Hokkaido University International Symposium on Sustainable Development 2006

Report

Secretariat of Sustainability Weeks
Hokkaido University

March, 2017

About This Document

This is the report of the Hokkaido University International Symposium on Sustainable Development and other related events. This mainly consists of PDF files converted from websites and reports of the symposium.

To keep the records as of when the events were held, some pages include out-of-date information, website links, and contact information which is not valid currently.

This is the English annual report of the symposium 2006. Its Japanese version and other years' annual reports of "Sustainability Weeks" are available on the website as well. We are glad if you refer to them for your better understanding.

Also, please understand that it is difficult to answer inquiries about the event details since the only event planners and host members at that time have detailed information. We hope this document helps you somehow to contribute to achieve a sustainable society.

Secretariat of Sustainability Weeks
Hokkaido University
March, 2017

Contents

1. Overview of Activities

Overview

- Title of event : **Hokkaido University International Symposium on Sustainable Development and its related events**

- Event period : Sat, Aug 5 – Wed, Aug 9, 2006

- Objectives : Based on the Hokkaido University Initiative for Sustainable Development (HUISD), which was launched in 2005, Hokkaido University aims to promote international educational and research collaboration that transcends the boundaries of conventional academic disciplines and to work with Japanese businesses to offer the University's latest research achievements to society.

- Achievements:

(1) The holding of the Hokkaido University Sustainability Science Forum

As part of the Poplar Project jointly initiated by Hokkaido University, The Asahi Shimbun Company and Hokkaido Television Broadcasting Co., Ltd. in July 2005, the University and The Asahi Shimbun Company cohosted the *Hokkaido University Sustainability Science Forum: Future of Humanity and Global Environment – From the Forests and Sea in the North* in Tokyo and Sapporo in 2006. The Tokyo forum, held at Yurakucho Asahi Hall on the morning and afternoon of August 5, drew a total of 1,000 people, whereas the Sapporo forum, held on August 6 at Hokkaido University Conference Hall, attracted 310.

(2) The publication of an advertisement for and a report on the Hokkaido University Sustainability Science Forum in The Asahi Shimbun

- An article featuring a conversation between the president of JFE Holdings Corporation and an executive and vice president of Hokkaido University was published in the morning edition of The Asahi Shimbun on August 5 nationwide, excluding Hokkaido, and on August 6 in Hokkaido (approximately 8.2 million copies in total).

- An article reporting on the forum was published in the national morning edition of The Asahi Shimbun on August 23, 2008. The newspaper's Hokkaido edition ran the article in a double-page color spread (pp. 16-17).

(3) The holding of the Hokkaido University International Symposium on Sustainable Development

This symposium, held at Hokkaido University Conference Hall from August 7 to 9, 2006, attracted 948 people from 19 countries. The plenary session on Day 1

featured 11 invited speakers, who addressed issues in five priority fields and interdisciplinary challenges. On Day 2, participants were split into three different parallel sessions to discuss technical issues. On Day 3, a poster session and another plenary session were held, and the topics also included the future of international collaboration. The three-day event featured 65 oral presentations and 147 poster presentations. Many participants expressed hopes that the symposium would be continued in the future, which led to the launch of the Sustainability Weeks program in the following year.

2. Sustainability Science Forum


TOKYO
8月5日(土)東京開催
北海道大学サステナビリティー・サイエンス・フォーラム
DO 科学
人類と地球環境の明日
―北の森から、北の海から―
SAPPORO
8月6日(日)札幌開催

8月5日(土)東京開催 ■会場:有楽町朝日ホール

TOKYO

参加無料

【午前の部】 午前10時30分～(開場午前10時)

北大プレゼンテーション「環境技術が開くサステナビリティー」

1 主催者挨拶　北海道大学　中村睦男総長

2 基調講演:「環境技術のフロンティア」
講　師:鈴木基之氏(中央環境審議会会長、国際連合大学特別学術顧問)

3 プレゼンテーション　ガイド・進行:石　弘之氏(北海道大学公共政策大学院教授)
市川　勝氏(北海道大学名誉教授)
笹賀一郎氏(北海道大学北方生物圏フィールド科学センター長)
渡辺義公氏(北海道大学大学院工学研究科教授)

【午後の部】 午後2時～(開場午後1時30分)

東京市民シンポジウム「人類と地球環境の明日―北の森から、北の海から」

1 基調講演:「北海道で考える」
講　師:倉本　聰氏(作家)

2 パネルディスカッション:
「人類と地球環境の明日―北の森から、北の海から」
月尾嘉男氏(東京大学名誉教授)
柿澤宏昭氏(北海道大学大学院農学研究院教授)
若土正曉氏(北海道大学低温科学研究所長)
岸　玲子氏(北海道大学大学院医学研究科教授)
コーディネーター:石　弘之氏

鈴木基之(すずき　もとゆき)
東京大学生産技術研究所教授、同所長、国際連合大学副学長などを経て、現在、放送大学教授・東京世田谷学習センター所長、国際連合大学特別学術顧問、中央環境審議会会長。地球や環境の有限性に鑑み、これまでの人間の考え方(パラダイム)を変えていく重要性を訴えている。1941年、東京都出身。

市川　勝(いちかわ　まさる)
東京大学理学系研究科博士課程を修了後、(財)相模中央化学研究所、北海道大学教授を経て、現在、北海道大学名誉教授。専門は触媒化学とナノテク。水素社会実現に向け触媒によるメタンガスや工場副生水素の高度利用(水素貯蔵・供給とベンゼンの製造)に取り組む。1942年、東京都出身。

笹賀一郎(ささ　かいちろう)
北海道大学農学部附属演習林教授、同演習林林木育種試験場長などを経て、現在北海道大学北方生物圏フィールド科学センター長。専門分野は森林科学、森林環境機能学(特に防砂学・森林水文学)。流域保全および森林機能の解明と利用方法の確立を研究。1948年、宮城県出身。

渡辺義公(わたなべ　よしまさ)
カリフォルニア工科大学客員研究員、宮崎大学教授などを経て、現在、北海道大学大学院工学研究科教授。専門は環境工学、衛生工学、水処理工学。「膜技術」を用いた汚水処理や有用資源の回収など、持続可能な水・廃棄物代謝システムの構築に挑む。1945年、北海道出身。

石　弘之(いし　ひろゆき)
朝日新聞社編集委員、東京大学教授、駐ザンビア大使などを経て、現在、北海道大学公共政策大学院特任教授。専門は地球環境問題。国連環境計画や国連開発計画の上級顧問、国際協力機構参与などを歴任。地球規模で進行する環境問題に警鐘を鳴らし続ける環境ジャーナリストの草分け。1940年、東京都出身。

倉本　聰(くらもと　そう)
東京大学を卒業後、ニッポン放送を経てシナリオ作家として独立。主にテレビドラマ(「北の国から」「昨日、悲別で」「優しい時間」他多数)を手掛ける、プロのシナリオライター、役者養成のための「富良野塾」を主宰。CCC富良野自然塾理事長としてゴルフ場跡地再生にも取り組む。1935年、東京都出身。

月尾嘉男(つきお　よしお)
名古屋大学教授、東京大学教授、総務省総務審議官などを歴任。東京大学名誉教授。専門はシステム工学だがITや経済、地域活性化や環境問題などマルチに活躍中。知床や釧路湿原、四万十川など日本各地の自然豊かな土地に「環境と情報」をキーワードにした私塾を展開。1942年、愛知県出身。

若土正曉(わかつち　まさあき)
第17次日本南極地域観測越冬隊員、ワシントン大学海洋学部客員研究員、北海道大学低温科学研究所教授などを経て、現在、同研究所長。専門は海洋物理学。オホーツク海や南極海の海洋循環、海水変動のメカニズムなど、極域の海洋が世界気候に果たす役割の研究に取り組む。1944年、広島県出身。

柿澤宏昭(かきざわ　ひろあき)
ワシントン大学客員研究員などを経て、現在、北海道大学大学院農学研究院教授、森林遺法院採際題検討委員、総合地球環境学研究所共同研究員。専門は森林政策学、森林社会学。ロシアやアメリカなど北方圏諸国の森林政策に詳しく、その持続的管理や多目的利用を模索する。1959年、神奈川県出身。

岸　玲子(きし　れいこ)
北海道大学医学研究科博士課程を修了後、ハーバード大、札幌医科大学助教授などを経て、現在、北海道大学教授。専門は公衆衛生学や疫学。日本学術会議や公衆衛生に関する政府各種委員を歴任。北海道の地域特性を踏まえた調査研究により、健康障害のリスク評価や予防対策研究に取り組む。北海道出身。

8月6日(日)札幌開催 午後2時～(開場午後1時30分) ■会場:北海道大学学術交流会館

SAPPORO

参加無料

札幌市民シンポジウム

「人類と地球環境の明日―北の環境現場から」

1 基調講演:「ユニバソロジ的地球環境論」
講　師:毛利　衛氏(宇宙飛行士)

2 パネルディスカッション:「人類と地球環境の明日―北の環境現場から」
齊藤誠一氏(北海道大学大学院水産科学研究院教授)
池田元美氏(北海道大学大学院地球環境科学院教授)
大崎　満氏(北海道大学大学院農学研究院教授)
喜田　宏氏(北海道大学大学院獣医学研究科教授)
丸山博子氏(丸山環境教育事務所)
コーディネーター:辻　篤子氏(朝日新聞社論説委員)

毛利　衛(もうり　まもる)
北海道大学大学院修了後、南オーストラリア州立フリンダース大学院で理学博士号取得。北海道大学助教授を経て、1985年 NASDA(現JAXA)のペイロード・スペシャリスト。1998年よりNASAのミッション・スペシャリスト。1992年と2000年、スペースシャトルに搭乗。現在、日本科学未来館館長、東京工業大学連携教授、日本学術会議会員。1948年、北海道出身。

齊藤誠一(さいとう　せいいち)
日本IBM(株)東京サイエンティフィックセンター客員研究員、(財)日本気象協会研究所研究員などを経て、現在、北海道大学大学院水産科学研究院教授。専門は、衛星海洋学、海洋生態学、水産海洋学。衛星データとITを活用した漁場予測情報サービスにより持続可能な漁業を目指す。1953年、福井県出身。

池田元美(いけだ　もとよし)
東京大学工学系研究科博士課程修了後、カナダ水産海洋省ベッドフォード海洋研究所研究員などを経て、現在、北海道大学大学院地球環境科学院長。専門は気候変動学、海洋物理学。地球温暖化、生物多様性、水資源、食糧生産、エネルギー等、諸問題解決に向けた最適解提示を目指す。1946年、東京都出身。

大崎　満(おおさき　みつる)
北海道大学農学研究科博士課程修了後、国際コムギ・トウモロコシ改良センター(メキシコ)客員研究員などを経て、現在、北海道大学大学院農学研究院教授。植物の根の働きやその周辺に存在する微生物の研究を通じて、肥料や農薬に頼らない持続的農業の研究や循環型環境修復に取り組む。1950年、北海道出身。

喜田　宏(きだ　ひろし)
北海道大学獣医学研究科修士課程修了後、武田薬品工業株式会社技術研究職、北海道大学助教授などを経て、現在、同大学院獣医学研究科教授。人獣共通感染症リサーチセンター長を兼務。「インフルエンザ制圧のための基礎的研究」で日本学士院賞を受賞するなど、インフルエンザ研究の第一人者。1943年、北海道出身。

丸山博子(まるやま　ひろこ)
北海道教育大学卒業後、野生生物情報センターなどを経て、1992年に丸山環境教育事務所を設立。自然生態系を手本とした環境教育の研究や実践に止まらず、道教育大や道工業大で教鞭をとる。道や札幌市の各種委員をつとめ、広く市民協働のまちづくりを目指し、活動を進める。北海道出身。

託児・手話通訳ご利用いただけます。
(札幌開催のみ)

参加応募要項

参加ご希望の方は、住所、氏名、年齢、職業、電話番号、ご希望のプログラム区分(右記参照)を明記の上、ハガキかFAXでお記の宛先までご応募ください。また、託児・手話通訳を希望される方はその旨をご記入ください。

●**応募先**／ハガキ:〒104-8691　東京都京橋郵便局私書箱56号「北大SSフォーラム」係
FAX:「北大SSフォーラム」事務局
03-6226-5651
(お問い合わせは「北大SSフォーラム」事務局
TEL:03-6226-6682まで※土日祝日を除く平日10:00～18:00)

●**応募締切**／7月18日(火)消印有効
●**当選発表**／厳正なる抽選の上、招待状の発送をもって発表にかえさせていただきます。
※プログラムの区分
①／プレゼンテーション(午前の部)+東京市民シンポジウム(午後の部)
②／プレゼンテーション(午前の部)のみ
③／東京市民シンポジウム(午後の部)のみ
④／札幌市民シンポジウム

●**アスパラクラブのホームページからもご応募いただけます。**
http://aspara.asahi.com/
(会員登録が必要です)

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主催:北海道大学、朝日新聞社
後援:文部科学省、環境省、経済産業省、北海道、札幌市、北海道教育委員会、札幌市教育委員会、北海道環境財団

北海道大学サステナビリティー・サイエンス・フォーラムを開催

本学と朝日新聞社及び北海道テレビ放送は，それぞれが課せられた社会的責務を，より効果的かつ公正に果たすことを目的に提携・協力を進めることで平成17年７月に基本合意をしました。この基本合意の下での提携・協力を「ポプラプロジェクト」と称し，今回，その一環として「北海道大学サステナビリティー・サイエンス・フォーラム」を開催しました。

８月５日（土）は東京会場の有楽町朝日ホールで，午前の部として中村総長のあいさつにはじまり本学関係者によるプレゼンテーションが行われました。午後は作家の倉本聰氏による基調講演に引き続き「人類と地球環境の明日－北の森から，北の海から」と題してパネルディスカッションが行われました。当日の東京は気温，湿度とも高いにもかかわらず午前，午後合わせておよそ1,000名の参加があり，プレゼンテーションや講演に熱心に耳を傾けていました。

翌日の８月６日（日）は本学学術交流会館で開催され，宇宙飛行士の毛利衛氏の講演に引き続き「人類と地球環境の明日―北の環境現場から」と題してパネルディスカッションが行われました。札幌会場も定員310名を上回る参加がありました。

なお，講演の概要は後日，「持続可能な開発」国際戦略本部のホームページに掲載されます。

あいさつをする総長

東京会場の参加者

札幌会場のパネルディスカッションの様子

（「持続可能な開発」国際戦略本部・学術国際部国際企画課・総務部広報課）

「北海道大学サステナビリティー・サイエンス・フォーラム」

実 施 報 告 書

開催期日(場所):2006年8月5日(東京)・6日(札幌)

北海道大学
朝日新聞社

★★ポプラプロジェクトとは

2005年7月、北海道大学と朝日新聞社、HTB北海道テレビ放送は、「環境」を主要テーマとした提携・協力に関する基本合意を締結しました。この合意に基づき展開される様々な事業は、北大の象徴であるポプラ並木に因み「ポプラプロジェクト」と名付けられ、環境に関する研究成果の情報発信をはじめ、調査活動やイベントなど幅広い範囲で、三者が協力していくことになりました。

★★「北海道大学サステナビリティー・サイエンス・フォーラム」とは

今夏、北海道大学は国際発信能力を高める「大学国際化プロジェクト」の一環として、サステナビリティーをメインテーマに「持続可能な発展国際シンポジウム」を開催しました。世界24ヶ国400名以上の参加者を得たこの国際シンポジウムの開催を記念し、「ポプラプロジェクト」の一環として一般市民に広く開放されたイベントを開催すべく、「北海道大学サステナビリティー・サイエンス・フォーラム」は企画されました。北海道を代表とする北方圏の自然力と、北大が130年にわたって培ってきた知の資産、そこから、人類の未来に貢献できる知見や提言を、朝日新聞を通じて全国に向け発信すべく、東京と札幌で開催しました。

★★告知記事・PR

※1月6日付社告（北海道支社版朝刊）


北大と環境フォーラム

※6月18日付社告（全国版朝刊）


フォーラム「人類と地球環境の明日」

※6月16日付社告（北海道支社版朝刊）


人類と環境 8月にフォーラム

北大・本社共催 5日東京、6日札幌

※8月5日付当日記事（北海道支社版朝刊）


豊かな北の自然 役割を考える

北大・朝日新聞社がフォーラム

※8月5日付当日記事（東京本社版朝刊）


森林火災や地震研究 着々と

★★記念広告 （8月5日、6日付朝日新聞朝刊全国版）

※全5段告知広告（東京本社版用:6月22日、7月2日、16日付朝刊、7月6日付夕刊に掲載）


人類と地球環境の明日—北の森から、北の海から—

8月5日(日)開催

※全5段告知広告（北海道支社版用:6月24日付朝刊ほか、24回掲載）


人類と地球環境の明日—北の森から、北の海から—

8月6日(日)開催

「人類と地球環境の明日 —北の環境現場から」


—地球環境時代における北海道大学の役割—

「北大リサーチ&ビジネスパーク構想」への期待

"Be ambitious!"

