) air pollution and marine environment; d)environmental technology, industry, and research

Tumen River Area Development Programme (TRADP)

- Basically a regional economic development programme for the Tumen River among the 5 riparian states of China, North and South Korea, Mongolia, and Russia) promoted by UNDP.

- A Strategic Action Programme (SAP) and the Tumen Programme Environmental Action Plan developed to deal with international water pollution and loss of biodiversity, with a $ 5 million funding from GEF over two years in 2000.

B. Cooperative Network of Local Governments

Association of Northeast Asia Regional Governments

- Established in 1996, with 34 local governments from 5 countries of the region participating, with a coordinating body and rotating secretariat provided by the host local government.
- Subcommittee on Environment established in 1998

C. NGO Networks and Forums

North Asia and North Pacific Environmental Partnership (NAPEP, formerly known as NEANPEF)

Atmosphere Action Network East Asia (AANEA)

And many others working on single issues, especially on migratory birds and wetlands

II. Multilateral Cooperation Covering East Asia/ Asia-Pacific Region

A. Intergovernmental

Acid Deposition Monitoring Network in East Asia (EANET)

- With preparatory work initiated by EAJ in 1993, the pilot phase was started in 1998, and is expected to go into full operation at the end of 2000. So far, largely funded and secretariat services provided by Japan, but some form of cost-sharing is being sought.

Environment Congress for Asia and the Pacific (ECO ASIA)

- An informal forum for exchange of information and policy dialogue among environmental ministers of the Asia-Pacific region initiated by EAJ in 1991, meeting on a yearly basis, funded and serviced by EAJ.
- Some projects are being carried out under its authority:
  e. g. ECO ASIA Long-term Perspective Project (LTPP)
  ECO ASIA Information Network (ECO ASIA Net)

Asia-Pacific Regional Seminar on Climate Change

- A regional forum for exchange of information and views related to climate change initiated EAJ in 1991, being held every year in various parts of the region, has now become institutionalized in the UNFCCC/Kyoto Protocol process, with the participation of many relevant international organizations, including the UNFCCC secretariat and GEF. But continues to be funded mainly by JEA.

Asia-Pacific Economic Cooperation (APEC)

- Though mainly a policy forum for economic cooperation established in 1989, growing importance is attached to dealing with environmental issues:

  e. g. The 1st APEC Environmental Ministerial Meeting held in 1994 issued an "APEC Environmental Vision" Statement.
  A three-pronged environmental work programme:
  1) integration of environment and development;
  2) sustainable cities, clean technologies, and the marine environment; and 3) long-term focus on food, energy, environment, economic growth, and population.

Asia-Pacific Network for Global Change Research (APN)

- An intergovernmental network to promote research on long-term changes in the earth's climate, ocean and terrestrial systems, established in 1995, with its headquarters in Kobe, Japan

B. Intergovernmental, with NGO Support

Asia-Pacific Migratory Waterbird Protection Strategy

- Formulated in 1994 at the 7th Meeting of the Ramsar Convention CCP, leading to the establishment of:

  e. g. Northeast Asian Crane Site Network Center (1997)
  East Asian Australasian Shorebird Network Center (1997)

C. NGO Initiatives

Asia-Pacific NGOs Environmental Conference (APNEC)

- First held in Bangkok, Thailand in 1991, and has since met every one or two years, with participation of NGOs and scholars from countries of the region. Promoted and financial arrangements facilitated mainly by the Japan Environment Council (JEC), has published its first NGO White Paper on Environment in Asia in 1998 (in Japanese) and in 1999 (in English)

There are many others predating UNCED, such as:

Asian NGO Coalition for Agrarian Reform and Rural Development (ANGOC)

Asia Pacific People's Environment Network (APPEN)

Environmental Cooperation in Northeast Asia

	IG or Non-G	Geographic coverage	Thematic coverage	Inst'nal arr'ts/ Secretariat	Funding
NEAC	IG	NEA	C	Host country	EAJ & host countries
NEASPEC	IG	NEA	C (3 priority areas)	SOM/ ESCAP	ADB, ESCAP as necessary
NOWPAP	IG	NEA	Marine environment	UNEP	Countries & UN system
TEMM	IG	NEA (China, ROK, Japan)	C (4 priority areas)	MOEs	3 Gov'ts
TRADP	IG	NEA	pollution, biodiversity	UNDP	UNDP, GEF and other donors
Ass'n of NEA Reg. Gov'ts	Local gov'ts	NEA	C	Rotating	Local gov'ts
NAPEP	Non-G	NEA + North Pacific	C	Exec. com'ttee/ IGES	External sources
AANEA	Non-G	NEA	Atmosphere	ROK NGOs	External sources

* IG: intergovernmental (includes inter-ministerial/agency level)
* Non-G: non-governmental
*C (thematic coverage): comprehensive

	IG/ Non-G	Geographic coverage	Thematic coverage	Inst'nal arr'ts/ Secretariat	Funding
RAP	IG	AP	C	ESCAP	Countries & UN system
ECO ASIA	IG	AP	C	EAJ	EAJ
EANET	IG	EA	Acid deposition	EAJ (interim)	EAJ (interim)
Reg. Seminar on CC	IG	AP	Climate change	EAJ	EAJ/ UNFCCC etc
APEC	IG	AP & N&S America	C	APEC Sec.	Self
APN	IG	AP	C (global)	GOJ/ Hyogo	GOJ/ Hyogo
Migratory Waterbird Strategy	IG/ Non-G	AP	Migratory waterbirds	Ramsar Convention sec.	Self
(e.g.) NEA Crane Network	IG/ Non-G	NEA	Cranes	Network	Self/ External sources
APNEC	Non-G	AP	C	ROK/ Japan	JEC/ External sources

* IG: intergovernmental (includes inter-ministerial/agency level)
* Non-G: non-governmental
*C (thematic coverage): comprehensive

Major Features of Environmental Cooperation in Northeast Asia

- Compared to other subregions, the relatively recent (post-UNCED) emergence of a multitude of subregional environmental programmes, forums and bilateral agreements

- Some of these appear to be comprehensive in their scope of activities or issues to be dealt with (NEAC, NEASPEC, TEMM, NAPEP, ECO ASIA, etc.), or are at least intended to be so, while some focus on a single issue (EANET, Crane Networks).

- Some multilateral initiatives target the subregion of Northeast Asia, while some others target the whole region of East Asia or, more broadly, Asia and the Pacific.

- The initiatives were established through different channels. There has been little coordination among them, and there is considerable overlap and redundancy.

- Some do not have clear, long-term goals.

- Many do not have a solid institutional structure and secure source of funding, except for those provided largely by Japan.

- Priority areas identified include air pollution (acid rain), inland and coastal water pollution, loss of biodiversity and deforestation.
- The status of participating countries differs from one initiative to another, depending on the international membership of the host country/organization.

- The assistance and involvement of international organizations such as UN/ESCAP, UNEP, UNDP, and ADB have been crucial in facilitating such initiatives.

Prospects for the Future

- Difficulties remain, especially in respect of the complex geopolitics of the subregion and the predominance of Japan as the single largest source of bilateral financial/technical assistance.

- But there are hopeful signs as well. South Korea's economy has quickly recovered from the "IMF shock", and coupled with the recent détente between North and South (a flurry of new diplomatic moves in the region surrounding North Korea), the ROK is playing an increasingly active leadership role in promoting multilateral environmental cooperation.

- Let a hundred flowers bloom? Definitely "Yes," especially in the early formative stages of environmental cooperation in Northeast Asia.

- However, there is clearly a need now to establish a systematic relationship among all the initiatives that will create synergy for strengthening cooperation among the various programmes and forums, including NEASPEC, NEAC, TEMM and NAPEP, by defining the role of each mechanism for environmental cooperation.

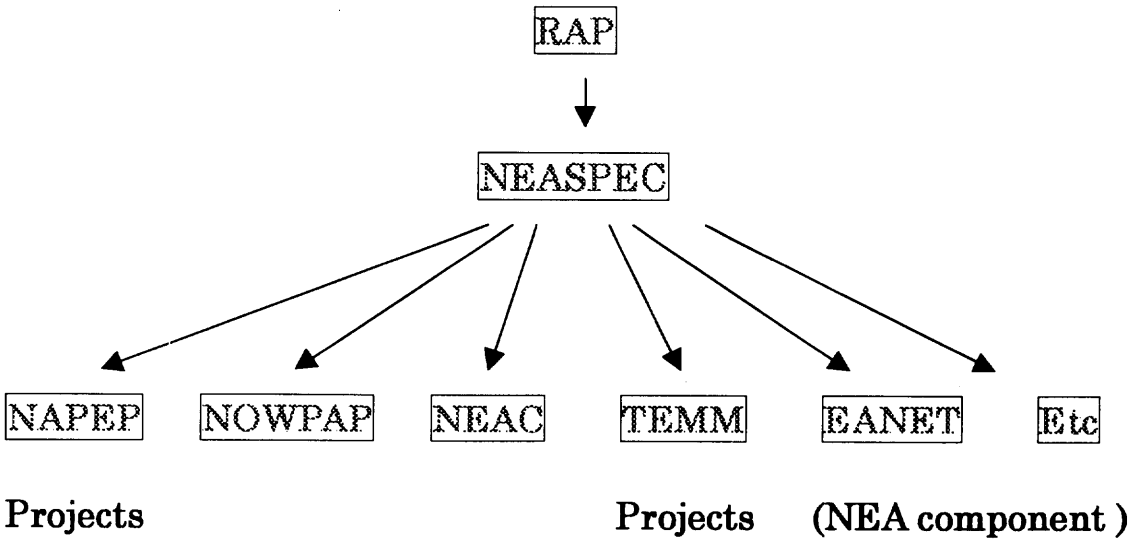
Conceptually, there are two options to put this into effect:

Option A: Hierarchical Model

- NEASPEC to provide the overall framework for environmental cooperation in Northeast Asia as an official intergovernmental programme, itself within the framework of RAP 2001-2005 and beyond. All other existing programmes, projects, and forums would become a component (or a medium for implementing a part) of NEASPEC.