北海道大学

★★開催概要

【北海道大学サステナビリティー・サイエンス・フォーラム】

主催：北海道大学、朝日新聞社
後援：文部科学省、環境省、経済産業省、北海道、札幌市、北海道教育委員会、札幌市教育委員会、北海道環境財団

【実施プログラム】

1）北大プレゼンテーション「環境技術が開くサステナビリティー」 （→報告書5ページ）

会　場：有楽町朝日ホール（来場者数480名）
日　時：2006年8月5日（土）午前10時30分～12時40分
① 基調講演：「環境技術のフロンティア」　鈴木 基之（国連大学特別学術顧問）
② 北大プレゼンテーション
市川　勝（北海道大学名誉教授）「触媒技術による資源とエネルギーの再生」
笹 賀一郎（北海道大学北方生物圏フィールド科学センター長）「森林における環境保全研究の最前線」
渡辺 義公（北海道大学大学院工学研究科教授）「水循環と希少資源回収の最新技術」
ガイド・進行：石　弘之（北海道大学公共政策大学院特任教授）

2）東京市民シンポジウム「人類と地球環境の明日―北の森から、北の海から」 （→報告書3ページ）

会　場：有楽町朝日ホール（来場者数580名）
日　時：2006年8月5日（土）午後2時～5時
① 基調講演：「北海道で考える」　倉本　聰（作家）
② パネルディスカッション「人類と地球環境の明日―北の森から、北の海から」（1時間50分）
出演者：
月尾 嘉男（東京大学名誉教授）
柿澤 宏昭（北海道大学大学院農学研究院教授）
若土 正曉（北海道大学低温科学研究所長）
岸　玲子（北海道大学大学院医学研究科教授）
コーディネーター：石　弘之（北海道大学公共政策大学院特任教授）

3）札幌市民シンポジウム「人類と地球環境の明日―北の環境現場から」 （→報告書4ページ）

会　場：北海道大学学術交流会館（来場者数310名）
日　時：2006年8月6日（日）午後2時～5時15分
① 基調講演：「ユニバソロジ的地球環境論」　毛利　衛（宇宙飛行士）
② パネルディスカッション「人類と地球環境の明日―北の環境現場から」
出演者：
齊藤 誠一（北海道大学大学院水産科学研究院教授）「リモートセンシングによる海洋生態系のモニタリング」
池田 元美（北海道大学大学院地球環境科学院教授）「地球よ、温暖化させても住まわせてくれますか?」
大崎　満（北海道大学大学院農学研究院教授）「食糧問題と持続可能な農業への転換」
喜田　宏（北海道大学大学院獣医学研究科教授）「環境問題としての鳥インフルエンザ」
丸山 博子（丸山環境教育事務所）「環境教育の20年」
コーディネーター：辻　篤子（朝日新聞社論説委員）

※敬称略

※講演の詳細は、北海道大学のホームページ http://www.hokudai.ac.jp/huisd でご覧いただけます。

北海道大サステナビリティー・フォーラム　人類と地球環境の明日

北の恵 忍び寄る影

作家 倉本聰氏

一枚でも葉をつくろう

パネリスト

月尾嘉男 東京大学名誉教授

若土正曉 北海道大学低温科学研究所長

檜津俊晴 北海道大学大学院農学研究院教授

岡崎子 北海道大学大学院医学研究科教授

石塚之 北海道大学大学院公共政策学連携研究部特任教授

東京会場 5日

月尾氏 経済と一体の再生を　檜津氏 森林回復で地域も活性

若土氏 栄養の宝庫の海も温暖化　岡氏 療養や自立支援にも一役

「矢印」探し 命守る

宇宙飛行士 毛利衛氏

人類共通の言葉は科学

パネリスト

コーディネーター 辻篤子 朝日新聞論説委員

札幌会場 6日

斎藤氏 海の健康は必須　池田氏 全体見渡す姿勢で　大越氏 潜在能力引き出そう

吉田氏 急激な変化が共生崩す　丸山氏 生態系の「物差し」持って

Do 科学

汚染・温暖化・森林火災…高まる危険

妊娠中や授乳期の飲酒は胎児・乳児の発育に悪影響を与えるおそれがあります。お酒は楽しく適量で。のんだあとはリサイクル。 飲酒は20歳になってから。

★★報道記事

※8月6日付東京会場報告記事（北海道支社版朝刊）

「北」の視点で環境語る

北大・本社フォーラム

「持続可能な発展」討議

東京会場

シンポジウムに先立ち、北大の研究者3人が、環境にかかわる研究成果を、発表した。

メタンから水素を製造

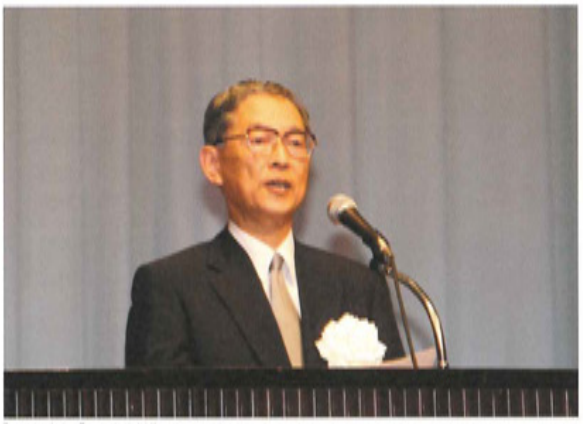
森林修復技術を体系化

下水のリン 回収可能に

※8月7日付
国際シンポジウム紹介記事
（北海道支社版朝刊）

研究者の情報交換
組織設立 あす提案

★★当日の模様



【東京会場】　中村総長あいさつ

【東京会場】　北大プレゼンテーション

【東京会場】　資料コーナーで北海道大学の情報収集をする参加者

【札幌会場】　パネルディスカッション

★★応募総数

① 東京会場（午前・午後通し）1,670名
② 東京会場（午前のみ）185名
③ 東京会場（午後のみ）629名
④ 札幌会場863名
※会場定員（東京638名、札幌310名）を勘案し、聴講券を発送した。

★★参加者数／参加者属性

① 参加者数：東京会場（午前）480名、同（午後）580名、札幌会場310名
② 参加者の構成（アンケートより）

【年齢】 いずれの会場も60代がもっとも多く、次が50代、70代以上の順。札幌会場はやや平均年齢は低くなっている。環境関連のイベントとしては、若年層の参加が比較的多かった。

【職業】 全体的に幅広い層からの参加が得られたが、会社員が多く、次いで主婦、自営業の順で参加が多かった。東京は専門的分野のプレゼンテーションもあったため、会社員の比率が高かった。札幌は会社員の比率が低く、教育関係者や学生の比率が高かった。

●年齢構成

年　齢	東京午前	東京午後	札　幌
10代	3.1%	1.4%	3.8%
20代	3.5%	3.1%	6.3%
30代	2.3%	2.7%	6.3%
40代	4.6%	5.5%	10.7%
50代	18.4%	23.0%	21.4%
60代	48.7%	43.5%	27.4%
70代以上	17.2%	17.4%	20.1%
その他・不明	2.2%	3.4%	4.0%

●職業構成

職　業	東京午前	東京午後	札　幌
会社員	29.1%	28.7%	16.6%
公務員	3.5%	4.8%	3.8%
自営業	8.8%	8.6%	8.8%
主婦（夫）	10.7%	9.6%	9.4%
NPO、NGO	3.5%	4.8%	3.1%
教育関係者	3.8%	5.1%	13.2%
学生	5.4%	3.1%	9.4%
その他・無職	35.2%	35.3%	36.7%

③ 認知経路
東京会場は8割強が朝日新聞の紙面による告知により、このフォーラムに参加した。札幌会場は北大ホームページや、実際に札幌市内で掲示、配布したポスター・チラシにより、フォーラムを認知した割合が高くなっている。

★★来場者の評価 （アンケート結果より）

【回答数】 東京午前が261通、東京午後が292通、札幌会場は159通のアンケートが得られた。

【評　価】 概ね7割がプラスの評価。不満は1割程度に止まる。

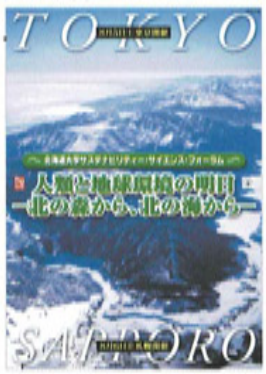
●評価

評　価	東京午前	東京午後	札　幌
満足	36.0%	37.3%	40.3%
まあ満足	35.6%	29.8%	33.3%
どちらとも言えない	10.3%	7.9%	7.6%
やや不満	8.1%	5.1%	8.2%
不満	3.1%	4.1%	3.8%
回答なし	6.9%	15.8%	6.8%

【北大の環境（技術）への取り組みへの関心の高まり】
参加前には北大の環境への取り組みを認知していたのは、東京会場では2割強、札幌でも4割強だったが、参加後はどの会場も9割前後の参加者が「関心が高まった」と回答している。

※ポスター

※チラシ表



※チラシ裏

※レジュメ　※パンフレット

3. International Symposium on Sustainable Development

北　海　道　大　学

「持続可能な発展」
国際シンポジウム

2006年8月7日～9日
北海道大学学術交流会館
（札幌市北区北8西5）

企画概要

今、人類社会は
持続不可能性という危機に
直面しています。
私たちの持続可能性（Sustainability）を
実現するために
研究者と高等教育機関の関係者が
学問領域を越えて
国境を越えて集まります。
「地球温暖化」
「水の統合的管理」
「循環型国際社会の構築」
「食糧・森林の安定的確保」
「感染症対策」について
分野横断的な科学的議論を展開し
研究と教育の両面で
持続可能な発展に貢献する
国際的な連携を図ります。

プログラム（予定）

8月7日（月） 9:00…全体会議（国内外11人の招待講演）

（講演者例）
- Prof. I. Yasui, Vice Rector of United Nations University, Japan
- Prof. K. J. Noone, Executive Director of IGBP, Royal Swedish Academy
- Prof. L. A. Mysak, McGill University, Canada
- Associate Prof. M. Schreurs, Maryland University, U.S.A.
- Prof. R.G. Webster, Director of WHO Collaborating Center for Studies on the Ecology of Influenza in Animals and Birds, U.S.A.
- Prof.T. Asano, University of California, Davis, U.S.A.
- Prof.N. El Bassam, President of the International Council of Sustainable Agriculture

8月8日（火） 9:00…分科会

分科会1: International Symposium- How to sustain Agrosphere, Biosphere and Geosphere in Asia
分科会2: Protection of Society from Infectious Threat
分科会3: Sustainable Metabolic Systems of Water & Waste for Area-based Society

8月9日（水） 9:00…全体会議とポスターセッション、まとめ

『持続可能性のための高等教育機関の役割』と『環境と開発に関する具体的な事例・警鐘と対策・提言』について講演、発表と議論

（講演者例）
- Dr. S. Shaeffer, Director UNESCO Bangkok
- Prof. P. Baklanov, Pacific Inst. Geography, Russia

【使用言語】英語　【参加料】無料　【申込方法】申込み用紙（下記HP上に掲載）に必要事項を記入し、下記のあて先までメールもしくはFAXで送って下さい。

主催：北海道大学「持続可能な発展」国際シンポジウム組織委員会

「持続可能な発展」国際シンポジウム実行委員会事務局（国際企画課内）

TEL 011-706-2916　FAX 011-706-2095

E-mail: kouryu@general.hokudai.ac.jp

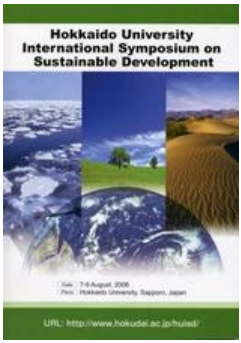
8月9日の全体会議における
ポスターセッションの
発表者を募集します

詳しくは漸次更新されるHPをご覧ください。 URL: http://www.hokudai.ac.jp/huisd/

Date Aug. 7-9, 2006 (Finished)

The Hokkaido University International Symposium on Sustainable Development was held on 7-9th August, 2006 in Sapporo, Hokkaidom, Japan.

It was the first multidisciplinary international meeting of its kind, bringing together educators of higher educational institutes and researchers to share their views of the sustainable development. About 950 educators and researchers from 19 countries and regions, representing fields as diverse as Earth Science, Ecology, Veterinary, Engineering, Political Science, Education and more, gathered for three days in Sapporo. All abstract and presentation data are available:



A major goal for the Symposium was to serve as a springboard for international collaboration toward the global sustainability among educators and researches beyond academic, national and regional boundaries. Many participants have told us about new insights and connections gained through the unique environment of the multidisciplinary meeting.

The Symposium finished with the proposals for creation of a network, named, "Hokudai Network for Global Sustainability". The Network is to accelerate education and research on Sustainable Development by sharing ideas and information through internet by increasing the visibility of the good practice and by enhance collaborative activities. The symposium also proposed the reunion, meeting at the next symposium held in 2009, with achievements of research and education.

The project team of Hokkaido University Initiative on Sustainable Development (HUISD) would take a central role of designing and operating the effective network activity. By doing so, Hokkaido University would accelerate further contributions to the global issue.

Picture Album: Hokkaido University International Symposium 2006

(Left side) Prof. K. Shetty speaches on "Sustainable Food Production:

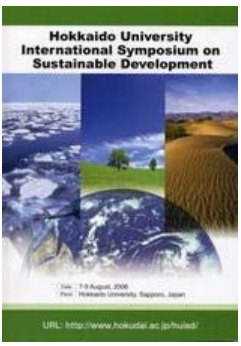
Integration of Emerging Global Food, Health and Environmental Challenges"

(Right side) Prof. K. J. Noone speaches "Creating an Applied Earth System Science:

Linking Global Environmental Change Science toSustainability Issues"

Hokkaido Uni. Int'l Symposium on SD in 2006

Date August 7-9, 2006 **(Finished)**



The Hokkaido University Symposium on Sustainable Development in 2006 had three different themes on each day. Its program with the theme led participants to have wide view and discuss for the future.
DAY1: Comprehensive View of Sustainable Development
DAY2: Sharing Recent Research Results
DAY3: Prospects for Means of Solution
Speech titles and speakers are as follows:

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DAY One: 7 August, 2006
Plenary Sessions: Comprehensive View of Sustainable Development

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Opening

Keynote Speech
"Prospects of the 21st Century with Respect to Sustainability" by Itaru Yasui, United Nations University, Japan

Session 1. " Sustainability of the Earth System"

Chaired by:
Motoyoshi Ikeda , Graduate School of Environmental Science Hokkaido University
1-1) "Creating an Applied Earth System Science: Linking Global Environmental Change Science to Sustainability Issues" by Kevin J. Noone, International Geosphere-Biosphere Programme (IGBP), The Royal Swedish Academy of Sciences, Sweden
1-2) "Glacial Inceptions: Past and Future" by Lawrence A. Mysak, Department of Atmospheric and Oceanic Sciences, McGill University, Canada
1-3) "Ecological Constrains on System Sustainability" by Takashi Kohyama, Faculty of Environmental Science, Hokkaido University
1-4) Summary by the Chairperson

Session 2. "Sustainable Society with Recycling System"

Chaired by:
Yoshimasa Watanabe, Graduate School of Engineering Hokkaido University
2-1) "Recovering Sustainable Water from Wastewater" by Takashi ASANO, Department of Civil and Environmental Engineering, University of California, Davis, U.S.A.
2-1) "Mottainai: A Comparative Study of the Politics of Innovation in Waste Management" by Miranda A. Schreurs, Department of Government and Politics, Maryland University, U.S.A.