- NEASPEC would be designed to serve as a truly comprehensive programme of action, clearly setting out its objectives, goals and strategies, identifying priority areas and projects, providing for collaboration and partnerships with the private sector businesses, NGOs and scientific/research communities, and supported by an institutional structure built on a solid financial basis.

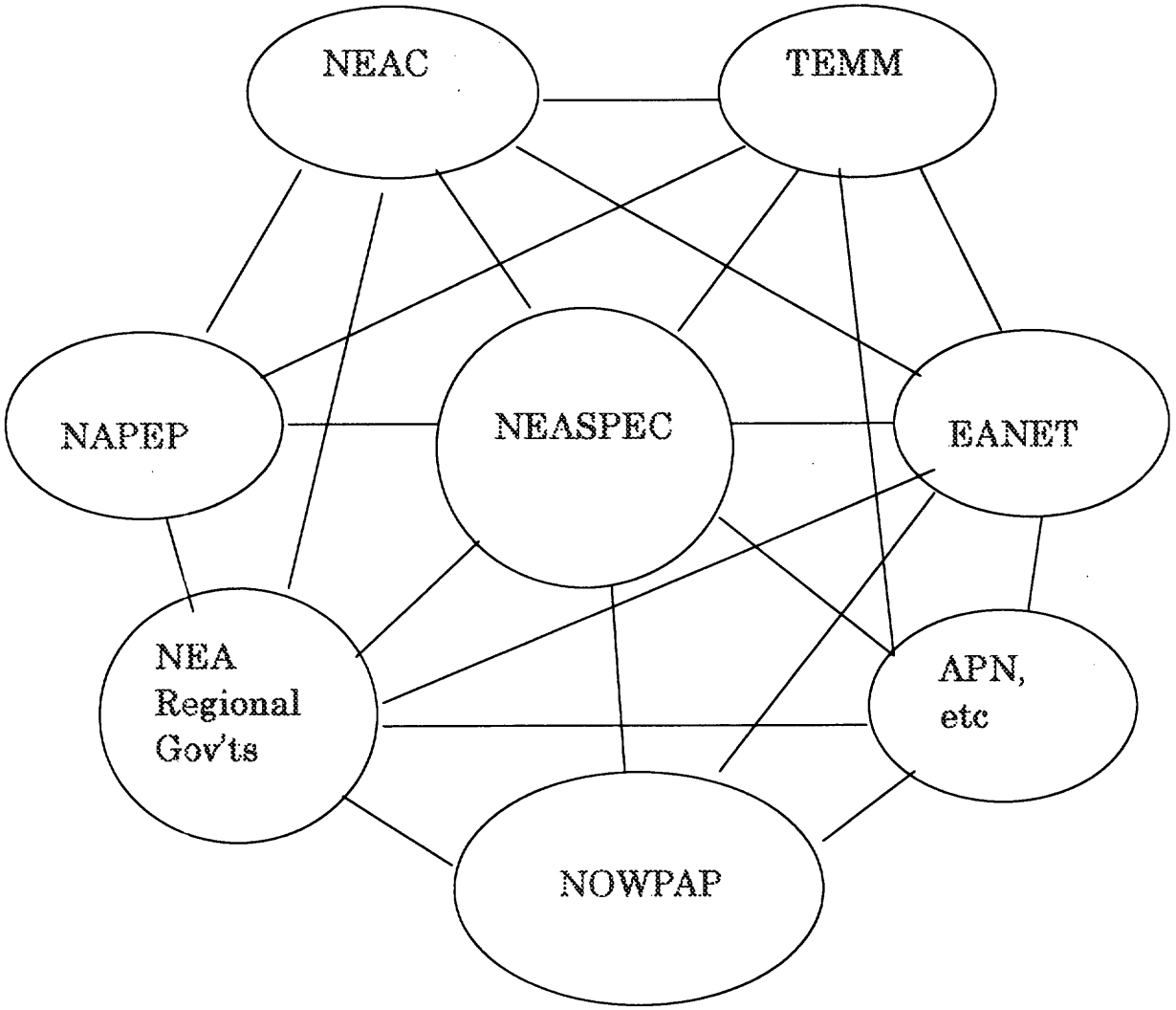
Option A: Hierarchical Model



Option B: Horizontal/Multi-layer Linkage Model

- **With NEASPEC at the hub of a wheel, linkages with other programmes and forums would be provided by means of, for example, joint planning and implementation of projects, holding joint or back-to-back meetings and workshops, or by linking each other on the Internet.**

Option B: Horizontal Linkage Model



N.B. : The two models are not mutually exclusive, and in reality, elements of both will have to be utilized, as exemplified in the "modular multilateralism" of the Baltic Sea region (See attached paper by Wakana Takahashi, p.13-15.)

Alternatively, since Option B is closer to the present state of affairs, it could be adopted in the near term, in transition in the longer term to Option A.

What is the Role of NEAC?

- NEAC was started primarily as a forum for exchange of information and policy dialogue among environmental ministries/agencies of participating countries, but over the years has developed into an open and flexible channel of communication and discussion among environmental authorities of both national and local governments as well as experts from scientific and NGO communities.

- The range of topics covered by NEAC is very broad and comprehensive, often taking up issues which are only now emerging on the horizon or those related to other policy domains, sectors and disciplines.

In either of the two options, NEAC can play a vital role by providing expert views on setting the agenda and priorities for NEASPEC, and by acting as a channel of communication between different programmes, forums, and other stakeholders, or even as a catalyst in implementing some of the programmes and projects.

Kazu Kato, IGES

In Conclusion,

Some Personal Observations & Suggestions

(1) De-emphasize the role of Japan (and of EAJ) as the predominant financier and promoter of bilateral environmental programmes and projects in the subregion.

(2) At the same time, more Japanese support should be directed towards subregional, multilateral programmes and mechanisms.

(3) We are very much encouraged by, and strongly support, the ROK's leadership and various initiatives (such as TEMM) in taking the subregional/mulitilateral approach to environmental cooperation in Northeast Asia.

(4) NEAC should become a truly open, transparent and comprehensive forum/process for promoting cooperation and partnership among environmental authorities (national and local governments), private sector businesses, civil society organizations (CSOs), and research/academic communities.

(5) But it should NEVER become a project-based or project implementation mechanism.

Review and Future of the Northeast Asian Environmental Cooperation : From an institutional viewpoint

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Acronyms

AANEA	Atmosphere Action Network East Asia
ADB	Asian Development Bank
ALGAS	Asian Least-Cost Greenhouse Gas Abatement Strategy
AMM	ASEAN Ministerial Meeting (Meeting of ASEAN Foreign Ministers)
AMME	ASEAN Ministerial Meeting on the Environment
APEC	Asia-Pacific Economic Cooperation
APN	Asia-Pacific Network for Global Change Research
ASEAN	Association of Southeast Asian Nations
ASOEN	ASEAN Senior Officials on the Environment
CBSS	Council of the Baltic Sea States
CEC	Commission of the European Communities
CO	carbon monoxide
CO_2	carbon dioxide
COMECOM	Council for Mutual Economic Assistance
EANET	Acid Deposition Monitoring Network in East Asia
EAS	East Asian Seas Action Plan
ECO-ASIA	Environment Congress for Asia and Pacific
EMEP- LRTAP	Co-operative Programme for Monitoring and Evaluation of the Long-Range Transmission of Air Pollutants in Europe
EC	European Community
EU	European Union
GEF	Global Environment Facility
JICA	Japan International Cooperation Agency
LRTAP	Long-Ranged Transboundary Air Pollution
LTPP	Long-term perspective project (for ECO-ASIA)
KOICA	Korean International Cooperation Agency
MRC	Mekong River Commission
NAPEP	North Asia-Pacific Environment Partnership
NEAC	Northeast Asian Conference on Environmental Cooperation
NEANPEF	Northeast Asia and North Pacific Environmental Forum (now, renamed NAPEP)
NEASPEC	North-East Asian Subregional Programme of Environmental Cooperation
NGOs	Non governmental organizations
NO_x	nitrogen oxide
NOWPAP	Northwest Pacific Action Plan
ODA	Official Development Aid
OECD	Organization for Economic Cooperation and
SACEP	South Asia Co-operative Environment Programmes
SAP	Strategic Action Programme (for TRADP)
SO_2	sulfur dioxide
SOM	Meeting of Senior Officials (for the NEASPEC)
SPREP	South Pacific Regional Environment Programme
TEMM	Tripartite Environment Ministers Meeting (ROK, China, and Japan)
TRADP	Tumen River Area Development Programme
UNCSD	United Nations Commission on Sustainable Development
UNCED	United Nations Conference on Environment and Development
UN/ECE	United Nations Economic Commission for Europe
UN/ESCAP	United Nations Economic and Social Commission for Asia and the Pacific
UNDP	United Nations Development Programme
UNEP/ROAP	United Nations Environment Programme Regional Office of Asia and Pacific

1. Introduction

Northeast Asia includes the People's Republic of China, the Republic of China (Taiwan), Japan, the Republic of Korea (South Korea), the Democratic People's Republic of Korea (North Korea), Mongolia, and the Russian Far East. The subregion extends from arctic to semi-tropical zones. High population density, high rate of consumption of natural resources and the pressures of rapid industrialization with inadequate environmental management have made Northeast Asia one of the most polluted subregions in the world. It has suffered environmental deterioration in terms of air pollution (including acid rain), coastal and inland water pollution, soil pollution, loss of biodiversity and desertification. Some of this damage has extended beyond the boundaries of the area.

Northeast Asia lacked a centralizing political, economic or social force until the late 1980s due to a diversity of systems. Except for certain bilateral initiatives, there was little cooperation on environmental issues. The end of the Cold War, however, led to joint efforts to promote multilateral environmental cooperation. Agenda 21, agreed upon during the Rio Summit in 1992, helped to promote regional and subregional environmental cooperation: a number of cooperative programs, plans and forums have been advocated and extended through multiple channels, including this NEAC Conference, NEASPEC, TEMM and NOWPAP.

It is not surprising, however, that institutions of Northeast Asian environmental cooperation have drawn criticism in the last decade. Environmental institutions are often seen as weaker than institutions in other areas, such as trade or security (Tay, 2000). The mechanism for cooperation has been characterized as unsatisfactory, with insufficient links between initiatives. Another criticism is that some initiatives failed to clarify long-term goals. Few regional environmental initiatives have a structure or financial foundation.