2-3) “Sustainable and Cyclical Economy of Asia” by Fumikazu Yoshida, Graduate School of Public Policy, Hokkaido University
2-4) Summary by the Chairperson

Session 3. “Emerging Infections and Global Environment”

Chaired by:
Tsukasa Seya , Graduate School of Medicine Hokkaido University
3-1) “Ecology and Evolution of Influenza Viruses: Preparation for the Occurence of Highly Pathogenic Avian Influenza and the Possibility of a Human Pandemic of Influenza” by Robert G. WEBSTER, Division of Virology, Department of Infectious Diseases, St. Jude Children’s Research Hospital, U.S.A.
3-2) “Are We Prepared for Emerging Zoonoses?” by Hiroshi KIDA, Research Center for Zoonosis Control, Hokkaido University
3-4) Summary by the Chairperson

Session 4. “Sustainability Governance on Food and Bioresource”

Chaired by:
Yutaka Saito, Sustainability Governance Project(SGP), Hokkaido University
4-1) ” Understanding and Approach to ‘Sustainability’ Science of Fisheries”by Teisuke Miura, Graduate School of Fisheries Sciences, Hokkaido University
4-2) “Strategy towards Achievement of Sustainable Agriculture for Food, Energy and the Environment in the Age of the Globalization” by Nasir El Bassam, International Research Centre for Renewable Energy (IFEED), Germany
4-3) “The Sustainability of Bio-production Systems” by Mitsuru Osaki, Sustainability Governance Project (SGP), Hokkaido University
4-4) Summary by the Chairperson

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DAY Two: 8 August, 2006
Parallel Sessions Theme: Sharing Recent Research Results

Session 1: International Symposium – How to sustain Agrosphere, Biosphere and Geosphere

Session 2: Protection of Society from Infectious Threat

Session 3: Sustainable Meatbolic System of Water and Waste for Area-Based Society

Group 1. Innovation of Membrane Technology for Water and Wastewater Treatment -IMTEC Sapporo
Group 2. Strategy for Sustainable Solid Waste Management

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DAY Three: 9 August, 2006
Plenary Sessions: Prospects for Means of Solution

Session 1. Roles of Higher Education and International Collaboration for Sustainable Development

Chaired by:
* Takeshi Kishinami, Hokkaido University
* Midori Yamagishi
1-1) Keynote Speech: "Education for Sustainable Development: If Not the Solution, At Least a Start" by Sheldon Shaeffer, UNESCO Bangkok, Thailand
1-2) Panel Discussion
*Coodinator: Norihito Tambo, The University of the Air, Japan
* Panelist:
— John Cusick, Environmental Center, University of Hawai'i at Manoa, U.S.A.
— M. Harun-ur-Rashid, Bangladesh Agricultural Research Institute, Bangladesh
— Motoyoshi Ikeda, Graduate School of Environmental Science, Hokkaido University
— Stephen Lincoln, School of Chemistry and Physics, University of Adelaide, Australia
— Sheldon Shaeffer, UNESCO Bangkok, Thailand

Session 2. Poster Session

Session 3. Countermeasures for Sustainable Development

Chaired by:
*Oleg Shcheka , Department of International Programs and Projects Far Eastern Branch of the Russian Academy of Sciences, Russia
*Takayuki Shiraiwa , Research Institute for Humanity and Nature, Japan
3-1) Keynote Speech: "Interaction between the Amur River Watershed and the Sea of Okhotsk in a Model of a Sustainable Development" by Petr Y. BAKLANOV, Pacific Institute of Geography, Far Eastern Branch of the Russian Academy of Sciences, Russia
3-2) "Sustainable Food Production: Integration of Emerging Global Food, Health and Environmental Challenges" by Kalidas Shetty, Department of Food Science, University of Massachusetts, Amherst, U.S.A.
3-3) "The Land Use Change in Northeast of China Since 1980" by Bai Zhang, Northeast Institute of Geography and Agricultural Ecology, Chinese Academy of Sciences, China
3-4) "An Evaluation of Water Allocation Mechanisms: A Korean Case" by Dong-Geun Han, College of Economics and Finance, Yeungnam University, Korea
3-5) "Challenges and Strategies for the Planning of Sustainable Landscapes" by Jack Ahern, Department of Landscape Architecture and Regional Planning, University of Massachusetts, Amherst, U.S.A.
3-6) "Creating Effective International Regimes: New Approach of Political Science" by Toru Miyamoto, Graduate School of Public Policy, Hokkaido University, Japan
3-7) Summary by the Chairperson and the Co-Chairperson

Session 4. Summary of the Symposium

* Summary of Parallel Session 1
* Summary of Parallel Session 2
* Summary of Parallel Session 3
* Summary of the Symposium

Organization	Faculty of Environmental Earth Science, Graduate School of Engineering, Graduate School of Fisheries Sciences, Graduate School of Public Policy, HUISD (Hokkaido

Hokkaido University International Symposium on Sustainable Development

Date 7-9 August, 2006

Place Hokkaido University, Sapporo, Japan

URL: http://www.hokudai.ac.jp/huisd/

Hokkaido University International Symposium on Sustainable Development

Foreword

It is our great pleasure to host an International Symposium on Sustainable Development.

Human beings are currently facing a variety of crises, e.g. deterioration of the global environment, energy shortages, food shortages and global warming. All of these crises concern the survival of human beings and the sustainability of human society. The United Nations and a number of other international institutions have repeatedly presented various appeals concerning sustainability due to their anxieties about the issues.

In Japan, a myriad of actions have also been taken in response to these international demands. Also in academic circles, sustainability has been discussed in various fields, but a major trend has not yet been created.

Hokkaido University has abundant track record and accumulation of expertise to respond to international demands in extensive academic fields that constitute the foundation of sustainability. The typical academic fields are "global warming," "integrated water management," "establishment of a recycle-oriented international community," "stabilized securement of food and forest" and "measures against infectious diseases."

We are very much honored to have distinguished speakers and participants from around the world in an international symposium on "sustainable development" with the focus in these areas. We hope this symposium will promote international collaboration in both education and research by transcending academic, national and regional boundaries. And also we hope that the symposium will be one of the important steps towards the establishment of the sustainable society and that Sapporo will be a center of such activities.

Mutsuo Nakamura
President
Hokkaido University

Background of this Symposium

~The Internationalization Strategy on Sustainable Development at Hokkaido University~

Hokkaido University, aspiring to promote its activities in the fields of education, research and social contribution as an internationally characteristic university, is engaged in various activities.

Four major activities to promote internationalization are:

(1) Reinforcement of exchanges with universities worldwide

Hokkaido University has concluded the Exchange Agreements with 141 universities (as of 1 April, 2006), including the Departmental Exchange Agreements, thereby widening the scope of exchanges of faculty members and students. We have, at the same time, been actively holding university-wide bilateral symposiums with our partner universities, thereby strengthening the cooperative activities with the limited number of partners.

(2) Increase in the number of international students

Today over 800 foreign students have been studying on campus at Hokkaido University. We have formulated the "Strategic Plan for International Activities" and have been promoting exchanges with Northeast Asia, particularly China, South Korea and Taiwan, in order to increase the number of international students..

(3) Strengthening international public relations activities and overseas networks

We have newly published and widely distributed the Hokkaido University introductory pamphlet's in Chinese and Korean versions in addition to English. The quarterly-published English and Chinese Newsletter also introduce Hokkaido University's most recent activities in an easy-to-understand manner. We have established a liaison office in Beijing in April 2006 to provide more information and better services for Chinese researchers and students, as well as to support former international students in alumni associations' activities.

(4) Promotion of international cooperation

We concluded the Comprehensive Partnership Agreement with the Japan International Cooperation Agency (JICA) in April 2005, forging a stronger cooperative framework than ever. Furthermore, we have accepted trainees regarding the establishment of a waste disposal system in Inland China in collaboration with the Japan Bank for International Cooperation (JBIC).

In addition to the above mentioned activities, Hokkaido University has started new challenges in the field of Sustainable Development. The concept of sustainable development involves environmental perspectives, such as the responsible use and conservation of the earth's finite resources, as well as economic and social perspectives, such as continued life and prosperity of humanity. Thus, sustainable development contains three elements - environment, economy and society. Sustainable development has become a shared concept in

the international community as evidenced by its reoccurrence at various United Nations conferences as well as throughout academia, such as the Science Council of Japan, which, for example, stated that a keyword running through all of its targeted missions is "sustainability, that is, the harmony between environment and economy" in the Principles of Strategic Science and Technology Policy, Japan, which were released in the spring of 2005.

The single phrase "internationalization of universities" actually involves extensive areas and diverse approaches. Our first target is internationalization in the area of sustainable development. We intend to implement strategies concerning research, education and social contribution, by focusing on enhancements of functions in the following four areas: (1) international research partnership; (2) international education partnership; (3) international cooperation, public relations and brand equity; and (4) comprehensive support (services) for international exchanges.

Hokkaido University Initiative for Sustainable Development, established in November 2005, has declared its objectives as follows:

- To make well known to the rest of the world the fact that Hokkaido University has practiced internationally competitive education and research;
- To make the university have a high affinity with the international community and abound in diversity;
- To make greater contributions to the international community through the spread of academic results and policy recommendations as well as the development of international cooperation activities

We at Hokkaido University have enough track record and accumulation of expertise to respond to international demands in extensive academic fields that constitute the foundation of sustainability. The representative academic fields are as follows:

- "Global warming"
- "Integrated water management"
- "Establishment of a recycle-oriented international community"
- "Stabilized supply of food and secured forest"
- "Measures against infections diseases"

I hope that plenty of fruitful discussion will be made during this international symposium, and your stay in Sapporo will be pleasant and memorable one.
Thank you.

Takeshi Kishinami
Vice President
Hokkaido University

Hokkaido University International Symposium on Sustainable Development - Program -

Sunday, August 6

Registration & Welcome Party

6:00pm - 7:30pm	*Registration at Hokkaido University Conference Hall*
	Welcome Party at Hokkaido University Centennial Hall

Day One: Monday, August 7

Plenary Sessions: Comprehensive View of Sustainable Development

at Hokkaido University Conference Hall - Auditorium A

8:00am -	*Registration*

Opening

8:30am - 9:00am	*Opening Address* **Mutsuo Nakamura**, Hokkaido University
	Congratulatory Speech by Guest of Honor **Daisuke Machida**, International Science and Technology Affairs Division, Ministry of Education, Culture, Sports, Science and Technology (MEXT), Japan
	Presentation: Background of This Symposium **Takeshi Kishinami**, Hokkaido Unviersity

Keynote Speech

9:00am - 9:45am	*Prospects of the 21st Century with Respect to Sustainability* **Itaru Yasui**, United Nations University, Japan …P1-3
9:45am - 10:00am	*Break*

Session 1. Sustainability of the Earth System

Chairperson: **Motoyoshi Ikeda**, Faculty of Environmental Earth Science, Hokkaido University …P4

10:00am - 10:40am	*Creating an Applied Earth System Science: Linking Global Environmental Change Science to Sustainability Issues* **Kevin J. Noone**, International Geosphere-Biosphere Programme (IGBP), The Royal Swedish Academy of Sciences, Sweden …P5-6
10:40am - 11:20am	*Glacial Inceptions: Past and Future* **Lawrence A. Mysak**, Department of Atmospheric and Oceanic Sciences, McGill University, Canada …P7-8
11:20am - 11:50am	*Ecological Constraints on System Sustainability* **Takashi Kohyama**, Faculty of Environmental Earth Science, Hokkaido University …P9-10
11:50am - 1:00pm	*Lunch Break*

Session 2. Sustainable Society with Recycling System

Chairperson: **Yoshimasa Watanabe**, Graduate School of Engineering, Hokkaido University …P12

1:00pm - 1:40pm	*Recovering Sustainable Water from Wastewater* **Takashi Asano**, Department of Civil and Environmental Engineering, University of California, Davis, U.S.A. …P13-14
1:40pm - 2:20pm	*Mottainai: A Comparative Study of the Politics of Innovation in Waste Management* **Miranda Schreurs**, Department of Government and Politics, University of Maryland, U.S.A. …P15-16
2:20pm - 2:50pm	*Sustainable and Cyclical Economy of Asia* **Fumikazu Yoshida**, Graduate School of Public Policy, Hokkaido University …P17-18
2:50pm - 2:55pm	*Break*

Session 3. Emerging Infections and Global Environment

Chairperson: **Tsukasa Seya**, Graduate School of Medicine, Hokkaido University …P20

2:55pm - 3:35pm	*Ecology and Evolution of Influenza Viruses: Preparation for the Occurrence of Highly Pathogenic Avian Influenza and the Possibility of a Human Pandemic of Influenza* **Robert G. Webster**, Department of Infectious Diseases, St. Jude Children's Research Hospital, U.S.A. …P21-22
3:35pm - 4:05pm	*Are We Prepared for Emerging Zoonoses?* **Hiroshi Kida**, Research Center for Zoonosis Control, Hokkaido University …P23-24
4:05pm - 4:20pm	*Break*

Session 4. Sustainability Governance on Food and Bioresource

Chairperson: **Yutaka Saito**, Sustainability Governance Project (SGP), Hokkaido University …P26

4:20pm - 4:50pm	*Understanding and Approach to "Sustainability" Science of Fisheries* **Teisuke Miura**, Graduate School of Fisheries Sciences, Hokkaido University …P27-28
4:50pm - 5:30pm	*Strategy towards Achievement of Sustainable Agriculture for Food, Energy and the Environment in the Age of the Globalization* **Nasir El Bassam**, International Research Centre for Renewable Energy (IFEED), Germany …P29-30
5:30pm - 6:00pm	*The Sustainability of the Bio-production Systems* **Mitsuru Osaki**, Sustainability Governance Project (SGP), Hokkaido University …P31-32
6:00pm - 7:00pm	*Move to Hotel*

Reception hosted by Mutsuo Nakamura, President of Hokkaido University

7:00pm - 9:00pm	at Keio Plaza Hotel Sapporo: Kita 5 Nishi 7 Tel +81-(0)11-271-0111 Fax +81-(0)11-271-7943

Day Two: Tuesday, August 8

Parallel Session 1:
International Symposium - How to Sustain Agrosphere, Biosphere and Geosphere

at Hokkaido University Conference Hall - Auditorium A

8:00am -	*Registration*

Opening

8:30am - 9:00am	*Opening Remarks* **Yoshihito Osada**, Hokkaido University **Mitsuru Osaki**, Sustainability Governance Project (SGP), Hokkaido University **Takashi Kohyama**, Faculty of Environmental Earth Science, Hokkaido University

Morning Session:

Progressive Approach on the Sustainable Fisheries Management

9:00am - 9:20am	*Creating "Safe and Worry-Free" Salmon Products Using a HACCP System Form Fishing through Processing to Distribution* **Mamoru Yoshimizu**, Graduate School of Fisheries Science, Hokkaido Universtiy
9:20am - 9:40am	*Genetic Approach to Management and Sustainable Use of Marine Bio-Resources* **Syuichi Abe, Moongeum Yoon and Noriko Azuma**, Graduate School of Fisheries Science, Hokkaido University
9:40am - 10:00am	*The Shiretoko World Natural Heritage Including Marine and Land Ecosystems: Towards Coexistence with Marine Diversity and Fisheries* **Yasunori Sakurai and Masahide Kaeriyama**, Graduate School of Fisheries Science, Hokkaido University

Roles of the Coupled System of Biosphere and Geosphere

10:00am - 10:20am	*Development of an Integrated Ocean Model for Understanding Changes in Ecosystem in the Western North Pacific Associated with Global Warming* **Yasuhiro Yamanaka**, Graduate School of Environmental Science, Hokkaido University
10:20am - 11:00am	*Coffee Break and Poster Session*
11:00am - 11:20pm	*Material Transports from River to Ocean and Their Contribution to Marine Biological Productivity* **Takeshi Nakatsuka**, Institute of Low Temperature Science, Hokkaido Unviersity
11:20am - 11:40am	*Present and Future of Terrestrial Ecosystem Models: Modeling Atmosphere-Vegetation Interactions* **Toshihiko Hara**, Institute of Low Temperature Science, Hokkaido University
11:40am - 12:00pm	*21st Century Center of Excellence Program 'Prediction and Avoidance of an Abrupt Change in Bio-Geosphere System'* **Motoyoshi Ikeda**, Faculty of Environmental Earth Science, Hokkaido University
12:00pm - 1:00pm	*Lunch Break*

Afternoon Session

1:00pm - 1:20pm	*Sustainable Food, Water and Energy in Asia* **Kensuke Fukushi**, IR3S, University of Tokyo, Japan

3rd Biomicrocosmos Workshop: Sustainability and Security of Food Production

1:20pm - 1:35pm	*Importance of Rhizosphere Research for Sustainable and Safe Food Production* **Jun Wasaki**, Creative Research Initiative 'Sousei' (CRIS), Hokkaido University
1:35pm - 1:55pm	*Soil Quality Evaluation and Sustainable Agriculture Development in the Region of Southwest Yunnan, China* **Zhang Naiming**, Yunnan Agriculture University, China
1:55pm - 2:15pm	*Arsenic Contamination of Groundwater: Food Safety and Human Health Hazard in Bangladesh* **M. Harun-ur-Rashid**, Bangladesh Agricultural Research Institute, Bangladesh
2:15pm - 2:35pm	*Improvement of P Uptake from Acid Soil by Transgenic Plants with Modified Citrate Metabolism* **Hiroyuki Koyama**, Gifu University, Japan
2:35pm - 3:20pm	*Coffee Break and Poster Session*
3:20pm - 3:40pm	*Mycorrhizal Fungi in the Tropical Rain Forest of Indonesia and its Utilization for Reforestation* **Keitaro Tawaraya**, Yamagata University, Japan

Integrative Perspective on the Sustainable Earth

3:40pm - 4:00pm	*Latest Progress on Land System Studies in China* **He-Quing Huang**, Chinese Academy of Sciences, China
4:00pm - 4:20pm	*Prospects and Roles of Global Land Project* **Billie Turner**, Clerk University, U.S.A.
4:20pm - 4:30pm	*Break*
4:30pm - 5:30pm	*Concluding Discussion*
6:30pm - 8:00pm	*Welcoming Party at Restaurant ELM in the Faculty House ENREISO*

Day Two: Tuesday, August 8

Parallel Session 2: Protection of Society from Infectious Threat

at Hokkaido University Conference Hall - Auditorium B

8:00am -	*Registration*

Morning Session

Opening

9:30am - 9:35am	*Welcoming Address* **Takashi Umemura**, Graduate School of Veterinary Medicine, Hokkaido University
9:35am - 9:40am	*Opening Remarks* **Hiroshi Kida**, Research Center for Zoonosis Control, Hokkaido University

Session 1

9:40am - 10:20am	*Ecology and Evolution of Influenza Viruses, Preparation for the Occurrence of Hightly Pathogenic Avian Influenza and the Possibility of a Human Pandemic of Influenza* **Robert G. Webster**, Department of Infectious Diseases, St. Jude Children's Research Hospital, U.S.A.
10:20am - 10:50am	*Computer Analysis for the Prediction of Structural Changes in Hemagglutinins of Future Antigenic Variants of Influenza Viruses* **Kimihiko Ito**, Research Center for Zoonosis Control, Hokkaido University
10:50am - 11:20am	*Coffee Break*

Session 2

11:20am - 12:00pm	*Deciphering Mechanisms of Prion Transmission Using Transgenic Mice* **Glenn C. Telling**, Department of Microbiology, Immunology and Molecular Genetics, University of Kentucky, U.S.A.
12:00pm - 12:30pm	*Tuberculosis: Research for Control Measures* **Yasuhiko Suzuki**, Research Center for Zoonosis Control, Hokkaido University
12:30pm - 2:00pm	*Lunch Break*

Afternoon Session

Session 3

2:00pm - 2:40pm	*Bats, Civets and Emergence of SARS* **Lin-Fa Wang**, CSIRO Livestock Industries, Australian Animal Health Laboratory, Australia
2:40pm - 3:20pm	*Japanese Encephalitis Molecular Epidemiology Implies Possible Rapid West Nil Virus Expansion: Development of West Nile Fever Vaccines* **Kouichi Morita**, Institute of Tropical Medicine, Nagasaki University, Japan
3:20pm - 3:50pm	*Epidemiology and Pathogenesis of Ebola Hemorrhagic Fever* **Ayato Takada**, Research Center for Zoonosis Control, Hokkaido University
3:50pm - 4:20pm	*Coffee Break*

Session 4

4:20pm - 5:00pm	*Control of Echinococcosis — the State of the Art* **Thomas Romig**, Dept. of Parasitology, University of Hohenheim, Germany
5:00pm - 5:30pm	*African Trypanosomiases* **Chihiro Sugimoto**, Research Center for Zoonosis Control, Hokkaido University
5:30pm - 5:35pm	*Closing Remarks* **Ikuo Takashima**, Graduate School of Veterinary Medicine, Hokkaido University

Day Two: Tuesday, August 8

Parallel Session 3:
Sustainable Metabolic System of Water and Waste for Area-Based Society

at Hotel Royton Sapporo

Group 1. Innovation of Membrane Technology for Water and Wastewater Treatment - IMTEC Sapporo -

8:30am -	*Registration*

Morning Session

Opening

9:00am -	*Opening Address and a Brief Report on the Current Status of Membrane Technology in Japan* **Yoshimasa Watanabe**, COE Program Leader, Hokkaido University
9:40am -	*Track for Wastewater* Moderator: **Kazuo Yamamoto**, Environmental Science Center, University of Tokyo, Japan
9:40am - 10:30pm	*Performance of Pre-denitrification Submerged Membrane Bioreactor (MBR) under Various Solid Retention Times* Speaker: **Ong Say Leong**, Center for Water Research, Division of Environmental Science & Engineering, National University of Singapore, Singapore *Effect of SRT on Membrane Fouling and Performance* Discusser: **Hang-Sik Shin**, Department of Civil and Environmental Engineering, KAIST, Korea
10:30am - 11:20am	*An Approach towards a Better Understanding of Fouling Phenomena in MBR* Speaker: **Roger Ben Aim**, Laboratory of Environmental Engineering (LIPE), INSA Toulouse, France *An Alternative Approach towards a Better Understanding of Fouling Phenomena in MBR* Discusser: **Duu-Jong Lee**, Department of Chemical Engineering, National Taiwan University, Taiwan
11:20am - 12:10pm	*Membrane Biofouling in the MBR Treating Domestic Wastewater: Identification of Key Players in Membrane Biofouling* Speaker: **Satoshi Okabe**, Graduate School of Engineering, Hokkaido University *Is Biofilm Formation The Key Player in MBR Biofouling?* Discusser: **Guang-Hao Chen**, Department of Civil Engineering, Hong Kong University of Science & Technology, China
12:10am - 1:30pm	*Lunch Break*

Afternoon Session

1:30pm -	*Track for Drinking Water I* Moderator: **Shin-ichi Nakao**, School of Engineering, University of Tokyo, Japan
1:30pm - 2:20pm	*Nanomaterials and Membranes for Water and Wastewater Treatment* Speaker: **Mark R. Wiesner**, Pratt School of Engineering, Duke University, U.S.A. *Nanosized Materials in Membrane Applications* Discusser: **Yoshihiko Matsui**, Graduate School of Engineering, Hokkaido University
2:20pm - 3:10pm	*Mechanism Involved in the Evolution of Irreversible Fouling in Microfiltration (MF) and Ultrafiltraion (UF) Membranes Used for Water Treatment* Speaker: **Katsuiki Kimura**, Graduate School of Engineering, Hokkaido University *Discussion of "Mechanism Involved in the Evolution of Irreversible Fouling in Microfiltration (MF) and Ultrafiltration (UF) Membranes Used for Water Treatment by Kimura et al. (2006)"* Discusser: **Gary Amy**, Institute for Water Education, UNESCO IHE, The Netherlands

3:10pm - 3:30pm	*Break*
3:30pm -	*Track for Drinking Water II* Moderator: **Yoshimasa Watanabe**, Graduate School of Engineering, Hokkaido University
3:30pm - 4:20pm	*Recovery of Spent Filter Backwash Water Using Coagulation-Assisted Membrane Filtration* Speaker: **Chihpin Huang**, Institute of Environmental Engineering, National Chiao Tung University, Taiwan
	Discussion for "Recovery of Spent Backwash Water Using Coagulation-Assisted Membrane Filtration" Discusser: **So-Ryong Chae**, Graduate School of Engineering, Hokkaido University
4:20pm - 5:10pm	*Low Pressure Membrane Filtration for Drinking Water Production in Germany : State of the Art and Future Developments* Speaker: **Stefan Panglisch**, Department of Water Technology, IWW Water Center, Germany
	Comment on "Low Pressure Membrane Filtration for Drinking Water Production in Germany State of the Art and Future Developments" Discusser: **Chung-Hak Lee**, School of Chemical and Biological Engineering, Seoul National University, Korea
5:10pm - 5:30pm	*Closing*
6:00pm -	*Party*

Day Two: Tuesday, August 8

Parallel Session 3:
Sustainable Metabolic System of Water and Waste for Area-Based Society

at Hotel Royton Sapporo

Group 2. Strategy for Sustainable Solid Waste Management

8:30am -	*Registration*
Opening	
1:30pm -	*Opening* **Toshihiko Matsuto**, Graduate School of Engineering, Hokkaido University
Session	
1:40pm - 2:40pm	*Waste Management, an Integrated Part of Sustainable Resource Management* **Paul H. Brunner**, Institute for Water Quality, Resource and Waste Management, Vienna University of Technology, Austria
2:40pm - 3:40pm	*Sustainable Land Disposal: Definitions and Possible Approaches* **Luis F. Diaz**, Calrecovery, Inc., U.S.A.
3:40pm - 4:00pm	*Coffee Break*
4:00pm - 5:00pm	*Integrated Strategy of Recycling in Korea* **Dong-Hoon Lee**, Department of Environmental Engineering, University of Seoul, Korea
5:00pm - 5:30pm	*Discussion*
5:30pm -	*Closing*

Day Three: Wednesday, August 9

Plenary Sessions: Prospects for Means of Solution

at Hokkaido University Conference Hall - Auditorium A

Session 1. Roles of Higher Education and International Collaboration for Sustainable Development

Chairperson: **Takeshi Kishinami**, Hokkaido University ···P34

Keynote Speech

9:00am - 9:30am

Education for Sustainable Development: If Not the Solution, At Least a Start

Sheldon Shaeffer, UNESCO Bangkok, Thailand ···P35-36

Panel Discussion

Coordinator: **Norihito Tambo**, University of the Air, Japan ···P37

9:30am - 11:30am

Panelists:

John Cusick, Environmental Center, University of Hawai'i at Manoa, U.S.A. ···P38

Stephen Lincoln, School of Chemistry and Physics, University of Adelaide, Australia ···P39

M. Harun-ur-Rashid, Training & Communication Wing, Bangladesh Agricultural Research Institute (BARI), Bangladesh ···P40

Motoyoshi Ikeda, Faculty of Environmental Earth Science, Hokkaido University ···P4

Sheldon Shaeffer, UNESCO Bangkok, Thailand ···P35

Session 2. Poster Session
Higher Education and Countermeasures for Sustainable Development

11:30am - 12:15pm *Poster Session at Room 1*

12:15pm - 1:15pm *Lunch Break*

Session 3. Countermeasures for Sustainable Development

Chairperson: **Oleg Shcheka**, Department of International Programs and Projects, Far Eastern Branch of the Russian Academy of Sciences, Russia ···P41

Co-Chairperson: **Takayuki Shiraiwa**, Research Institute for Humanity and Nature, Japan ···P42

Keynote Speech

1:15pm - 1:45pm

Interaction between the Amur River Watershed and the Sea of Okhotsk in a Model of a Sustainable Development

Petr Y. Baklanov, Pacific Institute of Geography, Far Eastern Branch of the Russian Academy of Sciences, Russia ···P43-44

1:45pm - 2:05pm

Sustainable Food Production: Integration of Emerging Global Food, Health and Environmental Challenges

Kalidas Shetty, College of Natural Resources and the Environment, University of Massachusetts, Amherst, U.S.A. ···P45-46

2:05pm - 2:25pm

Land Use Change and Related Driving Factors in Northeast China from 1980 to 2000

Bai Zhang, Northeast Institute of Geography and Agricultural Ecology, Chinese Academy of Sciences, China ···P47-48

2:25pm - 2:40pm *Break*

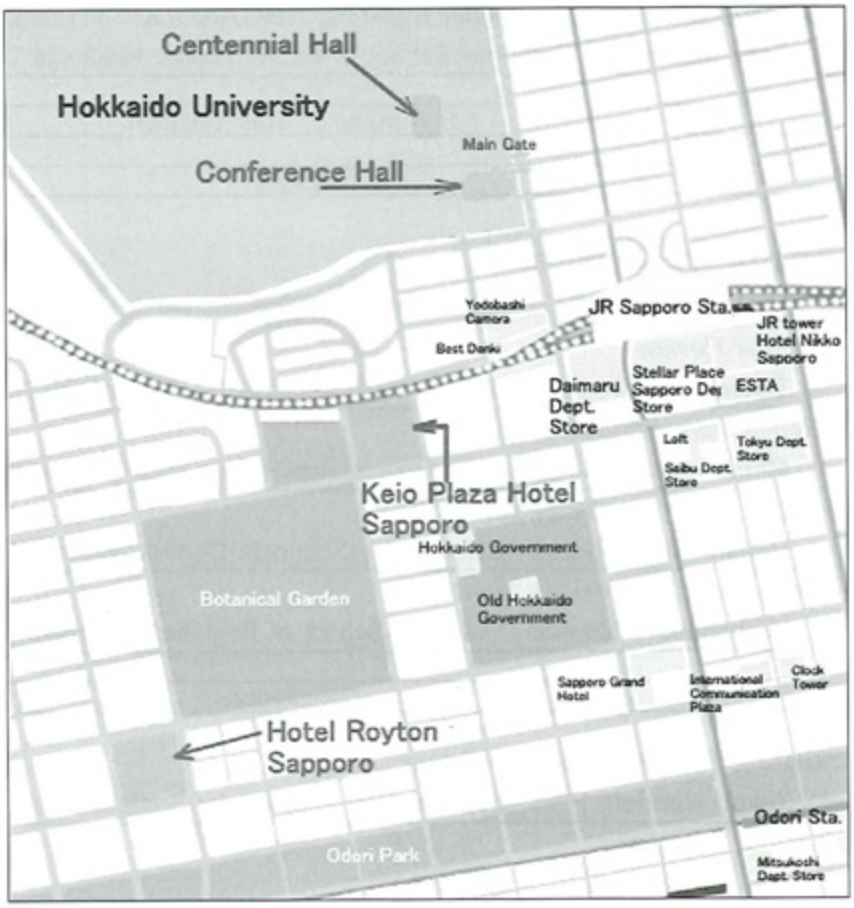
2:40pm - 3:00pm	*An Evaluation of Water Allocation Mechanisms: A Korean Case* **Dong-Geun Han**, College of Commerce and Economics, Yeungnam University, Korea ···P49-50
3:00pm - 3:20pm	*Challenges and Strategies for the Planning of Sustainable Landscapes* **Jack Ahern**, Department of Landscape Architecture and Regional Planning, University of Massachusetts, Amherst, U.S.A. ···P51-52
3:20pm - 3:40pm	*Creating Effective International Regimes: New Approach of Political Science* **Toru Miyamoto**, Graduate School of Public Policy, Hokkaido University ···P53-54
3:40pm - 3:45pm	*Summary of This Session*
3:45pm - 4:00pm	*Break*

Session 4. Summary of the Symposium

Chairperson: **Takeo Hondoh**, Hokkaido University Initiative for Sustainable Development (HUISD) ···P55

4:00pm - 4:05pm	*Overall Review* **Takeo Hondoh**, Hokkaido University Initiative for Sustainable Development (HUISD)
4:05pm - 4:15pm	*Report from Parallel Session 1* **Mitsuru Osaki**, Sustainability Governance Project (SGP), Hokkaido University ···P31
4:15pm - 4:25pm	*Report from Parallel Session 2* **Hiroshi Kida**, Research Center for Zoonosis Control, Hokkaido University ···P23
4:25pm - 4:35pm	*Report from Parallel Session 3* **Yoshimasa Watanabe**, Graduate School of Engineering, Hokkaido University ···P12
4:35pm - 4:50pm	*Discussion*
4:50pm - 5:00pm	*Closing Remarks: For Our Future Direction* **Takeo Hondoh**, Hokkaido University Initiative for Sustainable Development (HUISD)