It is high time for Northeast Asia to review the steps taken thus far and examine what should be the next step.

This paper is a study of the past and future of Northeast Asian environmental cooperation. In addition to describing the programs, forums, conferences and other initiatives in the region as well as in East Asia or Asia-Pacific as a whole, it will examine the actors, processes and institutions of subregional environmental cooperation. It questions by whom and how environmental cooperation has been addressed, identified and promoted; how does each actor interact with others; what is the nature of the basic subregional cooperative mechanisms to respond to environmental issues; and how the economic and political pictures of Northeast Asia have influenced the subregional environmental cooperation mechanisms.

Through these examinations, this paper aims to expose the weaknesses and inadequacies of Northeast Asian environmental cooperation mechanisms, and to provide the future prospects. The conclusion offers suggestions for future.

2. Overview of Northeast Asian Environmental Cooperation

Considering the geographical scope and the diverse economic and political systems of the Asia-Pacific region, UN organizations emphasized collaboration at subregional rather than regional levels. Plans and programs facilitated by such organizations are South Asia Co-operative Environment Programmes (SACEP), various environment plans and programs developed under the Association of South East Asian Nations (ASEAN), the Mekong River Commission (MRC) and the South Pacific Regional Environment Programme (SPREP).

Although lagging behind other subregions in the Asia-Pacific, Northeast Asia has begun to attach importance to promoting environmental cooperation. In the 1990s, the subregion began to show signs of progress on multilateral environmental cooperation.

This Chapter provides an overview of cooperative initiatives being undertaken in Northeast Asia on both multilateral and bilateral bases.

2.1. Multilateral Cooperation within Northeast Asia

Northeast Asian Conference on Environmental Cooperation (NEAC)

The origins of multilateral cooperation in Northeast Asia can be traced back to the year 1988 and the Japan-South Korea Environmental Symposium. The symposium was co-hosted by the respective environmental agencies in Japan and South Korea. UNEP cooperated, China participated, and the Soviet Union and Mongolia attended as observers. It thus developed into a forum for exchanging information and exploring the possibilities for regional cooperation between the five countries.

The Rio Summit in 1992 raised the desire to further develop the framework provided by the symposium, and the Japanese Environment Agency soon hosted the Northeast Asian Conference on Environmental Cooperation (NEAC).

The NEAC provided government organizations associated with the environment from five countries in Northeast Asia including Japan, South Korea, China, Mongolia and Russia and international organizations such as UNEP and UN/ESCAP with the chance to meet every year. Before the NEAC, cooperative programs undertaken on bilateral bases were run one at a time, usually by some type of joint committee. There existed no comprehensive framework for multilateral cooperation. Thus, the NEAC was organized as a forum for exchanging information from these individual programs undertaken by various countries. Japan, South Korea and China have hosted NEAC in turn, and Mongolia is host for the ninth meeting now in 2000.

North-East Asian Subregional Program on Environmental Cooperation (NEASPEC)

While NEAC is a forum for frank dialog on strategies between environmental government organizations, local governments and specialists, NEASPEC represents cooperation on environmental issues via foreign ministries (Oversea Environmental Cooperation Center, 1994).

The establishment of NEASPEC was agreed to on the first occasion of the Meeting of Senior Officials of Environmental Cooperation in North-East Asia (SOM) in 1993, hosted by UN/ESCAP. It's proponent was South Korea. Since then, highly formal meetings have been held every year or every two years as part of the program.

Its three priority areas are identified as follows: energy and air pollution; ecosystem management; and capacity building. At the 3rd SOM, held in 1996 in Mongolia, "the NEASPEC framework" was adopted and agreement was reached on basic structures and activities. Several fundamental projects on energy and air pollution have been identified and even implemented with the help of ADB financial aid.

NEASPEC aims to develop its own firm financial mechanisms rather than ad hoc project-based funding, and establishment of a core fund was agreed upon in March 2000. South Korea will contribute 100,000 dollars to the fund. NEASPEC is the region's only comprehensive environmental program that has been implemented in concrete ways. It is expected to fulfill a central role as a comprehensive and intergovernmental program in the subregion.

Northwest Pacific Action Plan (NOWPAP)

The Northwest Pacific Action Plan, NOWPAP, offered a framework which allows parties to focus on problems on a more specific and individual basis, such as coastal and marine pollution. Unlike the NEASPEC and the NEAC, which were regional initiatives, the NOWPAP was advocated by UNEP.

The Regional Sea Program took off from the regional level approach recommended at the 1972 Stockholm Conference and led to remarkable developments as subsequent action plans were formulated -- the Mediterranean Action Plan of 1975 and the Barcelona Convention of 1976. The approach has spread to other regions in the world, and there are now 14 Regional Sea Programs in operation, with more than 140 seacoast countries participating in various plans.

One of these plans is NOWPAP, in which four Northeast Asian countries participate: China, Japan, South Korea and Russia. These four countries adopted action plans at the first intergovernmental meeting held in Seoul in 1994.

Northeast Asian and North Pacific Environmental Forum (NEANPEF, renamed NAPEP)

A non-governmental regional network, the North Asia-Pacific Environment Partnership (NAPEP), was inaugurated in 1992 (originally named the Northeast Asia and North Pacific Environmental Forum). Comprised of environmental experts and NGOs from subregional countries, it has promoted exchanges of information and expertise between environmental NGOs through workshops and mobilization of resources to support specific projects, particularly for ecosystem management undertaken by member NGOs in the region.

Several workshops and conferences, attended by representatives of NPOs, governments, business, universities and think tanks from China, Mongolia, Russia, South Korea, Japan and the U.S. have been held.

Some participants at the workshops recommended joint research into sustainable ecological development in the Douman Jiang and Amur river regions and the establishment of an international advisory group consisting of an operating committee, a secretariat and expert groups to support NAPEP activities.

Tripartite Environment Ministers Meeting (TEMM)

A concerted effort at a ministerial level has also begun. Following a proposal from South Korea during the 6th United Nations Commission on Sustainable Development (UNCSD) in May 1998, the Tripartite Environment Ministers Meeting (TEMM) between China, Japan and South Korea was held in Seoul in January 1999. The three ministers recognized that facing environmental challenges in the Northeast Asia had become critical and that it was time to come together and intensify environmental cooperation.

The TEMM ministers agreed on priority areas requiring increased cooperation: a) raising awareness of the three countries' "environmental community" and stimulating information exchange; b) strengthening cooperation on global environmental issues, such as biodiversity and global warming; c) preventing air pollution and protecting the marine environment; and d) enhancing cooperation on environmental technology, the environmental industry and environmental research.

In order to achieve these tasks, the TEMM ministers emphasized the need for more cooperation not only between their respective governments' environmental agencies, but also between NGOs, research organizations and local governments. They also recognized that while using existing frameworks to realize these objectives is ideal, sometimes new working groups must be formed and contact points secured.

The TEMM is expected to be held on a yearly basis. The 2nd TEMM was held in Beijing in February 2000, where the ministers of the three countries agreed to develop and work on specific projects -- in particular focusing on raising consciousness of environmental community, fresh water pollution and land-based marine pollution prevention and cooperation in the field of environmental industry. The three countries have already initiated the concept project proposals, and steps have been taken toward implementation.

Tumen River Area Development Programme (TRADP)

On the economic cooperation front, the Tumen River Area Development Programme (TRADP) is facilitated by UNDP and aims to promote regional economic cooperation between China, South Korea, North Korea, Mongolia and Russia. A Memorandum of Understanding on Environmental Principles governing the TRADP was written in 1995.

The Tumen Region has achieved economic development at the expense of the environment and has been threatened by environmental degradation, namely, inland and coastal water pollution, biodiversity loss, deforestation and air pollution.

In response to the memorandum, a Strategic Action Programme (SAP) was created for the purpose of developing an effective long-term regional strategy for dealing with international water pollution and loss of biodiversity. The Global Environment Facility (GEF) decided to sponsor the SAP with 5 million dollars over a two-year period, and the program was launched in May 2000.

The Tumen Programme Environmental Action Plan was also developed in parallel, focusing

on transborder pollution and other forms of regional environmental damage, such as trade in endangered species. The Action Plan identified four program areas with detailed project proposals. TRADP member states are currently seeking investment and donor assistance for implementing such projects.

North East Asian Crane Site Network Center

The North East Asian Crane Network Center was established in 1997, based on the "Asia-Pacific Migratory Waterbird Protection Strategy." The strategy was formulated at the 7th Meeting of the Conference of the Contracting Parties to the Convention on Wetland (Ramsar), in which actions and priorities to protect migratory water birds and their habitats in Asia and the Pacific were identified.

There are eighteen network sites from six countries, namely, China, Japan, South Korea, North Korea, Mongolia and Russia. In addition, the East Asian Australasian Shorebird Site Network was also established in 1997, based on the Strategy, in which 24 sites from 10 countries participate. Also, the East Asian Anatidae Site Network was launched at the Conference of the Contracting Parties to the Convention on Wetland held in Costa Rica in May 1999.

2.2. Multilateral Cooperation covering East Asia/ the Asia-Pacific region

Acid Deposition Monitoring Network in East Asia (EANET)

The Acid Deposition Monitoring Network in East Asia (EANET), a multilateral initiative, targets the countries of Northeast Asia. The Environment Agency of Japan advocated its establishment. Attending member states from Northeast Asia include China, Japan, South Korea, Mongolia and Russia. It aims to develop a common understanding of the region's "acid rain" problem. Its preparatory-phase activities began in 1998, and full operation is expected to start by the end of 2000.

Asia-Pacific Economic Cooperation (APEC)

Covering a much broader geographical area of the Asia-Pacific, the Asia-Pacific Economic Cooperation (APEC) forum, inaugurated in 1989 and including 18 member economies, also began to work toward integrating environmental and economic concerns. The member economies from Northeast Asia include China, Japan, South Korea, Russia, and Taiwan.

The First Environmental Ministerial Meeting held in 1994 developed an "APEC Environmental Vision Statement." Since this statement and other declarations, APEC has developed a three-pronged environmental work program: namely, 1) integration of environmental and economic considerations in APEC's working groups; 2) attention to sustainable cities, clean technologies, and the marine environment; and 3) long-term focus on food, energy, environment, economic growth, and population.