Map of Venue



Hokkaido University Conference Hall Secretariat Office

Kita 8 Nishi 5, Kitaku, Sapporo

TEL +81-(0)90-8637-0024 FAX +81-(0)11-706-2095 E-mail kouryu@general.hokudai.ac.jp

http://www.hokudai.ac.jp/huisd/en/index.html

Keio Plaza Hotel Sapporo

Kita 5 Nishi 7, Kitaku, Sapporo

TEL +81-(0)11-271-0111 FAX +81-(0)11-271-7943

http://www.keioplaza-sapporo.co.jp/

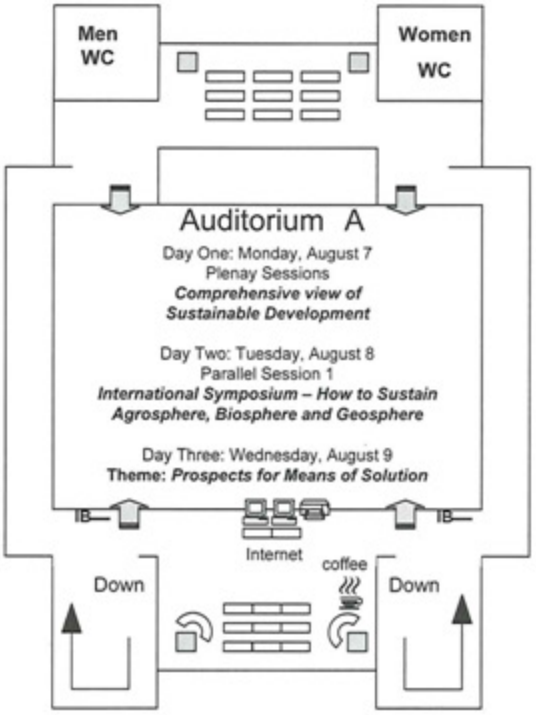
Hotel Royton Sapporo

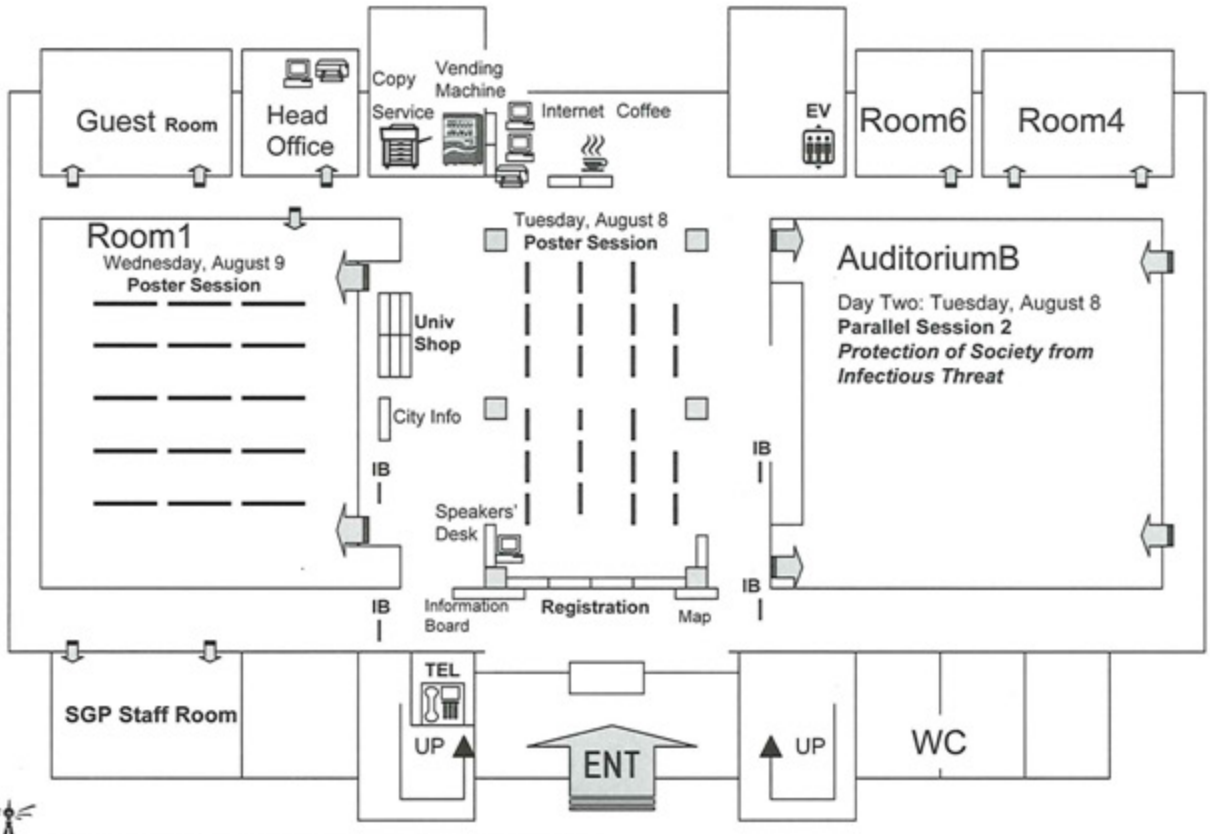
Kita 1 Nishi 11, Chuoku, Sapporo

TEL +81-(0)11-271-2711 FAX +81-(0)11-207-3344

http://www.daiwaresort.co.jp/royton/

Hokkaido University Conference Hall





Free Internet access via **Wireless LAN is available** in this Building.
For ID and Password, please contact Registration.

SAPPORO CAMPUS MAP

Scenic Campus


51. Furukawa Hall

56. Experimental Farms

62. *Sakushukotoni* River

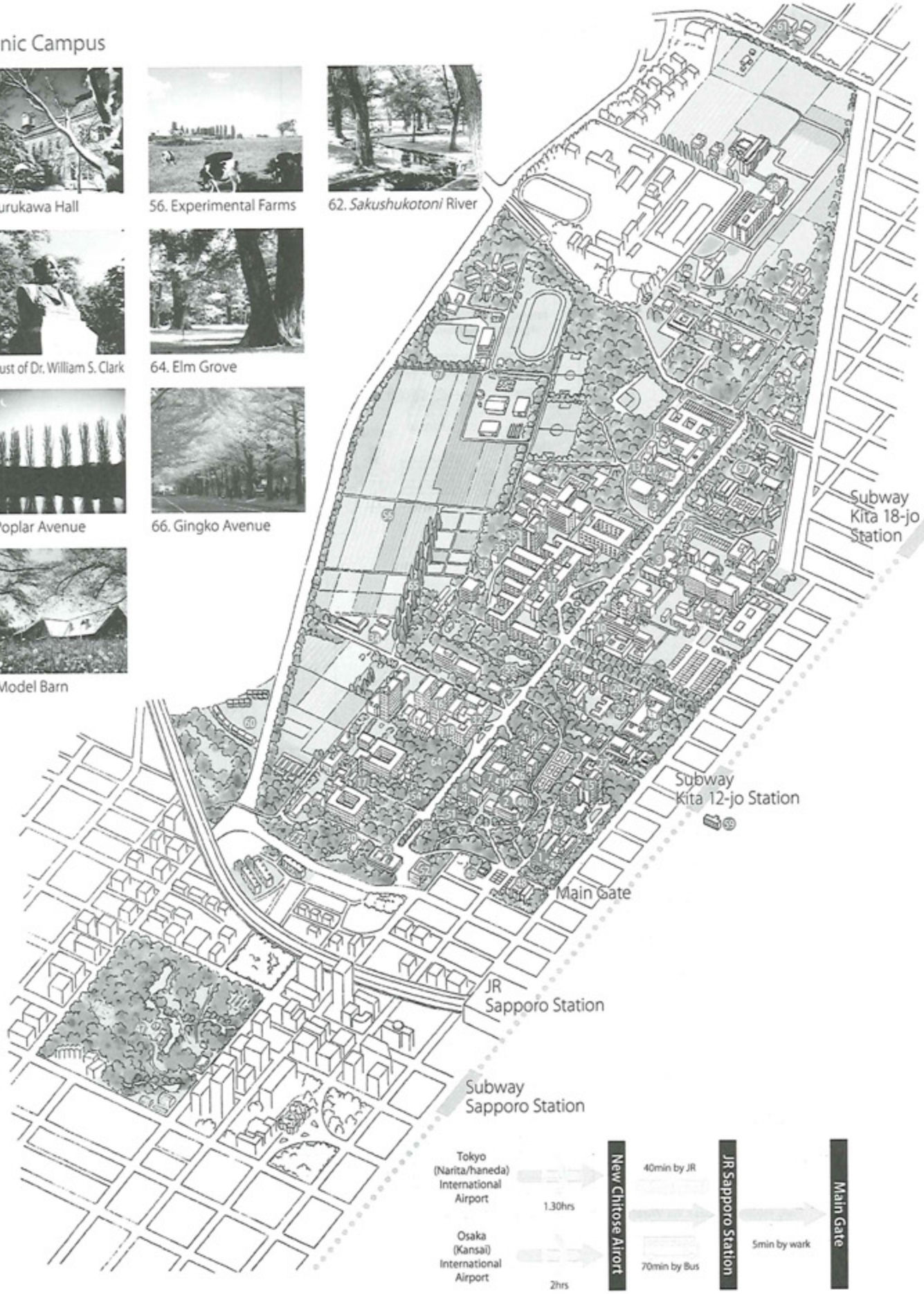

63. Bust of Dr. William S. Clark

64. Elm Grove


65. Poplar Avenue

66. Gingko Avenue


68. Model Barn



ADDRESSES

Sapporo Campus

	Graduate Schools, Faculties, etc.	Address	Zip	Tel	Fax
1	Administration Bureau	Kita 8, Nishi 5 Kita-ku, Sapporo	060-0808	+81-(0)11-716-2111	+81-(0)11-706-2095
2	Hokkaido University Library	Kita 8, Nishi 5 Kita-ku, Sapporo	060-0808		747-2855
3	North Library	Kita 17, Nishi 8 Kita-ku, Sapporo	060-0817		706-7851
4	University Hospital	Kita14, Nishi 5 Kita-ku, Sapporo	060-8648	+81-(0)11-716-1161	706-7627
	Graduate Schools and Faculties				
5	Graduate School / Faculty of Letters	Kita10, Nishi 7 Kita-ku, Sapporo	060-0810	+81-(0)11-716-2111	706-4803
6	Graduate School / School of Education	Kita11, Nishi 7 Kita-ku, Sapporo	060-0811		706-4951
7	Graduate School / School of Law	Kita 9, Nishi 7 Kita-ku, Sapporo	060-0809		706-4948
8	Graduate School / School of Economics and Business Administration	Kita 9, Nishi 7 Kita-ku, Sapporo	060-0809		706-4947
9	Graduate School / School of Medicine	Kita15, Nishi 7 Kita-ku, Sapporo	060-8638		717-5286
10	Graduate School / School of Dental Medicine	Kita13, Nishi 7 Kita-ku, Sapporo	060-8586		706-4919
11	Graduate School / Faculty of Engineering	Kita13, Nishi 8 Kita-ku, Sapporo	060-8628		706-7895
12	Graduate School / School of Veterinary Medicine	Kita18, Nishi 9 Kita-ku, Sapporo	060-0818		706-5190
13	Graduate School of International Media and Communication	Kita17, Nishi 8 Kita-ku, Sapporo	060-0817		706-7801
14	Graduate School of Information Science and Technology	Kita 14, Nishi 9 Kita-ku, Sapporo	060-0814		706-7890
15	Graduate School of Environmental Science / Faculty of Environmental Earth Science	Kita10, Nishi 5 Kita-ku, Sapporo	060-0810		706-4867
16	Graduate School / Faculty / School of Science	Kita10, Nishi 8 Kita-ku, Sapporo	060-0810		756-1244
17	Graduate School / Research Faculty/ Faculty of Agriculture	Kita 9, Nishi 9 Kita-ku, Sapporo	060-8589		716-0879
18	Graduate School of Life Science / Faculty of Advanced Life Science	Kita 10, Nishi 8 Kita-ku, Sapporo	060-0810		716-0879
19	Graduate School / Faculty of Public Policy	Kita 9, Nishi 7 Kita-ku, Sapporo	060-0809		706-4948
20	Faculty of Pharmaceutical Sciences / School of Pharmaceutical Sciences and Pharmacy	Kita12, Nishi 6 Kita-ku, Sapporo	060-0812		706-4989
	Research Institutes and Research Centers				
21	Institute of Language and Culture Studies	Kita17, Nishi 8 Kita-ku, Sapporo	060-0817	+81-(0)11-716-2111	706-7801
22	Institute of Low Temperature Science	Kita19, Nishi 8 Kita-ku, Sapporo	060-0819		706-7142
23	Research Institute for Electronic Science	Kita12, Nishi 6 Kita-ku, Sapporo	060-0812		706-4977
24	Institute for Genetic Medicine	Kita15, Nishi 7 Kita-ku, Sapporo	060-0815		706-7855
25	Catalysis Research Center	Kita21, Nishi10 Kita-ku, Sapporo	001-0021		706-9110
26	Slavic Research Center	Kita 9, Nishi 7 Kita-ku, Sapporo	060-0809		706-4952
27	Information Initiative Center	Kita11, Nishi 5 Kita-ku, Sapporo	060-0811		706-2936
28	Central Institute of Radioisotope Science	Kita 15, Nishi 7 Kita-ku, Sapporo	060-0815		706-7862
29	Center for Instrumental Analysis	Kita12, Nishi 6 Kita-ku, Sapporo	060-0812		706-4929
30	International Student Center	Kita 8, Nishi 8 Kita-ku, Sapporo	060-0808		706-4874
31	Center for Research and Development in Higher Education	Kita17, Nishi 8 Kita-ku, Sapporo	060-0817		737-5173
32	University Museum	Kita10, Nishi 8 Kita-ku, Sapporo	060-0810		706-2658
33	Research Center for Integrated Quantum Electronics	Kita13, Nishi 8 Kita-ku, Sapporo	060-8628		716-6004
34	Field Science Center for Northern Biosphere	Kita11, Nishi10 Kita-ku, Sapporo	060-0811		706-4930
35	Center for Advanced Research of Energy Conversion Materials	Kita13, Nishi 8 Kita-ku, Sapporo	060-8628		706-6655
36	Meme Media Laboratory	Kita 13, Nishi 8 Kita-ku, Sapporo	060-8628		706-7808
37	Research and Education Center for Brain Science	Kita 15, Nishi 7 Kita-ku, Sapporo	060-8638		706-7873
38	Creative Research Initiative "Sousei"	Kita 21, Nishi 10 Kita-ku, Sapporo	001-0021		706-9110
39	Research Center for Zoonosis Control	Kita18, Nishi 9 Kita-ku, Sapporo	060-0818		706-5190
40	Hokkaido University Archives	Kita 8, Nishi 5 Kita-ku, Sapporo	060-0808		706-4870
41	Admission Center	Kita 17, Nishi 8 Kita-ku, Sapporo	060-0817		706-7484
42	Center for Advaced Tourism Studies	Kita 17, Nishi 8 Kita-ku, Sapporo	060-0817		706-7801
43	Health Administration Center	Kita 8, Nishi 5 Kita-ku, Sapporo	060-0808		706-4872
44	Environmental Preservation Center	Kita 15, Nishi 9 Kita-ku, Sapporo	060-0815		706-7800
45	Management Center of Intellectual Property	Kita 8, Nishi 5 Kita-ku, Sapporo	060-0808		706-5310
46	College of Medical Technology	Kita12, Nishi 5 Kita-ku, Sapporo	060-0812		706-4916

47	Botanic Garden	Kita 3, Nishi 8, Chuo-ku, Sapporo	060-0003	+81-(0)11-221-0066	221-0664

Facilities

48 Conference Hall
49 Poplar Hall
50 Centennial Hall
51 Furukawa Hall*
52 Hokkaido University Co-op
53 Career Center
54 Visitor Center
55 Faculty House Trillium
56 Experimental Farms*
57 Gym
58 Keiteki-Ryo (Student Domitories)
59 Foreign Student'sl House
60 Internationa Residence
61 Foreign Scholar's Accommodation

Touristic Attractions Spots

62 Sakushukotoni River*
63 Bust of Dr. William S. Clark*
64 Elm Grove*
65 Poplar Avenue*
66 Gingko Avenue*
67 Heisei Poplar Avenue
68 Model Barn*

Hakodate Campus

Graduate School / Faculty / School of Fisheries Sciences	3-1-1 Minato-cho, Hakodate	041-8611	+81-(0)138-40-5505	+81-(0)138-43-5015

Profiles and Abstracts

Keynote Speaker

Itaru Yasui

Vice Rector
United Nations University, Japan

> Monday August 7, 2006 / 9:00am-9:45am

ACADEMIC DEGREES:

B. A. 1968	The University of Tokyo (Faculty of Engineering)
Ph. D. 1973	The University of Tokyo (School of Engineering)

PROFESSIONAL APPOINTMENTS:

1973	Assistant, Faculty of Engineering, The University of Tokyo
1975	Lecturer, Institute of Industrial Science, The University of Tokyo
1975 - 1977	Postdoctoral Fellow, Rensselaer Polytechnic Institute, USA
1979	Associate Professor, Institute of Industrial Science, The University of Tokyo
1990	Professor, Institute of Industrial Science, The University of Tokyo
1996 - 1999	Director, Center for Collaborative Research, The University of Tokyo
1998 - 1999	Representative, National Conference for Centers for Industry - University Collaboration
2000	Head Investigator, Man - Earth Research Project of the Japan Ministry of Education, Culture, Sports and Technology
2003	Vice Rector, United Nations University
2003 - 2005	Affiliate Professor, The University of Tokyo
2007	Professor Emeritus, The University of Tokyo

RESEARCH INTERESTS:

Evaluation of Environmental Sustainability, Holistic Approach to Solve Sustainability Issues, Life Cycle Assessment, Advanced Science and Technology and Society

Prospects of the 21st Century with Respect to Sustainability

Itaru Yasui
Vice Rector
United Nations University
Jingumae, Shibuya, Tokyo 150-8925, Japan

The most important global issue for the 21st century is the sustainability of the human activities with relation to the limitation of the Earth. What is the sustainability? There are so many kinds of definitions of sustainability. Of course, the original one is the description found in the report of Brundtland committee in 1987, but currently there is no agreement on this issue.

United Nations determined eight millennium development goals in 2000, and these seem to be the UN's definition of sustainability up to the year of 2015, although it must be difficult to attain the goals by that time.

Eight millennium development goals are listed as follows;
1. Eradicate extreme poverty and hunger
2. Achieve universal primary education
3. Promote gender equality and empower women
4. Reduce child mortality
5. Improve maternal health
6. Combat HIV/AIDS, malaria and other diseases
7. Ensure environmental sustainability
8. Develop a global partnership for development

Item 7 includes global warming, water supply, ecosystem conservation etc. The global warming is one of the most important issues for 21st century. If the prediction based on the simulation of global warming is correct and if two degree is really the limit to keep the global metabolism, we mankind have to discard the dependence on fossil fuel within twenty years.

In the plan of implementation for WSSD held in Johannesburg in 2002, changing unsustainable patterns of production and consumption was noted as the most important target to be attained by all advanced countries.

In order to discuss this kind of issue it is useful to utilize the concept of "Environmental Kuznets Curve". It seems true that improving processes start to work spontaneously after reaching the peak of pollutions, overexploitation of ecological resources, natural disasters and even the amount of final disposal of waste. But so far it is not clear the concept also fits to the case such as the reduction of carbon dioxide and/or energy consumption.

Technological innovations must be necessary to solve unsustainable way of lives in advanced countries, such as over-consumption of gasoline with big automobiles or electricity for air conditioners, but it seems not enough to solve the problem solely by means of technology. A habit of mind of people must be changed so as to reduce burdens on energy and other natural resources of the Earth.

Population of the world is now believed to reach 9 billion in the year of 2050, but this value by United Nations seems to be overestimated. Population will reach the maximum at about 7.8 billion in the year of 2045, and will start to decrease since then.

It is quite likely that the 21st century is the first century for mankind to observe natural decrease in population not by pandemic disease. The only problematic region will be Africa. The millennium goals, especially items from 1 to 6, must be realized in Africa, because it is known in the other region that the birth rate goes down substantially after the improvement of such situations.

In addition, it is necessary to answer the question, "what is the development for human beings?" UNDP uses Human Development Index (HDI) as a metrics for the development. HDI includes longevity, education and income and these three are key factors to express the freedom to have options of human lives.

In some countries like Bhutan, the king proposed to use Gross National Happiness GNH as the metrics instead of GDP. This proposal must be considered seriously in most of advanced countries and countries in transition.

In this presentation, new concepts such as "Eco-Premium" for technologies and products, "The Third Revolution" for people's habit of mind and "A New Interpretation of CSR" in relation to realize true sustainability of the Earth.

Chairperson and Panelist

Motoyoshi Ikeda

Professor
Division of Environmental Science Development
Faculty of Environmental Earth Science
Hokkaido University

> 【Plenary Session 1】 Monday August 7, 2006 / 10:00am-11:50am
> 【Parallel Session 1】 Tuesday August 8, 2006 / 11:40am-12:00pm
> 【Panel Discussion】 Wednesday August 9, 2006 / 9:30am-11:30am

ACADEMIC DEGREES:

B.A. May 1969 Aeronautics, University of Tokyo
M.A. March 1971 Aeronautics, University of Tokyo
Ph.D. March 1974 Aeronautics, University of Tokyo

PROFESSIONAL APPOINTMENTS:

1979 - 1981	Research Associate, the U.S. National Research Council at NOAA/PMEL
1981 - 1983	Research Associate, the University of British Columbia
1983 - 1994	Research Scientist, Bedford Institute of Oceanography
1994 -	present Professor, Hokkaido University
1997 - 2002	Program Director for the IARC, Frontier Research System for Global Change
2002 -	present Dean, Graduate School of Environmental Science, Hokkaido University

RESEARCH INTERESTS:

(1) Modelling of current meanders and mesoscale eddies in the Gulf Stream, Kuroshio, California Current System, Labrador Current and Norwegian Coastal Current
(2) Modelling of oceanographic processes in the marginal ice zone and ice flow near the coast
(3) Sea ice simulation off the Labrador Coast and in the Sea of Okhotsk
(4) Data analysis of atmosphere, sea ice and ocean from the Arctic and Atlantic regions, showing decadal oscillations and global warming
(5) Analysis of SEASAT and GEOSAT altimeter data showing mesoscale variabilities off Labrador and in the Newfoundland Basin
(6) Modelling of paleoclimate in the Japan Sea
(7) Data assimilation for the Gulf Stream and Kuroshio
(8) Modelling of carbon dioxide flux in the northern North Pacific
(9) Coupling of natural system and societal system

Speaker

Kevin J. Noone

Professor
Executive Director
International Geosphere-Biosphere Programme (IGBP)
The Royal Swedish Academy of Sciences, Sweden

> 【Plenary Session 1】 Monday August 7, 2006 / 10:00am-10:40am

ACADEMIC DEGREES:

BSE.	1982	Washington University, Seattle, U.S.A. (Chemical Engineering)
MSE.	1985	Washington University, Seattle, U.S.A. (Civil and Environmental Engineering)
Ph.D.	1987	Washington University, Seattle, U.S.A. (Civil and Environmental Engineering)

PROFESSIONAL APPOINTMENTS:

1987 - 1991	Faculty at Stockholm University, Sweden
1992 - 1995	Research Scientist and Adjunct Professor of Oceanography, Center for Atmospheric Chemistry Studies, Graduate School of Oceanography, University of Rhode Island, U.S.A.
2000 - 2004	Professor of Meteorology and head of the Atmospheric Physics Division at the Department of Meteorology, Stockholm University, Sweden
2005	Moved to the Department of Applied Environmental Research at Stockholm University
2004 - 2005	Currently the Executive Director of the International Geosphere-Biosphere Program (IGBP), since the autumn of 2004

RESEARCH INTERESTS:

Early research work in Chemical Engineering focused on transparent semiconductors for use as solar cells in the generation of electricity. Primary research interests at present are in the area of atmospheric chemistry & physics, and the effects of aerosols and clouds on air quality and the Earth's climate. Advocate of an interdisciplinary approach to obtaining a solid scientific basis for decisions on environmental and climate issues. Author/coauthor of more than 110 scientific articles and book chapters, more than 70 of which are in refereed journals.

Creating an Applied Earth System Science:
Linking Global Environmental Change Science to Sustainability Issues

Kevin J. Noone
Executive Director
International Geosphere-Biosphere Programme (IGBP)
The Royal Swedish Academy of Sciences, Sweden

The UN Millennium Development Goals are an inspiring and formidable challenge for society: within the next decade we must aim to eradicate extreme poverty and hunger; achieve universal primary education; promote gender equality and empower women; reduce child mortality; improve maternal health; combat deadly diseases; ensure environmental sustainability; and construct a global partnership for development. At the same time, society is faced with other challenges such as global climate change, air pollution, decreases in global biodiversity, food resources and how all of these issues tie into global security.

Some have argued that it is not feasible to address all of these issues at once, and that we should simply use a sort of cost-benefit analysis to choose one on which to concentrate. This view may be appealing, but it is fundamentally misguided. It would be a tragedy if, for instance, we were able to completely eradicate HIV/AIDS only to discover that by ignoring global environmental change issues, malaria had become even more widespread or fresh water resources even more scarce. We do not have the luxury of solving these problems one at a time; they need to be tackled together. Understanding how the natural Earth System works, and how we humans influence (and are influenced by) it is at the very heart of addressing these issues, and achieving the Millennium Development Goals.

We now know that human activities now match (and often exceed) the natural forces that regulate the Earth System. Recent ice core data show that current levels of carbon dioxide and methane are well outside the range of natural variability over the last 800,000 years. Roughly half of the world's ice-free land surface has been altered by human actions. Humans now fix more nitrogen than nature does. Particles emitted by human activities alter the energy balance of the planet, as well as have adverse effects on human health. These may seem to be unrelated issues; however, over the last decades, we have gained a deeper understanding of the degree to which all of these separate issues are linked. The Earth System is a very complex system with myriad feedbacks, and it has and presumably can still exhibit rapid, global-scale responses to changes in environmental conditions.

The global change research community faces an increasing challenge to present research results in more accessible and informative ways to stakeholders - particularly those concerned with sustainable development. We are frequently expected to answer questions on the effects of global change on regional- and even local scales: stakeholders seek strategies to deal with future environmental change.
The need to understand how the natural world works has not diminished, but in fact underpins the answers to questions of sustainable development. We still must concentrate on first class science involving the interactions and feedbacks between biological, chemical and physical processes and human systems. However, scientists, resource managers and policy makers require a common understanding in order for their interactions to be mutually beneficial.

In my presentation, I will attempt to give an overview of the current landscape of Earth *System* Science, give an example (or two) of planetary-scale feedback systems that may impact sustainable development strategies, discuss some the current structural challenges we have in addressing the interdisciplinary questions with which we are faced, and provide some ideas for creating an *Applied Earth System Science* linking global environmental change research to sustainable development.

Speaker

Lawrence A. Mysak

Professor
Department of Atmospheric and Oceanic Sciences
McGill University, Canada

> 【Plenary Session 1】 Monday August 7, 2006 / 10:40am-11:20am

ACADEMIC DEGREES:

B.Sc. 1961	University of Alberta, Canada (Applied Mathematics, Assoc Mus (performance in flute), both with first class honours)
M.Sc. 1963	University of Adelaide, S. Australia (Mathematics)
Ph.D. 1966	Harvard University, U.S.A. (Applied Mathematics)

PROFESSIONAL APPOINTMENTS:

1966 - 1967	Research Fellow in Geophysical Fluid Dynamics, Harvard University
1967 - 1970	Assistant Professor, Mathematics, University of British Columbia
1970 - 1976	Associate Professor, Mathematics and Oceanography, Uni. of British Columbia
1976 - 1986	Professor, Mathematics and Oceanography, University of British Columbia
1986 - 1996	AES/NSERC Industrial Chair Professor of Climate Research, McGill University
1986 - 1990	Director of Climate Research Group, Department of Meteorology (now Atmospheric and Oceanic Sciences), McGill University
1989 -	Pres.Canada Steamship Lines Professor of Meteorology, Dept. of Atmos. & Oceanic Sciences, McGill University
1990 - 1996	Founding Director of Centre for Climate and Global Change Research (C2GCR), McGill University
1993 - 1994	Sabbatic Leave (Montreal)
2000 - 2001	Sabbatic Leave (ETH, Zurich; INGV, Bologna)

RESEARCH INTERESTS:

Modelling and analysis of large and intermediate scale atmosphere-ice-ocean circulation and climate variability in the Arctic. Modelling century to millennial scale variability of the global ocean-ice-atmosphere-land climate system during the Quaternary period. Modelling geosphere-biosphere interactions and feedbacks using reduced complexity earth system models.

Glacial Inceptions: Past and Future

Lawrence A. Mysak

Professor

Department of Atmospheric and Oceanic Sciences

McGill University, Canada

Determining the causes and mechanisms of glacial inceptions during the past half million years has challenged scores of climate theoreticians and modellers. After introducing the basic Milankovitch theory of glaciation, I will review a number of earlier modelling studies on past glacial inceptions which have employed high-resolution GCMs or EMICs: Earth system Models of Intermediate Complexity. The latter class of climate models has been developed over the past two decades in order to investigate the many interactions and feedbacks among the geophysical and biospheric components of the Earth system over long time-scales.

Following an overview of various EMICs from Europe and North America, including the McGill Paleoclimate Model (MPM), I will present some recent simulations of the last glacial inception (LGI) in response to orbital (Milankovitch) and radiative (atmospheric CO2) forcing. Special attention will be given to determining the relative roles of the ocean thermohaline circulation, freshwater fluxes, orography, cryospheric processes and vegetation dynamics during the inception phase.

The lecture will conclude with a discussion on the (possible) occurrence of the next glacial period. To address this issue, which has been inspired by recent Berger-Loutre papers with titles like "An exceptionally long interglacial ahead?", I shall present EMIC simulations of the climate for the next 100 kyr which are forced by a various prescribed atmospheric CO2 levels, as well as insolation changes. The influence of a near-term global warming scenario on glacial inception will also be examined.

Finally, the recent simulations of glacial inceptions in the Potsdam (PIK) EMIC which includes an interactive carbon cycle will be described. It is not inconceivable that due to human activities, the current interglacial will last for at least another half million years.

Speaker

Takashi Kohyama

Professor
Section of Environmental Biology
Faculty of Environmental Earth Science
Hokkaido University

> 【Plenary Session 1】 Monday August 7, 2006 / 11:20am-11:50am
> 【Parallel Session 1】 Tuesday August 8, 2006 / 8:30am-9:00am

ACADEMIC DEGREES

B.A.	1978	Tokyo Metropolitan University (Biology)
M.A.	1980	Kyoto University (Botany)
Ph.D.	1983	Kyoto University (Botany)

PROFESSIONAL APPOINTMENTS

1983 - 1985	JSPS Post-Doctoral Fellow, Kyoto University
1985 - 1987	Lecturer, Faculty of Education, Kagoshima University
1987 - 1991	Associate Professor, Faculty of Education, Kagoshima University
1991 - 1994	Associate Professor, Center for Ecological Research, Kyoto University
1994 -	presentProfessor, Faculty of Environmental Earth Science, Hokkaido University
2000 -	presentSub-group leader, Ecosystem Change Research Program, Frontier Research Center for Global Change, JAMSTEC

RESEARCH INTERESTS

I have been interested in the complex architecture and tree species diversity of forest ecosystems. I have carried out research in temperate subalpine forests, warm-temperate rain forests and tropical rain forests in eastern Asia. Based on field census data, I developed simulation models and proposed 'the forest architecture hypothesis' (1993) to explain species coexistence by stratification. Undergoing change in forest ecosystems with global environmental change gives a unique opportunity to understand forest ecosystem properties. In 1997-2002, I organized a project of forest ecosystem monitoring and modeling named TEMA ('Global Change Impacts on Terrestrial Ecosystems in Monsoon Asia') as a core research of IGBP-GCTE.