Asia-Pacific Network for Global Change Research (APN)

On the scientific front, the Asia-Pacific Network for Global Change Research (APN) was established in 1995 for the purpose of strengthening links between the scientific community and policy makers in the Asia-Pacific Region. The intergovernmental network aims to promote, encourage and support research on long-term change in the earth's climate, ocean and terrestrial systems as well as research on related physical, chemical, biological and socioeconomic processes.5 Its member states from Northeast Asia are: China, Japan, South Korea, Mongolia and Russia.

Environment Congress for Asia and Pacific (ECO-ASIA)

Inspired by the Rio Summit, the Environment Agency of Japan initiated the Environment Congress for Asia and Pacific (ECO-ASIA), with the objective of fostering policy dialogue and cooperation among environmental ministers of participating countries.

While ECO-ASIA was originally intended as an informal forum of information exchange

among ministers, it now includes the "ECO-ASIA Long-term Perspective Project (LTPP)," which aims to identify environmental policies that can contribute to the long-term sustainable development of the Asia-Pacific region. The project identifies major environmental issues confronting the region, examines their connection to socioeconomic issues, and forecasts social economic and environmental issues that may arise from various development scenarios for the regions.

2.3. Bilateral Cooperation

One feature of environmental cooperation in Northeast Asia is the predominance of initiatives undertaken between two countries rather than among more than two. Japan occupies a unique position in the region as a highly industrialized country that contributes development assistance and other aid to countries throughout the world. Japan's government now emphasizes environmental cooperation as an important part of economic cooperation and promotes bilateral environmental cooperation as a facet of development assistance[1].

Most notable among such bilateral initiatives are those between Japan and China. In the 1990's, the volume and quality of cooperation on environmental matters rose. Grants, technical assistance and yen loans have been made through various organs of government and aid organizations[2].

Since environmental projects usually fail to contribute directly to economic growth, however, the governments of developing countries have been less than enthusiastic about asking for environment-related assistance, particularly when it comes to industrial pollution and global environment-related initiatives.

So, the Ministry of International Trade and Industry developed in 1990 the "Green Aid Plan," which places importance on reducing industrial pollution and promoting efficient energy use (Economic Cooperation Division, Ministry of International Trade and Industry of Japan, 1997). In addition to Indonesia and the Philippines, China is considered high priority in this respect.

The trend is growing towards cooperative projects undertaken between the local governments of China and Japan. The cities of Kita-kyushu and Hiroshima can be cited as encouraging examples of this. Cooperative projects initiated by the private sector are also developing, including technological projects[3].

In parallel with the gaining momentum of various cooperative initiatives, the framework to support these activities are also evolving.

In March 1994, the Japan-China Environmental Conservation Cooperation Agreement was signed. The Japan-China Environmental Conservation Joint Committee has met annually since in order to coordinate the overall activities stipulated in the agreement. The committee, which relevant government agencies attend, reviews the existing state of cooperative initiatives and considers new projects.

The Sino-Japan Friendship Center for Environmental Protection, established in Beijing in 1996, has performed a central role acting as a liaison on matters related to environmental cooperation. In 1996, the Japan-China Comprehensive Forum on Environmental Cooperation was started to exchange ideas.

Bilateral summits have also produced initiatives. At their summit in 1997, the leaders of Japan and China reached an agreement on environmental cooperation in the 21st century,

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[1] Adopted as a cabinet decision in June 1992, Japan's ODA Charter stipulates that one of four key factors to be considered is "pursuit in tandem of environmental conservation and development."

[2] For information related to environmental concerns and economic cooperation in Northeast Asia, see Ryo Fujikura's "The Current Status and Problems Relating to Japanese Economic Assistance and Its Impact on Environmental Preservation in the Asian Region," in the International East Asia Research Center, *Higashi Asia no Shiten* (view on East Asia), March 1998, page 122-133 (in Japanese).

[3] For information on China-Japan Environmental cooperation, see the Overseas Environmental Cooperation Center (OECC), *Collected Data of Examples in Japan-China Environmental Cooperation*, commissioned by the Environment Agency in 1998, March 1999.

including two major initiatives: "Japan-China Environmental Development Model City Plan"[4] and "Environmental Information Network"[5].

Meanwhile, developmental and environmental assistance for China is a great concern for many donor countries. The China Council for International Cooperation on Environment and Development, a high-level non-governmental advisory body, was established in 1992. Its stated purpose is "to further strengthen cooperation and exchange between China and the international community in the field of environment and development." It was established with the objective of promoting cooperation in the field of environmentally sensitive development with China and the international community[6].

Japan has sent members to the council and has participated enthusiastically. Japanese private sector groups have also participated.

Environmental cooperation between Japan and South Korea is not at the level of Japan-China cooperation in terms of quality or volume. The background to this gap is that yen loans and grant aid from Japan to South Korea recently ceased on the judgment that the Korean economy has already graduated from the stage of requiring assistance (Ministry of Foreign Affairs in Japan, 1998). The initiatives that do exist on environmental training, joint research cooperation and information exchange on environmental technology at the level of central and local governments are somewhat lackluster.

Nonetheless, there is a trend toward development of a framework supporting cooperation between Japan and South Korea. The Japan-South Korea Environmental Conservation Cooperation Agreement was signed in June 1993. The Japan-Republic of Korea Environmental Conservation Joint Committee meets annually based on the agreement. The committee's chief function is to coordinate and plan cooperative projects between the two countries, and currently 21 projects are under way[7].

Summits began to address furthering environmental cooperation between the two countries. In one declaration (http://www.mofa.go.jp/region/asia-paci/korea/joint9810.html) adopted in October 1998, the two leaders agreed that both governments would cooperate closely on resolving various global issues that transcend national borders and that are becoming new threats to the security and welfare of the international community.

They also agreed that both countries would promote Japan-South Korea environmental policy dialogue in order to strengthen cooperation on various issues concerning the global environment, such as reducing greenhouse gas emissions and measures to fight acid rain.

A plan of action was created, specifying that the two nations investigate possibilities for communication and dialogue on environmental strategies, for strengthening environmental cooperation in the Northeast Asian region, for starting joint research on environmental hormones (endocrine disrupters) and environmental industry. Based on this declaration, the Japan International Cooperation Agency (JICA) and Korea International Cooperation Agency (KOICA) have developed a joint training program for improvement of the water environment, targeting neighboring developing countries in East Asia.

Joint environmental initiatives between Japan and Korea are moving from "assistance" to "an equal cooperative relationship". There is room for much further development in this new equal-footing relationship.

By contrast, environmental cooperation between Japan and Mongolia proceeds under

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[4] The Model City Plan calls for the selection of model cities for environmental programs. Model cities include aggressive strengthening of environmental regulations, Japan's assistance (including ODA loans with preferential terms for environmental projects and technical assistance). These environmental measures, designed to reduce air pollution and acid rain, for example, should also be designed to generate successes that will encourage extension of conservation efforts and wider adoption of environmental policies throughout China. The three cities are currently Dalian, Chongjing and Guiyu. See <http://www.mofa.go.jp/policy/oda/summary/1998/8.html>.

[5] The project is to set up computers for processing environmental information at a hundred locations throughout the country, establishing a nationwide environmental network centered on the Sino-Japan Friendship Center for Environmental Protection located in Beijing.

[6] See Web site of China Council <http://www.harbour.sfu.ca/dlam/index.html>

[7] Of the 21 projects so far, six are environment-related. (Environment Agency of Japan materials).

Japanese leadership. An economic crisis struck Mongolia after the Council for Mutual Economic Assistance (COMECOM) under the former Soviet Union stopped extending assistance in 1991.

The urgency of Mongolia's need for assistance was recognized at a summit in London the same year, and Japan began increasing financial assistance, becoming Mongolia's largest donor country.

Japan-Mongolia relations have since experienced a considerable turn for the better in comparison to the Cold War era, and bilateral cooperation on the environment has gone smoothly. Cooperative projects range from technical cooperation, including hosting trainees and sending experts, to grant and yen loan projects in forestry management, subterranean water development and power generation plants.

Japan and Russia announced in 1993 an Economic Declaration to develop economic and trade relations. The Japanese government has increased the quality and volume of official development assistance (ODA) to assist Russia's reform efforts. The ODA ranges in use from emergency humanitarian assistance to technical and financial assistance.

The Russian Far East, in particular, has grown increasingly important to the deepening of Russian-Japanese relations. Almost half of Japanese humanitarian aid went to this region. There has been a little emphasis on environmental cooperation between the two countries. Cooperation on the environment between two countries has been slow in the making. In April 1991, the Japan-Soviet Environmental Protection Cooperation Agreement was signed, and Russia agreed to inherit the terms of the agreement intact after the collapse of the Soviet Union. Although the agreement does not call for a joint committee as other bilateral agreements have done, a meeting between Japan and Russia was held in January 1994. The two sides agreed to start joint research on marine ecology in the Japan Sea.

There are basically no initiatives on the environmental front between Japan and North Korea, simply because they have no diplomatic relations.

Bilateral initiatives in Northeast Asia without Japan are emerging, most notably between South Korea and China.

South Korea has shifted from being a recipient to a donor country. The government established the Economic Development Cooperation Fund (EDCF) in 1987 and the Korean International Cooperation Agency (KOICA) in 1991. South Korea joined the Organization for Economic Cooperation and Development (OECD) in 1996. Main recipient countries are Asian, in particular China. Korean environmental ODA to China is expanding.

Environmental cooperation between South Korea and China does not necessary center on ODA, however. In October 1993, an Agreement on Environmental Cooperation between the two countries was signed; they agreed to promote cooperation on the basis of equality and mutual benefit, in the areas of information exchange, technology transfer and joint research.

The Korea-China Environmental Cooperation Joint Committee has met each year in line with the agreement, and 12 bilateral projects have been launched. Major projects among the 12 include the Yellow Sea Large Marine Ecosystem Project. This comprehensive project includes Transboundary Diagnostic Analysis activities, a strategic action program and environmental improvements. The UNDP is also involved with this project and expenses are provided for by GEF[8] .