Ecological Constraints on System Sustainability*

Takashi Kohyama
Professor
Section of Environmental Biology
Faculty of Environmental Earth Science, Hokkaido University

The anthropogenic biosphere is a complex adaptive system, constrained by a variety of processes, of which typical spatial-temporal scale is different from each other. In this lecture, I show the need of multi-scale analysis of system change, taking an example of forest ecosystems. I also propose that a similar approach is valid for socio-environmental systems.

We carried out a synthetic investigation of forest ecosystems in eastern Monsoon Asia. The target area is characterized by the continuous forested biomes from tropic to subarctic zones under prevailing humid climate. We made challenge to link physiological processes of foliage canopy to landscape-scale processes of tree-population demography and tree-community dynamics, and to integrate forest ecosystem processes into watershed-scale budget. So far, physiological screening and micrometeorological monitoring gave a fine-scale validation of land ecosystem processes. However, the prediction of the long-term response of forest systems to global change requires the coupling of ecosystem physiology and tree population demography. To interface the gap between them, we developed multi-scaled models and predicted such processes as the time delay in vegetation response to global change.

Ecosystem modeling uses such procedure to deal with biological units with naturally variable sizes such as biological individuals, species populations, etc. This situation is somewhat similar to social systems, where available statistic data is arranged with municipal/state/country basis with a variable size, and where, for instance, per capita demand of resources by human population is also largely variable. It is also obvious that the maintenance of human population is constrained by net primary productivity (NPP), as a measure of ecosystems. I show examples of relating NPP and vegetation/soil organic mass to the socio-economical statistics, at various scales, to elucidate emerging unit-scale-dependent components of socio-environmental systems, for the meaningful examination of the system sustainability.

* This paper has been prepared in collaboration with Akihiko Ito and Yoshiki Yamagata of National Institute for Environmental Studies, Tsukuba, Japan.

Chairperson and Speaker

Yoshimasa Watanabe

Professor
Division of Environmental Engineering
Graduate School of Engineering
Hokkaido University

> 【Plenary Session 2】 Monday August 7, 2006 / 1:00pm-2:50pm
> 【Parallel Session 3】 Tuesday August 8, 2006 / 9:00am-9:40am
> 3:00pm-5:10pm
> 【Plenary Session 4】 Wednesday August 9, 2006 / 4:25pm-4:35pm

ACADEMIC DEGREES:

B.A. 1967 Hokkaido University (Sanitary Engineering)
M.A. 1969 Hokkaido University (Sanitary Engineering)
Ph.D. 1972 Hokkaido University (Sanitary Engineering)

PROFESSIONAL APPOINTMENTS:

1972 Associate Professor, Miyazaki University, Japan
1975 Visiting Associate, California Institute of Technology, USA (- 1976)
1979 Associate Professor, Asian Institute of Technology, Thailand (- 1981)
1988 Professor, Miyazaki University
1993 Professor, Hokkaido University (- Present)

RESEARCH INTERESTS:

Development of water metabolic system of area-based society
Hybrid water and wastewater treatment technology using membrane
Phosphorous recovery from sludge

Speaker

Takashi Asano

Professor Emeritus
Department of Civil and Environmental Engineering
University of California, Davis
Davis, CA95616, U.S.A.

> 【Plenary Session 2】 Monday August 7, 2006 / 1:00pm-1:40pm

ACADEMIC DEGREES:

B.A.	1959	Hokkaido University (Agricultural Chemistry)
M.S.	1965	University of California, Berkeley (Civil and Environmental Engineering)
Ph.D.	1970	The University of Michigan, Ann Arbor (Environmental and Water Resources Engineering)

PROFESSIONAL APPOINTMENTS:

1971 - 1975	Assistant Professor, Department of Civil Engineering and Engineering Mechanics, Montana State University, Bozeman, MT.
1975 - 1978	Associate Professor, Department of Civil and Environmental Engineering, Washington State University, Pullman, WA.
1978 - 1992	Water Reclamation Specialist, State Water Resources Control Board, State of California, Sacramento, CA.
1981 - 2002	Adjunct Professor, Department of Civil and Environmental Engineering, University of California at Davis, Davis, CA.
1996	The Kubota Endowed Chair Visiting Professor of Environmental Engineering, Department of Urban Engineering, The University of Tokyo.
1997	The Nishihara Endowed Chair Visiting Professor of Environmental Engineering, International Center for Water Environment Engineering, Hokkaido University.
2002 -	Professor Emeritus, Department of Civil and Environmental Engineering, University of California at Davis, Davis, CA.

RESEARCH INTERESTS:

Planning and regulatory aspects of water resources development and water reuse, Microbial risk analysis in water reuse, Environmental and water resources engineering, Water reclamation and reuse, Indirect potable reuse, Advanced water and wastewater treatment, and Groundwater recharge.

Recovering Sustainable Water from Wastewater

Takashi Asano
Professor Emeritus
Department of Civil and Environmental Engineering
University of California, Davis
Davis, CA 95616, U.S.A.

The sustainability of water resources is of particular importance in light of projected increases in global population. It has been reported that the current world population of 6.2 billion is increasing at a rate of about 1.2 percent per year (United Nations, 2003) with the highest rates of population growth occurring in urban areas in mostly developing countries where supplies of freshwater tend to be limited or already exploited. Increasing urbanization has resulted in an uneven distribution of population and water, thus imposing unprecedented pressures on limited water supplies. These pressures are exacerbated during periods of drought.

For water supplies to be sustainable, the rate at which water is withdrawn from water sources needs to be in balance with the rate of renewal or replenishment of these water sources. In addition to a balance of water quantity, water quality must also be sustainable, recoverable or reusable. Water that is withdrawn for societal needs is also a source of water replenishment that should be considered in the sustainability equation.

Historically, after water has been used for societal needs, it has been labeled as "waste"water and treated to the extent deemed necessary for discharge into a receiving water or for land disposal. During most of the 20th century, the emphasis of wastewater treatment was on pollution abatement, protection of public health, and prevention of environmental degradation through removal of biodegradable material, nutrients, and pathogens. However, over the last few decades, the potential for recovering water from wastewater has been recognized. In fact, in many parts of the world, it is no longer practical or possible for water to be used only once. Thus, water reclamation, recycling and reuse are one element of water resources development and management that provides a viable option for traditional water supply. Water reclamation, recycling and reuse are multi-disciplined and require close examinations of infrastructure and facilities planning, wastewater treatment plant siting, treatment process reliability, energy considerations, public health, economic and financial analyses, and water utility management involving effective integration of water and reclaimed water functions.
In this presentation, the foundation of water reclamation, recycling and reuse will be discussed and the salient features of implementing water reuse projects including Orange County's Groundwater Replenishment System in California are summarized with considerations for future research needs.

REFERENCE

United Nations (UN Population Division) (2003) *World Population Prospects: The 2002 Revision - Highlights*, United Nations Population Division, Department of Economic and Social Affairs.
Accessed at: http://www.un.org/esa/population/unpop.htm

Speaker

Miranda Schreurs

Associate Professor
Department of Government and Politics
University of Maryland, U.S.A.

> 【Plenary Session 2】 Monday August 7, 2006 / 1:40pm-2:20pm

ACADEMIC DEGREES:

B. A. 1986 University of Washington
M. A. 1987 University of Washington
Ph. D. 1996 University of Michigan-Ann Arbor

PROFESSIONAL APPOINTMENTS:

Teaching courses on Japanese Politics, East Asian Politics, German Politics, European Politics, Comparative Environmental Politics and Law, and Research Methodology

RESEARCH INTERESTS:

Comparative and International Environmental Politics in Japan, China, East Asia, Germany, Europe, and the United States

Her books include *Environmental Policy in Japan* (co-edited with Hidefumi Imura, Edward Elgar, 2005), *The Environmental Dimensions of Asian Security: Cooperation and Conflict over Pollution, Energy, and Resources* (co-edited with In-taek Hyun, United States Institute of Peace Press, forthcoming), *Environmental Politics in Japan, Germany, and the United States* (Cambridge University Press, 2002), *The Internationalization of Environmental Protection* (co-edited with Elizabeth Economy, Cambridge University Press, 1997), and *Ecological Security in Northeast Asia* (co-edited with Dennis Pirages, Yonsei University Press, 1998).

Mottainai: A Comparative Study of the Politics of Innovation in Waste Management

Miranda Schreurs
Associate Professor
Department of Government and Politics
University of Maryland, U.S.A.

Consumer societies are being faced by increasingly difficult and pressing problems related to waste management. Household waste contains an increasingly large share of electronic products — computers, televisions, DVDs — that have added new challenges for municipalities that already have great difficulties in disposing of waste.
This paper examines innovative measures that are being developed to reduce waste at its source in the European Union, Japan, and the United States and considers how policy ideas are diffusing across borders.

Speaker

Fumikazu Yoshida

Professor
Graduate School of Public Policy
Hokkaido University

> 【Plenary Session 2】 Monday August 7, 2006 / 2:20pm-2:50pm

ACADEMIC DEGREES:

B. A. 1973 Tokyo Metropolitan University (Economics)
M. A. 1975 Kyoto University (Economics)
Ph. D. 1985 Kyoto University (Economics)

PROFESSIONAL APPOINTMENTS:

1978 - 1980 Lecturer, Faculty of Economics, Hokkaido University
1980 - 1992 Associate Professor, Graduate School of Economics, Hokkaido University
1992 - Professor, Graduate School of Economics, Hokkaido University

RESEARCH INTERESTS:

Environmental Economics
Waste Management
Cyclical Economy

Sustainable and Cyclical Economy of Asia

Fumikazu Yoshida
Professor
Graduate School of Public Policy
Hokkaido University

Cross-Border Resource Cycling

Because of economic globalization, the material cycle has totally transcended national borders. In particular, imports and exports of scrap metal, post-consumer waste paper, waste plastic, and other reclaimed materials are booming due to heavy demand stemming from falling demand in Japan and to Asian economic growth.

Building a Cyclical Society Including All of East Asia

East Asia already has a large product and material cycle, making it impossible to create a cyclical society conceived for Japan alone. Therefore I would like to discuss the challenges for each actor in building a cyclical society system in East Asia, while taking into consideration the proposals mentioned thus far.

First, it is essential to assemble statistical data on the used consumer appliances/electronics and automobiles that are exported. This is impossible to determine from current Ministry of Finance customs statistics. We must also find out how resources are being recycled in importing countries. In view of the need for this information, the government must start by assembling statistics.

Second, information exchange and discussions on wide-area recycling should be carried out on the government level. Haste is needed especially on issues related to the Basel Convention. The EU practices wide-area waste management on the grounds that within the EU this does not constitute transboundary movement under the convention.

Third, in relation to manufacturers, the government should consider the application of EPR to used products and those produced overseas. Unless this is done, exporters cannot escape criticism that they are trying to avoid domestic environmental regulations.

And fourth, recyclers should run recycling businesses - not only in Japan, but in other Asian countries as well - that use their technology and expertise to advantage. Of course environmental friendliness and transparency will be crucial, and they should start with pilot projects.

Chairperson

Tsukasa Seya

Professor
Department of Microbiology and Immunology
Graduate School of Medicine
Hokkaido University

> 【Plenary Session 3】 Monday August 7, 2006 / 2:55pm-4:05pm

ACADEMIC DEGREES:

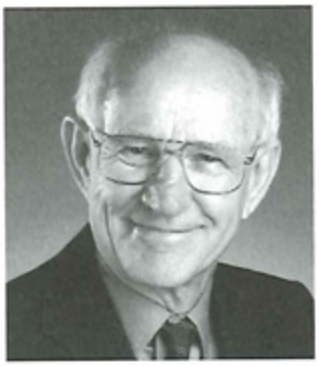
1984 Ph.D. degree (Hokkaido University)
1987 M.D. degree (Hokkaido University)

PROFESSIONAL APPOINTMENTS:

1987 - 1996 Associate Director, Department of Immunology, Center for Adult Diseases, Osaka. (Immunology)
1988 - 1992 Lecturer, Osaka University
1994 - 1997 Investigator, 'Inheritance and Variation' (Director, Dr. K. Toyoshima), PRESTO, JST (ex. JRDC)
1996 - 1998 Deputy Director, Department of Immunology, Osaka Medical Center for Cancer and Cardiovascular Diseases (ex. Center for Adult Diseases, Osaka)
1996 - 2001 Investigator, 'Swine to Human Xenotransplantation' (Director, Dr. R. Shirakura), PROBRAIN
1997 - 2002 Investigator, 'Cancer Immunotherapy' (Director, Dr. T. Masaoka), OPSR
1998 - 2004 Professor (concurrently), Nara Institute of Science and Technology
1998 - 2001 Director, Department of Immunology, Osaka Medical Center for Cancer and Cardiovascular Diseases
2001 - 2004 Director-in-Chief/Chairman, Research Institute of Osaka Medical Center for Cancer
2002- 2007 Team leader of CREST (Human diseases in association with innate immunity).
2002 - 2004 Professor (concurrently), Osaka University School of Medicine
2003 - Subleader in the "Protein Factory project" in Koseisho
2003 - 2004 Core member, COE Osaka University (Dr. N. Taniguchi)
2004 - Professor, Hokkaido University Graduate School of Medicine (Department of Microbiology and Immunology)
2005 - 2006 Professor, Institute for Virus Research, Kyoto University (Concurrently)
2005 - Lecturer, University of Tokyo, Graduate School of Medicine (Concurrently)

RESEARCH INTERESTS:

Complement proteins and receptors
Innate immunity
Measles virus receptors
Anti-tumor immunotherapy
Xenotransplantation
Toll-like receptors
Cell adhesion molecules
Structure-function relationship of proteins
Abnormality of proteins and disease expression



Speaker

Robert G. Webster

Professor
Division of Virology, Department of Infectious Diseases
St. Jude Children's Research Hospital, U.S.A.

> 【Plenary Session 3】 Monday August 7, 2006 / 2:55pm-3:35pm
> 【Parallel Session 2】 Tuesday August 8, 2006 / 9:40am-10:20am

ACADEMIC DEGREES:

B.Sc. 1955 Otago University, New Zealand (Microbiology)
M.Sc. 1957 Otago University, New Zealand (Microbiology)
Ph.D. 1962 Australian National University, Australia (Microbiology)

PROFESSIONAL APPOINTMENTS:

1975 - Director, World Health Organization Collaborating Center for Studies on the Ecology of Influenza in Animals and Birds
1988 Rose Marie Thomas Chair, Division of Virology, Department of Infectious Diseases, St. Jude Children's Research Hospital

RESEARCH INTERESTS:

His interests include the emergence and control of influenza viruses, viral immunology, the structure and function of influenza virus proteins and the development of new vaccines and antivirals. The major focus of his research is the importance of influenza viruses in wild aquatic birds as a major reservoir of influenza viruses and their role in the evolution of new pandemic strains for humans and lower animals. His *curriculum vitae* contains over 500 original articles and reviews on influenza viruses. He has trained many scientists who now contribute to our understanding of the evolution and pathogenesis of influenza.

Memberships: American Society for Microbiology
American Society for Virology
Royal Society of Medicine
American Association for the Advancement of Science

Honors: Fellow of the Royal Society, London, 1989
Fellow of the Royal Society of New Zealand, 1990
National Academy of Sciences of the United States of America, 1998
Twelfth Annual Bristol-Myers Squibb Award for Distinguished Achievement in Infectious Diseases, 2002; New Zealand Biotech Distinguished Biotechnologist Award, 2006

Ecology and Evolution of Influenza Viruses: Preparation for the Occurrence of Highly Pathogenic Avian Influenza and the Possibility of a Human Pandemic of Influenza

Robert G. Webster

Professor

Division of Virology, Department of Infectious Diseases,

St. Jude Children's Research Hospital, Memphis, TN 38105 U.S.A.

Pandemic influenza is a zoonotic disease caused by the transfer of influenza A viruses or virus gene segments from aquatic bird reservoirs to humans and domestic animals. In wild aquatic birds - the natural hosts of all influenza viruses - these viruses exist in harmony with their natural host. After transfer to other species influenza viruses evolve rapidly.