Thus, environmental cooperation initiatives between China and South Korea have been promoted based on equality and mutual benefit. This applies to statements during recent summits on environmental cooperation.

At their summit in China in 1999, the two countries agreed to raise the profile of their relationship from its present status as a cooperative friendship to a comprehensive partnership for the 21st century. Such a partnership would expand cooperation in a variety of fields including government, security, economy, culture, the environment and human communications.

Other bilateral cooperation agreements in the region include ones concluded between China and Mongolia and between South Korea and Russia.

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[8] See Web-page of Ministry of Foreign Affairs and Trade, Republic of Korea, <http://www.mofat.go.kr/main/etop.html>

3. Assessment of Northeast Asian Environmental Cooperation Mechanisms

3.1. Major Features

- During the first half of the 1990s, a large number of subregional environmental programs, forums and bilateral agreements emerged. Some of these appear to be comprehensive initiatives (TEMM, NEASPEC, NEAC, NAPEP, TRADP, and ECO-ASIA), while some focus on a single issue (NOWPAP, EANET, and Crane networks).
- Some multilateral initiatives target the subregion of Northeast Asia, while some target the whole region of East Asia or, even more broadly, Asia and the Pacific.
- The status of participating states differs from one initiative to another, depending on the international membership of the host country/organization[9].
- The initiatives were established through different channels, including environment ministers, official diplomatic channels, officers of environment agencies and ministries, NGOs, academics. There has been little coordination of the various channels. Consequently, some initiatives contain considerable redundancy.
- Some initiatives failed to clarify their own long-term goals.
- Environmental issues identified as priority include air pollution (acid rain), inland and coastal water pollution, loss of biodiversity and deforestation. Although countries in the subregion have attached importance to the first three issues, there seems little interest from governments, civil society or NGOs in combating desertification (UNEP, 2000)[10].
- Transboundary pollution has been not seen as immediate a threat as domestic problems, and most countries in the subregion consider it a future threat rather than a present emergency. There has been little scientific consensus on the issue. So, governments have had little incentive to deal with transboundary pollution. The trend is changing recently, however.
- Most of the regional environmental initiatives have no institutional structure or financial foundation.
- The assistance of international organizations such as UN/ESCAP, UNEP, UNDP and the ADB (Asia Development Bank) has been crucial in facilitating such cooperative initiatives.

Subregional cooperation in Northeast Asia has existed for less than a decade. In contrast, European cooperation has more than 30 years of history; and ASEAN, more than 20 years. Northeast Asia has established permanent policy-dialogue forums and identified issues to be tackled jointly. Some of the initiatives are approaching the second stage -- collecting scientific data through environmental monitoring. It may be too early to judge the appropriateness and effectiveness of current environmental cooperative mechanisms.

Environmental cooperation has moved forward slowly. Some of the cooperative initiatives have stagnated in terms of institutional and financial development. The economic and political situations of Northeast Asia have constrained the development of environmental cooperation mechanisms, resulting in stagnation.

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[9] For example, North Korea attends NEASPEC, for which UN/ESCAP provides an interim secretariat, because it is a participating country of the United Nations. However, it does not attend NEAC, EANET or ECO-ASIA which are not hosted by UN organizations but countries in the subregion. In addition, North Korea cannot receive assistance from the ADB, to which it does not belong. Taiwan has no access to many initiatives due to its unstable position in international politics, whereas it is a member of APEC and the ADB.

[10] Yet countries in the subregion are trying to strengthen their national policies individually. China, after experiencing severe floods mostly due to destruction of natural forests, has expressed deep concern on the issue. Much international assistance has been spent on afforestation.

3.2. Weaknesses

Absence of regional organizations

The EC/EU has seen a number of successes on environmental cooperation, such as efforts in unifying environmental standards in connection with economic activity in trade and manufacturing. As for long-ranged transboundary air pollution (LRTAP) control, the LRTAP Convention itself was facilitated and coordinated by the United Nations Economic Commission for Europe (UN/ECE), which has provided minimal secretariat services to its member states. And, compliance has been very high.

It should be pointed out that EC/EU financial and technology transfer mechanisms have official and unofficial links with the LRTAP Convention. This apparently made it easier for the member states to comply with the LRTAP Convention and its protocols.

It should also be pointed out that EC/ EU directives on regulating air pollutant emissions have encouraged certain countries to comply with the Convention.

Unlike the EC/EU, ASEAN did not create a strong central bureaucracy but provided minimal and largely administrative support to member states through the ASEAN Secretariat (Tay, 2000). It has developed many regional environmental action plans, three ASEAN environmental programs (1978-1992), two strategic action plans (1994-), and transboundary pollution action plans (1995-) (ASEAN Secretariat, 1994, 1995).

The institution supporting those plans and programs is well-structured, consisting of ASEON (ASEAN Senior Officials on the Environment), ASEAN Ministerial Meeting on the Environment (AMME), ASEAN Ministerial Meeting (AMM, Meeting of ASEAN Foreign Ministers) and the ASEAN Summit meetings (Kato and Takahashi, 2000). Consequently, ASEAN has managed to develop a comprehensive and strategic environmental cooperative framework with few redundancies.

Northeast Asia, however, is characterized by the fact that no comprehensive regional organization equivalent to EC/EU or ASEAN exists.

So, there has been virtually no one to coordinate the initiatives on environmental cooperation. The functions and activities of each subregional program, plan and forum may overlap. In fact, redundancies seem inevitable in Northeast Asia. For example, the role of NEASPEC and NEAC resembled each other at their primary stages, although the situation has improved since[11].

Many now point out that Northeast Asia needs to create a systematically coordinate all the initiatives and thereby create a synergy for strengthening cooperation.

Absence of a regional organization such as ASEAN or the EC adversely affects the institutional and financial arrangements of each program since each initiative must start negotiations from scratch.

The European Commission has provided administrative support in developing and implementing European environmental plans. The ASEAN Secretariat has done likewise. No such regional organization exists in Northeast Asia to provide such a service. UN/ESCAP has taken responsibilities of NEASPEC secretariat, whereas the EANET interim secretariat is at Japan's Environment Agency. Talks on where to located full-scale secretariats have mostly broken down.

Most initiatives in Northeast Asia have had shaky financial foundations. The costs of implementing the EC's environmental plans have been covered by sturdy financial mechanisms. ASEAN, unlike the EC, has not covered the costs of implementing the environmental cooperation plans and programs but has instead sought to attract and coordinate external funding.

Northeast Asia, by contrast, has no regional organization to provide such services. So, most environmental cooperative initiatives have suffered from a scarcity of financial resources.

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[11] NEASPEC later began to implement a small number of technical assistance projects on air pollution control, and it has played a central role in Northeast Asia as an official intergovernmental program for subregional environmental cooperation. NEAC, on the other hand, has provided a frank forum for exchange of information and views on a wide range of topics, including the use of innovative techniques and policy instruments and the role of local governments.

One exception is EANET: its preparatory activities have been sponsored by the government of Japan, a promoter of the program, as a part of its ODA[12]. Yet, Tokyo prefers that every member state either share the financial burden to some extent or ask for donations from Japan.

Limit of the role of UN Organizations

The absence of a powerful regional organization resulted in enhancement of the role of UN organizations in facilitating and catalyzing subregional environmental cooperation in Northeast Asia.

UN/ESCAP has placed one priority on promoting subregional cooperation on the environment. For Northeast Asia, it has played the role of interim secretariat of NEASPEC. It has also striven to promote communication and has sometimes endeavored to persuade the ADB to provide funding for implementing NEASPEC projects.

Along with UN/ESCAP, UNEP has also attached importance to the subregional approach, and has provided technical assistance for a number of projects developed under subregional environmental programs.

The most notable contribution of the UNEP in promoting subregional cooperation lies in its catalytic and coordinating role to initiate the Regional Seas Programme, which includes NOWPAP and East Asian Seas (EAS) Action Plan.

The UNDP's main task is to assist developing countries adopt integrated approaches focusing on managing natural resources to improve the livelihoods of people living in poverty. It also provides financial and technical assistance to subregional environmental initiatives in the developing world. GEF has provided technical assistance grants to projects proposed for Northeast Asia in the areas of biodiversity and climate change, including a project on preparation for a Strategic Action Programme for the TRADP.

In this way, UN organizations have conducted various activities underlining their catalytic and coordinating role in promoting regional and subregional cooperation on environment. There is, however, a limit to the role of UN organizations.

UN/ESCAP and UNEP-ROAP are tasked with covering the entire Asia-Pacific region with limited human and financial resources, meaning they are very limited when it comes to what they can offer the subregion of Northeast Asia.

For example, UN/ESCAP has played a significant role in establishing and facilitating subregional environmental programs, namely, SACEP, ASEAN programs, SPREP and NEASPEC. Once such subregional programs are fully established, however, the UN/ESCAP hopes they come to stand on their own feet with the support of the countries in the subregion.

In the case of NEASPEC, UN/ESCAP has acted as interim secretariat since 1997. Most countries in the subregion want UN/ESCAP to continue to take the responsibility, while the UN/ESCAP wants to give up the position.

Different National Perspectives

Northeast Asian countries have significant differences in their viewpoints and approaches to environmental cooperation.

China has suffered devastating environmental deterioration, including heavy industrial pollution, desertification, inland water and coastal pollution. China believes subregional cooperation should be focused on these issues.

China is quite sensitive to the use of the term "transboundary" as it does not wish to be seen by other countries as causing pollution that threatens environmental conditions in territories outside its borders.

Since most countries in East Asia are developing ones with limited resources in terms of science, personnel and finances, China believes developed countries in the subregion should offer substantial financial support for the establishment and operation of environmental programs as

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[12] Japan published "Initiative for Sustainable Development (ISD) at the dawn of the 21st Century" in 1997, which stated that Japanese ODA provides financial and technical aid to developing countries in the region for use in EANET activities.

well as technical assistance to projects in their priority areas.

Japan has long worked to satisfy China's demands through financing and implementing a number of environmental projects in China as part of its ODA, as earlier mentioned.

Japan apparently believes multilateral initiatives should not overlap with its bilateral and existing multilateral assistance projects but instead focus on monitoring of the state of the environment and transboundary pollution. Japan also appears wary of multilateral initiatives out of concern that such an initiative could become another channel for development assistance. Japan has suggested that subregional countries should share the burden to some extent.

Japan places priority for multilateral programs on areas such as marine pollution, acid rain, air and water pollution. Japan has recently expressed deep concern for climate change.

South Korea is keener to promote multilateral environmental cooperation in Northeast Asia. It apparently believes that multilateral initiatives should include both technical projects as preferred by China and monitoring-type environmental management projects as preferred by Japan (Valencia, 1998).

So, South Korea has tried to mediate between China and Japan by proposing priority projects of NEASPEC be energy and air pollution. It seems that South Korea prefers the presence of international organizations in such multilateral initiatives. It has suggested coordinating mechanisms for environmental cooperation be channeled by financial and technical assistance from international organizations including UNDP, UN/ESCAP and ADB.

Russia and Mongolia need financial and technical assistance to protect their environments. The priorities for Russia include ecosystem management and more practical and action-oriented programs (Valencia, 1998), whereas Mongolia attaches importance on natural disaster (drought), nature and wildlife protection, and air pollution.

Similarly, it should be pointed out that, even in a single country, there exist divergent and sometimes competing viewpoints. These days, not only environment ministries/agencies but trade, energy, agriculture, foreign affairs, fisheries, transportation and other ministries have taken action regarding the environment. Officials from different ministries have different perspectives, their own jurisdictions and their own interests.

Although a number of attempts have been made to strengthen multilateral initiatives on environmental cooperation, such attempts have been hindered by competing interests.

Limited Participation of Citizens and NGOs

In this subregion, at the domestic level, the role of the public and NGOs in environmental activities has been limited, except civil society movements against industrial pollution as observed in Japan and South Korea, and nature and wildlife conservation activities. There lack appropriate mechanisms for bringing the public and NGOs into full play.

Nevertheless, each country attempts to introduce certain mechanisms to promote public participation in environmental protection activities. In most countries, the media have played a significant role in increasing public awareness of environmental conditions, and have worked with NGOs to get official responses.

NGOs' participation in multilateral environmental cooperation has been limited in Northeast Asia thus far. One exception is nature and wildlife conservation. The North East Asian Crane Site Network, launched in 1997, welcomes public participation, and has encouraged information exchange and sharing of the experience of wetlands sites important to cranes. The network was facilitated by an international NGO, the Wetlands International Asia Pacific and Wetlands International. A number of NGOs in the subregion as well as governmental organizations collaborated on the network.

In other important areas, the role of citizens and NGOs in environmental protection has been limited.

3.3. Future Prospects

Need to further subregional environmental cooperation

Considering the weaknesses of environmental cooperative mechanisms, enhancing

cooperation in Northeast Asia may be difficult. Nevertheless, the need exists and can be summarized as follows:

a) In Northeast Asia, transboundary acidic precipitation, coastal and inland water pollution, will likely become critical problems in the future, although there is little consensus yet among scientists of the countries concerned on the geographic extent and scale of such transboundary flux and its adverse effects. The subregion has also faced desertification and loss of biodiversity. The size of the subregion seems to offer an appropriate framework for rational utilization of the region's natural resources and mitigation of the effects of environmental degradation. Cooperation is needed to tackle the issues.
b) In Northeast Asia, there was little observable trend toward regional economic integration until the 1990s, when there was some economic cooperation, such as TRADP. These opportunities underscore the need for environmental cooperation in the subregion.
c) Northeast Asia was separated into West-East camps during the Cold War era, and memories of the hot as well as cold wars remained. Northeast Asia has no mechanisms in place for maintaining its own regional peace and security. Some countries have been unable to establish normal diplomatic relations with each other. Several cases of territorial disputes remain unsolved. Considering these circumstances, the belief that regional stability and peace can be enhanced through the development of a framework for environmental cooperation is intuitively appealing (Schreurs & Pirages eds., 1998; Matsushita et al., 2000; Yonemoto, 1998).

However, It should be noted that environmental cooperation does not automatically result in the promotion of peace and security. In fact, states don't always participate in ongoing initiatives in the subregion due to certain political obstacles. In order to promote regional stability through the development of environmental cooperation, programs need to be carefully designed with special consideration given to the existing geopolitical dynamics in the subregion.

Lessons from the European experience

The experience in other regions of furthering subregional environmental cooperation offers a good guide for Northeast Asia.

The long-ranged transboundary air pollution control in Europe is one of the most successful cases in the world. Agenda 21, as adopted at the Rio Summit, suggests the experience of the Europeans with their programs needs to be shared with other regions of the world.

The brief history is as follows: In Europe, the OECD responded to a request from Scandinavian countries to inaugurate a multilateral monitoring program of acid rain in 1972. The OECD program was taken over by UN/ECE in 1977, and renamed the Co-operative Programme for Monitoring and Evaluation of the Long-Range Transmission of Air Pollutants in Europe (EMEP-LRTAP).

The LRTAP Convention was agreed upon in 1979. Although the convention itself regulated no air pollutants, protocols on 30% reduction of sulfur emission and on NO_x emission control were adopted in 1984 and 1988.

The Second Sulfur Protocol was agreed upon in 1992. Calculation using a computer model enabled the protocol to set a different target of emission reduction for each country.

As for scientific fact-finding processes, Northeast Asia apparently tries to follow the footsteps of Europe. In fact, EANET has invited EMEP experts to their meetings for advice and information. The current stage of EANET is roughly equivalent to the middle of the 1970s when the OECD program was initiated. This region needs to develop a scientific consensus on emissions monitoring and estimation of the transmission of air pollutants.

As for institutional arrangements and processes, it might be too early to judge whether East Asia will follow the European experience because Northeast Asia has less than 10 years of experience.

There are many differences between the two regions. East Asia apparently has more difficulty than Europe reaching a consensus, due to a lack of economic, political and social homogeneity. As mentioned earlier, the LRTAP Convention has been well maintained by strong

links to EU policies and aid programs, whereas there is no regional organizations equivalent to the EC/EU in East Asia. Also, a byproduct of the political goal of improving East-West relations during the Cold War was the promotion of the establishment of the LRTAP in Europe. These regional characteristics of Europe assisted the enhancement of multilateral cooperation.

Considering these factors, it is improbable that East Asia will follow in Europe's footsteps. It does not, however, mean that there are few lessons to be learned from the European experience. In Europe, EC/EU environment aid programs have been formally and informally linked with EU common policies on environment and other regional policies such as the LRTAP Convention.

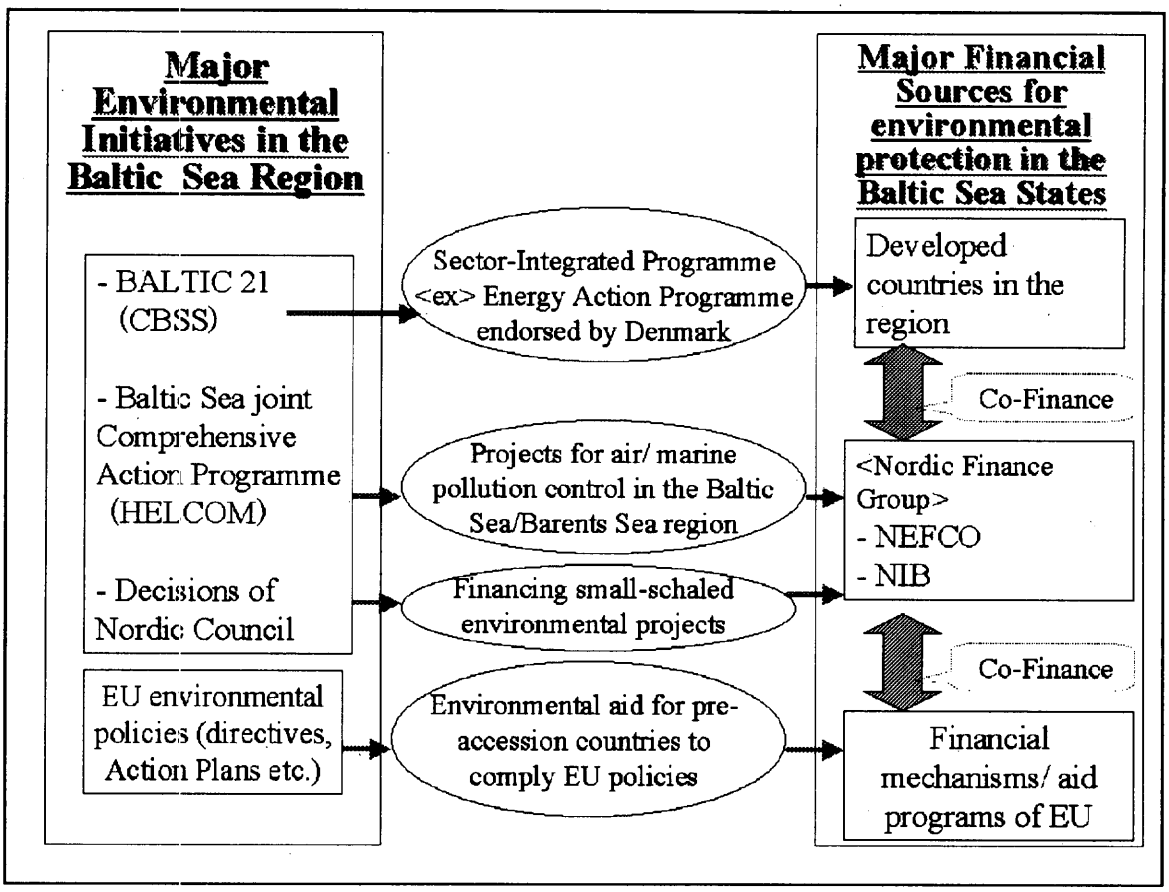
This linkage approach is applicable to Northeast Asia in promoting cooperation in a strategic and cooperative way. It is also observed in the Baltic Sea region. Although the subregion has no legally-binding environmental policies equivalent to EC/EU directives, there are several multilateral cooperative frameworks. Such frameworks include the Council of the Baltic Sea States (CBSS)[13], the Nordic Council[14], and the Helsinki Commission[15].

Each framework has made its own objectives clear and worked out various environmental action plans and programs. Such decisions have been efficiently linked with multilateral and bilateral environmental aid of Scandinavian countries (See Figure in the next page).

[13] CBSS is attended by the foreign ministers of 11 countries -- Denmark, Estonia, Finland, Germany, Iceland, Latvia, Lithuania, Norway, Poland, Russia and Sweden -- and the European Commission. Aiming to promote sustainable development in the region, the CBSS worked out Agenda 21 for the Baltic Sea Region (named 'Baltic 21") and its action program. Baltic 21 was adopted by the Foreign Ministers of the CBSS in 1998 (Baltic 21 Secretariat, 1999).

[14] The Nordic Council is a forum for co-operation between Nordic parliamentarians and between parliamentarians and governments in the Nordic region. It was established in 1952 and is attended by Denmark, Finland, Iceland, Norway and Sweden.

[15] The Convention on the Protection of the Marine Environment of the Baltic Sea Area, the Helsinki Convention was signed in 1974. Through the Convention, the Baltic Sea States established a commission, the Baltic Marine Environment Protection Commission, known as the Helsinki Commission (HELCOM). It is participated by the nine Baltic Sea States, Denmark, Estonia, Finland, Germany, Latvia, Lithuania, Poland, Russia, and also the European Economic Community (EEC). Recognizing the importance of a long-term perspective, Helsinki Commission adopted "the Baltic Sea Joint Comprehensive Environmental Action Programme" in 1992.



Source: Takahashi, W.

<Figure. Linkages between environmental initiatives and environmental aid in Baltic Sea Region>

It is expected that Northeast Asia can draw more lessons from the Baltic Sea region (than from the EC/EU) since there are similarities between the two subregions. That is, countries within the two subregions differ widely in terms of economic, social and environmental preconditions.

The Baltic Sea region's experience may be applied to Northeast Asia in the following ways:

- Linkage between regional common policies and aid programs[16]: regional/subregional (multilateral) initiatives are based on the spontaneous cooperation among countries in the region. Sharing of the financial burden between member states is desirable, in principle. Since it is difficult, however, for the developing countries in a region to implement such programs or plans, financial and technical assistance from developed countries and international institutions are indispensable.
- Linkage between bilateral and multilateral aid: Bilateral aid is based upon the diplomatic judgment of the two countries concerned. On the other hand, multilateral aid can attach importance to regional priorities[17]. However, multilateral aid has little capacity to finish on

[16] For example, the Baltic 21 Action Programme focused on several sectors of crucial importance to the region--agriculture, energy, fisheries, forests, industry, tourism and transport - and on spatial planning (Baltic 21 Secretariat, 1999). Each sector has one or two lead parties. For the energy sector, Denmark takes responsibility and uses its ODA to implement the program.

[17] In the past, there was little multilateral assistance targeting Northeast Asia expect for the aid provided through international institutions/banks. In recent years, however, Japan, United States and South Korea have expanded

its own due to financial constraints, so it requires maintaining ties with bilateral aid and private investment.

- Application of sector-integrated approach and multi-effect approach: These approaches are applied to environmental action programs in Europe and the Baltic Sea region. The multi-effect approach recognizes the fact that the same pollutant is often relevant for several of the environmental problems. Reduction of emissions to address one problem will help to address others. For example, reductions of CO_2 emissions to address climate change also reduce SO_2, NO_x and CO emissions, hence reducing acidification, and improving tropospheric ozone and urban air quality (CEC, 1997). It is therefore important to take this into consideration when working out programs for effectively reducing pollutants. Although priorities for developed countries and developing countries differ, the application of a multi-lateral approach may possibly reconcile their interests.

  On the other hand, the sector-integrated approach suggests that "rather than be directed solely at each environmental issue, the strategy of action program ... [needs to] create a new interplay between the main groups of actors (government, enterprises, the public) and the principle economic sectors ... through the use of an extended, and integrated range of instruments" (CEC, 1993). This can most efficiently be done within the overall framework within which all activities are integrated and coordinated.

As mentioned earlier, several cooperative efforts in various issue-specific fields with the involvement of several countries concerned coexist and are well coordinated in the Baltic Sea region. (These initiatives vary in their member states.) This concept is called "modular multilateralism" (Ivanov, 1999) -- "each 'module' entails more than individual bilateral and multilateral cooperation." That is, "each 'module' may encompass a number of common or shared interests that cannot be effectively secured" through a cooperative effort. It is assumed that this concept is applicable to Northeast Asia, where no comprehensive and overall initiatives exist, but several cooperative initiatives exist.

4. Conclusion: Suggestions for Furthering Cooperation

It is relatively easy to show the difference between Northeast Asia and other regions such as the Baltic Sea region and Europe. More difficult is the task of offering constructive lessons to be drawn from Northeast Asia's precursors, while recognizing the different economic, social and political realities. Northeast Asia is a unique subregion in terms of political, economic and social variety, so the region cannot shape its future only by borrowing know-how from other region/subregions' experience. The following are some suggestions:

First, a collective effort is needed to draw up a comprehensive list of issues critical on national and subregional levels in Northeast Asia. The list also needs to show what has already been done by whom and how; and what has not yet been done. In order to complete the task, the active participation of all parties concerned is required.

Taking the list into consideration, the subregion needs to enhance environmental cooperation based on the above-mentioned 'modular multilateralism.' Northeast Asia is characterized by the fact that participating states differ from one initiative to another, depending on the host, and some initiatives cover the subregion of Northeast Asia, while others cover the whole of East Asia or, even more broadly, Asia and the Pacific.

It seems those seeking regional environmental cooperation, in principle, tend to pursue the attendance of all the parties in all the subregional areas, even if no overall framework exists in this subregion. Thus, as Ivanov (1999) argues, various combinations of participants should be permitted, depending on the issue and capacity.

In order to make each 'module' more than an individual initiative, each initiative needs to be open to links with many other parties. It is desirable that the NEAC opens its door not only to

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trilateral initiatives on multilateral development aid projects. This trend is expected to continue.

officials of environment agencies/ministries, but also to local governments, academics and NGOs. Likewise the EANET welcomes the participation of newcomers, and new countries such as Laos decided to attend it in 1999.

Northeast Asia needs to create systematic coordination between all the initiatives, in particular initiatives undertaking similar/related subjects. To make it easier, the first step to be taken would be to set up a system to maintain transparency and full disclosure. Recently, some regional and subregional initiatives have set up their own web-pages on the Internet[18]. This trend should grow.

The subregion needs to develop processes to link the regional/subregional initiatives with multilateral and bilateral aid programs, as the Baltic Sea region has done. Each initiative has faced financial constraints. Considering the fact that regional cooperation is based on spontaneous initiatives among the countries, sharing the financial burden is a necessity. Countries need to continue negotiations with patience. Thus far the willingness of a country to share some of the financial burden has depended on the country's enthusiasm for the initiative and its ability to pay. Taking developing countries' difficulties into consideration, developed countries and international institutions need to provide financial and technical assistance.

A comprehensive and strategic environmental action plan should be developed for medium and long-term objectives. Such action plans have already succeeded in other regions and subregions such as the EU, the Baltic Sea region and ASEAN. It is also recommended that the plan (program) applies the above-mentioned "multi-effect approach" and the "sector-integrated approach."

It would be better if the plan can identify not only major measures but also concrete instruments, the time-frame, sectors/actors concerned, and financial mechanisms, as the Fifth EU environmental action program did. In a sense, the ECO-ASIA long-term perspective project tries to draw out such a plan. For the working process of such an action plan, highly official (ministerial leveled) meetings such as TEMM, ESCAP ministerial meeting and "Rio + 10" will offer an important opportunity.

It is desirable long-term objective that Northeast Asia create a framework in which all parties in the subregion attend. With reference to the political security situation in this subregion, this objective will not be easily achieved. There has been some reason for optimism, such as realization of North-South Korea summit and North Korea's expected participation in ARF.

It will be international organizations and NGOs that will act as media for the countries in the subregion. Apart from the UN/ESCAP, UNDP and UNEP, it is expected that the ADB and APEC will play a significant role in this area. Taiwan, whose status in international law is unstable, participates in both ADB and APEC as "Chinese Taipei." If Russia and North Korea join, the ADB could be a good medium linking the two countries.

On the other hand, NGOs have played a big role promoting regional cooperation in the area of ecosystem conservation. International NGOs and NGO networks have promoted the North East Asian Crane Site Network, in which 18 sites from six countries in the subregion including North Korea and Japan participate. Taiwan participates in Atmosphere Action Network East Asia (AANEA), a network of NGOs in East Asia, in which NGOs from seven countries including China, Taiwan and Hong Kong participate[19]. It is worth remembering that only NGOs can link all countries in Northeast Asia.

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[18] Those include: EANET, TEMM, TRDAP and the Crane Network. Collaborative activities of NEASPEC are also introduced in UN/ESCAP homepage.

[19] The countries include: China, Hong Kong, Japan, Korea, Mongolia, Russia and Taiwan.

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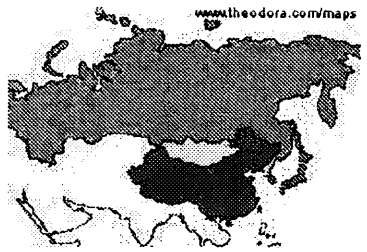
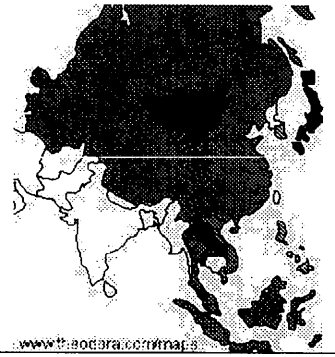
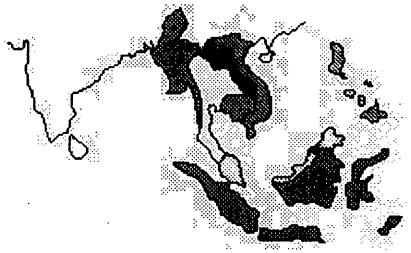
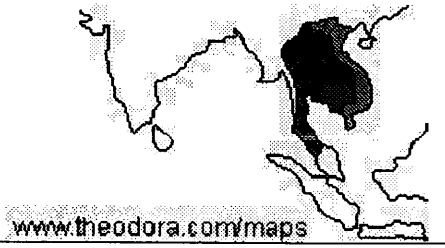
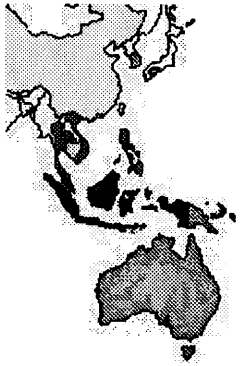
Appendix

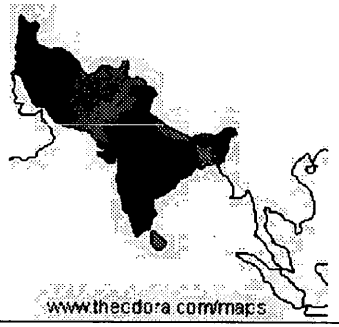
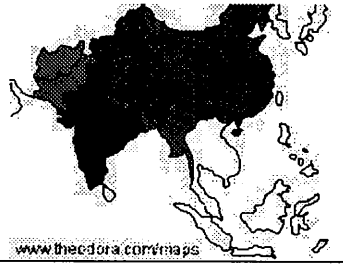
Major Subregional (Multilateral) Initiatives for Environmental Cooperationin Asia and the Pacific

Takahashi & Kato, IGES

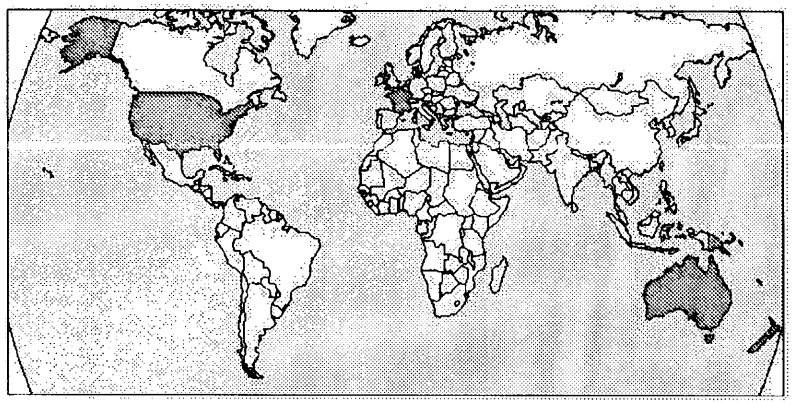
Title	Participating Countries	Profile	Major Events
(1) Northeast Asia			
NEASPEC	China, Japan, South Korea, Mongolia, North Korea, and Russia	Comprehensive and intergovernmental programme of environmental cooperation. Facilitated by the UN/ESCAP.	1993 1st Senior Official Meetings (Seoul) 1996 Adoption of the "Framework for the NEASPEC" (Ulaanbaatar)
NEAC	China, Japan, South Korea, Mongolia, and Russia	An annual forum for government officials of environmental agencies and other environmental specialists.	1988 Japan-Korea Environmental Symposium 1993 1st Conference
NOWPAP	China, Japan, South Korea and Russia	Intergovernmental programme for protecting and managing (transboundary) marine environmental issues in Northwest Pacific. Endorsed by UNEP.	1994 1st Intergovernmental Meeting and adoption of the Action Plan
TEMM	China, Japan and South Korea	An annual meeting of the tripartite environment ministers	1999 1st Meeting 2000 2nd Meeting
TRADP	China, North Korea, Mongolia, Russia and South Korea	TRADP promotes regional economic cooperation. Apart from investment and trade, transport, tourism, human resource, development, telecommunications and energy, environmental sector has been given priority.	1995 Memorandum of Understanding on Environmental Principles signed 1997 GEF decided to finance in developing a Strategic Action Programme (SAP) 2001 Action Programme (expected)
NAPEP(formerly **NEANPEF**)	China, Japan, South Korea, North Korea, Mongolia, Russia, and USA (Alaska, etc.)	A non-governmental network of environmental experts and NGOs	1992 NEANPEF formed in Seoul 1993 Irkutsk meeting and workshop, Russia 1996 Kushiro meeting and workshop, Japan 1997 Amur River workshop, Russia 1998 Dontin/Yueyang workshop, China

Title	Participating Countries	Profile	Major Events
(2) East Asia			
EANET	China, Indonesia, Japan, ROK, Malaysia, Mongolia, Philippines, Russia, Thailand, Vietnam, (Laos)	Intergovernmental network for acid deposition monitoring. Endorsed by the government of Japan.	1993 1st Expert Meeting 1997 1st Intergovernmental Meeting 1998 Preparatory-Phase Activities 2000 Full operation(expected)
(3) ASEAN (Southeast Asia)			 www.theodora.com/maps
ASEAN	Brunei Darussalam, Cambodia, Indonesia, Laos, Malaysia, Myanmar, Philippines, Singapore, Thailand, and Vietnam	Under the framework of ASEAN, many cooperative efforts have been initiated.	1977 ASEAN Environment Plans (~1992) 1985 Agreement on the Conversation of Nature and Natural Resources(not enter into force) 1989 1st ASOEN 1994-8 Strategic Plan of Action on Environment 1995 Cooperation Plan on Transboundary Pollution 97 Regional Haze Action Plan

Title	Participating Countries	Profile	Major Events
(4) Mekong River			
Mekong River Commission (MRC)	Cambodia, Laos, Thailand, and Vietnam	An intergovernmental organization for cooperation on all fields of sustainable development, utilization, management and conservation of the water and related resources of the Mekong River Basin.	1957 Creation of the Committee for coordination of investigation of the Lower Mekong Basin 1978-95 Interim Mekong Committee (without Cambodia) 1996 Signing of the Agreement on the cooperation for the sustainable development of the Mekong River Basin
(5) East Asian Sea			
East Asian Sea Action Plan	Australia, Cambodia, China, Indonesia, ROK, Malaysia, Philippines, Singapore, Thailand and Vietnam	Intergovernmental programme for protecting and managing (transboundary) marine environmental issues in East Asian Sea. Endorsed by UNEP.	1981 Action Plan for the Protection and Sustainable Development of the Marine Environment and Coastal Areas 1994 A revised Action Plan and a Longterm Strategy for the Coordinating Body on the Seas of East Asia (COBSEA)

Title	Participating Countries	Profile	Major Events
(6) South Asia			
SACEP	Afghanistan, Bangladesh, Bhutan, India, Iran, Maldives, Nepal, Pakistan, and Sri Lanka	An intergovernmental and comprehensive environmental programme	1981 Creation of SACEP (entry into force: 1982) 1992 SACEP's Strategy and Programme 1995 Adoption of South Asian Seas Action Plan (Bangladesh, India, Maldives, Pakistan and Sri Lanka) 1998 Male Declaration on control and its prevention of air pollution and its likely transboundary effects
(7) Hindu Kush-Himalayas			
International Center for Integrated Mountain Development (ICIMOD)	Afghanistan, Bangladesh, Bhutan, China, India, Myanmar, Nepal, and Pakistan	An International center established by the governments of the region for the purpose of implementing various programmes to attain environmental stability and sustainability in mountain ecosystems and the eradication of poverty	1983 Development of the ICIMOD (center) 1984 Phase 1 work programme 1987 Establishment of core programmes 1990 1st Quinquennial Review (QQR) 1994 Reorganization of the programmes Regional collaborative programme (1995)

Title	Participating Countries	Profile	Major Events
(8) The South Pacific			
SPREP	Australia, Cook islands, Fiji, France, Kiribati, Marshall islands, Micronesia, Nauru, New Zealand, Niue, Palau, Papua new Guinea, Solomon Islands, Tonga, Tuvalu, UK, USA, Vanuatu and Western Samoa	A regional organization established by the governments and administrations of the Pacific region for the purpose of managing environmental issues	1973 Adoption of Programme for nature conservation 1982 South Pacific Regional Environment Programme South Pacific Action Plan (marine environment) 1986 Noumea Convention (marine environment: entry into force in 1990) 1992 Agreement establishing the SPREP (1995: entry into force) 1997-2000 Action Plan for Managing the Environment of the South Pacific Region



Source: http://www.ext.grida.no/ggynet/agree/marenv/c044.htm
(Yearbook of International Co-operation on Environment and Development 1999/2000)

* This appendix was originally submitted to ECO ASIA long-term perspective Project (LTPP) 7th International Workshop, 22-23, Feb. 2000, Shonan International Village, Kanagawa, Japan. This is the revised version.

Appendix

The 9th Northeast Asian Conference on Environmental Cooperation



- Date : July 26-28, 2000
- Venue : Chinggis Khaan hotel, Ulaanbaatar, Mongolia
- Organized by : Ministry of Nature and Environment

PROGRAM

Wednesday, July 26, 2000

09.00-09.30	Registration
09.30-09.45	Opening Ceremony Opening Address S.Banzragch – State Secretary, Ministry of Nature and Environment
09.45-10.30	Keynote Speeches (10 minutes for each speech)
10.30-12.30	Session I : Forest Protection and Afforestation
12.30-14..00	Lunch
14.00-16.00	Session II: Water Contamination and Purification
18.00- 20.00	Reception -Hosted by Mr. S.Banzragch / State Secretary, Ministry of Nature and Environment/

Thursday, July 27, 2000

09.00-11.30	Session III : Extension of Network of the Special Protected Areas and Capacity Building
12.30-14.00	Lunch
14.00-16.00	Review and Future of the Northeast Asian Environmental Cooperation
17.00-18.00	Drafting Committee
19.30	Cultural program

Friday, July 28, 2000

09.00-12.30 Plenary session

- Adoption of Chairperson's Summary
- Selection of host country for the 10th NEAC
- Press conference

12.30-14.00	Lunch
14.00-20.00	Excursion to the Special protected area "Gorkhi -Terelj"
18.00	Farewell Party in "Terelj" Hosted by Mr.B. Ganbaatar, Director, Department of International Cooperation, MNE

THE 9TH NORTHEAST ASIAN CONFERENCE ON ENVIRIONMENTAL COOPERATION (NEAC)

JULY 26-28, 2000, CHINGGIS KHAAN HOTEL,
ULAANBAATAR, MONGOLIA

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