In the past century there have been three pandemics in humans: 1918 Spanish, 1957 Asian, 1968 Hong Kong. These have emerged after reassortment between human influenza viruses and those in the aquatic birds of the world or directly from avian sources probably via intermediate hosts. The pandemics of the past century have been confined to the H1, H2 and H3 subtypes but there is no convincing evidence to exclude the others. The spread of H5N1 influenza viruses from Eastern Asia to Europe, Africa and India increases the geographical range and pandemic potential of this virus. Ducks are playing an important role in the continued evolution and spread of the H5N1 viruses including prolonged shedding and selection of antigenic variants. The H5N1 viruses from 2004-2006 are highly pathogenic in poultry, ferrets, felids and humans. The role of migrating birds in the spread of H5N1 and exchange of viruses between domestic and wild birds in Asia is of great concern. H5N1 viruses continue to break the ecological rules established for other highly pathogenic avian influenza viruses. What are the prospects for the H5N1/06 virus to become consistently transmitted from human to human and cause a global catastrophe? Options for control include increase biosecurity and the use of reverse genetics to produce standardized vaccines for human and veterinary use. The immediate control of the spread of H5N1 is through the use of the antiviral neuraminidase inhibitors. Continuing stockpiling of anti-neuraminidase drugs is prudent.

Speaker

Hiroshi Kida

Director, Research Center for Zoonosis Control
Professor, Graduate School of Veterinary Medicine
Hokkaido University

> 【Plenary Session 3】 Monday August 7, 2006 / 3:35pm-4:05pm
> 【Parallel Session 2】 Tuesday August 8, 2006 / 9:35am-9:40am
> 【Plenary Session 4】 Wednesday August 9, 2006 / 4:15pm-4:25pm

ACADEMIC DEGREES:

B.V.M.	1967	Hokkaido University (Veterinary Medicine)
D.V.M.	1967	The Ministry of Agriculture, Forestry and Fisheries
Ph.D.	1977	Hokkaido University (Veterinary Medicine)

PROFESSIONAL APPOINTMENTS:

1969 - 76	Research Officer for Vaccine Development, Takeda Chem Indst, Ltd
1976 - 78	Lecturer, Dept Veterinary Hyg & Microbiol., Hokkaido University
1978 - 94	Associate Professor, Dept Vet Hyg & Microbiol, Hokkaido Univ
1980 - 81	Visiting Scientist, Dept Virol, St. Jude Children's Research Hospital/WHO Collab Center for Ecology of Influenza Viruses, Memphis, Tennessee
1986 - 87	Visiting Professor, Dept Virol Mol Biol, St. Jude CRH/WHO CCEI
1989	Professor, University of Zambia School of Vet Med, Lusaka, Zambia
1994 - 95	Professor, Dept Vet Hyg and Microbiology, Hokkaido Univ
1995 - date	Professor, Dept Disease Control, Hokkaido Univ Grad Sch Vet Med
1995 - 05	Hokkaido University Senator
2001 - 05	Dean, Hokkaido Univ Sch and Grad Sch Vet Med
2004 - date	Head, OIE Reference Laboratory for Highly Pathogenic Avian Influenza
2005 - date	Director, Research Center for Zoonosis Control

RESEARCH INTERESTS:

Ecology and pathogenesis of influenza viruses, Zoonoses, Vaccinology

Are We Prepared for Emerging Zoonoses?

Hiroshi Kida

Director, Research Center for Zoonosis Control
Professor, Graduate School of Veterinary Medicine
Hokkaido University

Recent outbreaks of highly pathogenic avian influenza have spread worldwide. This H5N1 virus has jumped the species barrier and caused severe disease with high mortality in humans. A concern is that only the H5N1 virus is assumed to cause next pandemic in humans. Since each of the subtypes of influenza viruses perpetuates among migratory ducks and their nesting lake water in nature and avian viruses of any subtype can contribute genes in the generation of reassortants in pig, none of the 15 HA and 9 NA subtypes can be ruled out as potential candidates for future pandemic strains.

We have carried out global surveillance study of avian influenza and influenza virus isolates of 49 combinations of HA and NA subtypes have been isolated from fecal samples of ducks. So far, 76 other combinations have been generated by the genetic reassortment procedure in chicken embryos. Thus, avian influenza viruses of 125 combinations of HA and NA subtypes have been stocked for vaccine strain candidates and diagnostic use. Their pathogenicity, antigenicity, genetic information and yield in chicken embryo have been analyzed and registered in the database.

On the basis of the strategy for the control of influenza, Hokkaido University has established "Research Center for Zoonosis Control" in 2005. The long term goals of the center are the prevention and control of emerging zoonoses. To achieve the goals, the aims of the present program are; 1) to elucidate the ecology of zoonotic pathogens, 2) to detect the reservoir host and the route of transmission of each pathogen, 3) define the gene sequences that permit interspecies transmission of agents among animals including humans, 4) to clarify the molecular basis of pathogenisity of each agent for each of animal species, 5) to develop rapid methods for diagnosis of zoonoses and detection of the agents, 6) to establish international networks for global surveillance of zoonoses, 7) to scheme contingency plans for the prevention and control of zoonoses, 8) to provide training courses for personnel who conduct control management at the sites of disease outbreaks, 9) to exchange personnel between different laboratories in the world in order to develop new strategies for the control of zoonoses, and 10) to establish "International Collaboration Centers for Zoonosis Control" by 2008.

Chairperson

Yutaka Saito

Professor
Division of Environment and Resources,
Graduate School of of Agriculture, Hokkaido University
Deputy Director
Sustainability Governance Project (SGP), Hokkaido University
Hon. Prof. Fujian Academy of Agricultural Sciences

> 【Plenary Session 4】 Monday August 7, 2006 / 4:20pm-6:00pm

ACADEMIC DEGREES:

B.A. 1972 Hokkaido University (Agricultural Biology)
M.A. 1974 Hokkaido University (Agricultural Biology)
Ph.D. 1978 Hokkaido University (Agricultural Biology)

PROFESSIONAL APPOINTMENTS:

1981 - 1993 Assistant Professor, Faculty of Agriculture, Hokkaido University
1993 - 1996 Associate Professor, Faculty of Agriculture, Hokkaido University
1996 - Professor, Graduate School of Agriculture, Hokkaido University

RESEARCH INTERESTS:

Biological pest management is still woefully insufficient in Japan, despite priority-level recommendations from more and more governments around the world. Implementation costs and the old-fashioned production systems used by small-scale farmers are the main reasons why such safe technology is proving difficult to introduce into Japanese agriculture. As such, I will try to idealize how to transform the status quo into systems that utilize safe biological pest management, natural fertilizers and the like, to achieve rational biomass production, and in turn develop new, sustainable agricultural systems applicable to Japan as well as to the rest of Asia. For such purposes, I have studied on utilizing fundamental ecology to develop new methods of controlling plant pests biologically, on permanent biological control systems in the Moso bamboo plantations of Fujian, China, and development of a simulation model of natural enemy-pest systems in agricultural fields.

I have also conducted basic researches on the behavioral ecology and sociobiology: By now, my major contributions are as follows: Discovery of mutual sociality in spider mites; Discovery of the importance of kin-selection in variation of male-to-male aggression;Development of an integrated game model explaining the conditions under which aggression, altruism and cooperation evolved.

Speaker

Teisuke Miura

Professor
Division of Marine Environment and Resource Sensing
Graduate School of Fisheries Sciences
Hokkaido University

> 【Plenary Session 4】 Monday August 7, 2006 / 4:20pm-4:50pm

ACADEMIC DEGREES:

B.A. 1970 Hokkaido University (Fisheries Sciences)
Ph.D. 1988 Hokkaido University (Fisheries Sciences)

PROFESSIONAL APPOINTMENTS:

1971 - 1989 Instructor, Faculty of Fisheries, Hokkaido University
1989 - 1994 Associate Professor, Faculty of Fisheries, Hokkaido University
1994 - 1995 Professor, Faculty of Fisheries, Hokkaido University
Present Professor, Graduate School of Fisheries Sciences, Hokkaido University

RESEARCH INTERESTS:

System design of fisheries is the broad area of research interests. To develop sustainability of fisheries, the minimization of the environmental burden through appropriate management of resource utilization and energy consumption is the main focus of research activities. Some of the latest research topics are listed below:

1- Total Utilization of Squids (*Todarodes pacificus*) toward Zero Emissions
2- Measurements of Energy Consumption and the Environmental Burden in Squid Fisheries
3- LCA Methodology to the Evaluation of Japan Fisheries

Understanding and Approach to "Sustainability" Science of Fisheries

Teisuke Miura
Professor
Division of Marine Environment and Resource Sensing
Graduate School of Fisheries Sciences
Hokkaido University

According to FAO's reports, currently, approximately 44% of key fish species are being exploited at their maximum, 16% are overexploited with no room for expansion, and 6% have been depleted. These figures show that world's aquatic resources are unsustainably, not sustainably, used. Japan imports approximately 40% of fishery products consumed in the country. Now, demand for marine products in Japan cannot be met without imports. The international community has started to see that Japan, a major importer of marine products, for example prawns and shrimps, has been indirectly facilitating the destruction of the environment in developing countries.

In these circumstances, how should we consider sustainable fisheries? Considerations that we need to make in considering global sustainability of Japan's marine-product supply are: ①the establishment of global supply system; ②the securing of stable supply and safety of imported fishery products; and ③the establishment of partnership with importing countries. This paper, based on "Fisheries Research and Technical Development Strategy," a report that proposes new basic policies for fisheries of the 21st century, introduces the current status and problems of Japan's fisheries industry.

However, there is currently no clear definition of "sustainability of the fisheries industry." In this paper, I attempt to establish it logically. There are various ways to interpret the word "sustainability." Japan for Sustainability (JFS), for example, considers sustainability as from five basic compositions: ①Resource and Capacity, ②Fairness across Time, ③Fairness across Space, ④Diversity, and ⑤Human Will and Networking.

Based on this JFS's concept, the author fist discuses sustainability of the fisheries industry and then examines the "sustainability" science of fisheries-theme of this lecture-more specifically, ①new logic of the "sustainability" science of fisheries, ②educational philosophy of the "sustainability" science of fisheries, and ③problems of the "sustainability" science of fisheries. Also, a framework for practice is proposed using concepts of "backcasting" and "benchmarking."

Speaker

Nasir El Bassam

Director, International Research Centre for Renewable Energy (IFEED), Germany
President, International Council of Sustainable Agriculture (ICSA)

> 【Plenary Session 4】 Monday August 7, 2006 / 4:50pm-5:30pm

ACADEMIC DEGREES:

B.Sc., M.Sc. and Ph.D. University of Bonn, Germany (Professorship, Resource Managemnet)

PROFESSIONAL APPOINTMENTS:

- Director, International Research Centre for Renewable Energy e. V. (IFEED), Germany
- Chairman, Working Group, Biomass for Food, Energy and the Environment, Sustainable Rural Energy Network (SREN), FAO, United Nations
- President, International Council of Sustainable Agriculture and Resource Management (ICSA)
- Associate Professor, Federal Agriculture Research Centre, Braunschweig, Germany
- Promoting and supervising M.Sc. and Ph.D. students
- EU-Adviser in developing and evaluating of research programs
- Promoting academic and scientific research and co-operation between Germany and other countries at various levels and disciplines

RESEARCH INTERESTS:

The Centre IFEED undertakes the responsibility in the field of research, education, demonstration, transfer of technology and co-operation with national and international organizations. It also offers the agriculture, trade and industry to introduce and commercialize their products. The Centre has been recognized under his leadership recently as a "Centre of Excellence" in promoting renewable energy technologies for Food and Water Supply, especially in rural areas. Special emphasis is dedicated on optimization of energetic and food autonomy in decentralized living areas and to promote regional development and sustainable resource management.
ICSA is an international organization registered in Canada and aiming to discuss and promote worldwide research, strategies, dialogue and cooperation between scientists, researcher, institutions, universities, industry and communities to achieve sustainability in agriculture production systems and to protect the environment and climate.

Strategy towards Achievement of Sustainable Agriculture for Food, Energy and the Environment in the Age of the Globalization

Nasir El Bassam

Director

International Research Centre for Renewable Energy (IFEED), Germany

President

International Council of Sustainable Agriculture (ICSA)

Agriculture is the foundation of all cultures, economic advancement and human dignity. Also, Agenda 21 of the Rio de Janeiro Conference in 1992 put significant emphasis on agriculture as a key for intra-and intergenerational equity

Today we face immense pressure in the global environment resulting from industrial emissions of greenhouse gases, the continual growth of the world population and the depletion of natural resources. The recognition of the necessity for actions and the intention and the will are vital evolutionary steps towards sustainability,

Food security is often undermined by factors such as water availability, land distribution, poverty, and environmental degradation. Among the major food security threats on the horizon are climate change, the loss of diversity of plant and animal species and the rise of food borne illnesses

The key concept is to promote the conservation and the sustainable use of natural resources, which allows long term economic growth and enhancement of productive capacity, along with being equitable and environmentally acceptable.

In order to meet challenges, the future energy policies should put more emphasis on developing the potential of energy sources, which should form the foundation of future global energy structure. In this context, the FAO in support of the Sustainable Rural Environment and Energy Network (SREN) has developed the concept of the Integrated Energy Farms for the optimization, evaluation, and implementation of sustainable food, water and energy production systems in rural communities.

Speaker

Mitsuru Osaki

Executive Advisor, Hokkaido University

Director, Sustainability Governance Project (SGP), Hokkaido University

Professor, Division of Biological Resources and Production, Research Faculty of Agriculture, Hokkaido University

> 【Plenary Session 4】 Monday August 7, 2006 / 5:30pm-6:00pm
> 【Parallel Session 1】 Tuesday August 8, 2006 / 8:30am-9:00am
> 【Plenary Session 4】 Wednesday August 9, 2006 / 4:05pm-4:15pm

ACADEMIC DEGREES:

B. Sc. 1976	Hokkaido University (Agriculture)
M. Sc. 1978	Hokkaido University (Agriculture)
Ph. D. 1981	Hokkaido University (Agriculture)

PROFESSIONAL APPOINTMENTS:

1981 - 1982	Research Fellow, Laboratory of Plant Nutrition, Faculty of Agriculture, Hokkaido University
1982 - 1984	Associate Scientist at CIMMYT (Mexico)
1984 - 1997	Assistant Professor, Faculty of Agriculture, Hokkaido University
1997 - 1999	Associate Professor, Faculty of Agriculture, Hokkaido University
1999 - 2001	Associate Professor, Graduate School of Agriculture, Hokkaido University
2001 - 2006	Professor, Graduate School of Agriculture, Hokkaido University
2006 - now	Professor, Research Faculty of Agriculture, Hokkaido University

RESEARCH INTERESTS:

Rhizosphere regulation, plant-soil-microrganisms interaction,
Plant Productivity through carbon-nitrogen metabolisms
Al tolerance and phosphorus deficiency of plants grown low pH soil
Human-Dimension on ecological management
Global Land Project

The Sustainability of Bio-production Systems

Mitsuru Osaki
Executive Advisor, Hokkaido University
Director, Sustainability Governance Project, Hokkaido University
Professor, Research Faculty of Agriculture, Hokkaido University
E-mail: mosaki@chem.agr.hokudai.ac.jp

The present high productivity levels enjoyed by modern agronomy have largely been attained through intensive land management practices such as the vigorous application of fertilizers, fungicides, pesticides and herbicides, improved tillage and irrigation techniques, mono cropping, mechanization, and so on. However, these activities are becoming increasingly difficult to sustain due to 1) soil degradation and environmental pollution, 2) reduced oil production, and 3) climate changes. In this paper, I would like to discuss how to guarantee the sustainable development of human societies by proposing new biomass production fields, for which highly detailed models must be constructed via a systems simulation approach, and by developing sustainable cultivation methods as follows.

(a) Development of integrated and detailed models for sustainable biomass production: There are three compelling reasons why such detailed models are necessary for achieving sustainability. The first is to integrate the fragmented pieces of knowledge we have accumulated so far. The second is the process of establishing goals - namely, how the systems models may contribute heuristically. The third is using model simulations to evaluate levels of sustainability. Highly detailed models of food and biomass production systems must involve every activity related to the production and utilization of biomass, namely rhizosphere and phytosphere control, pest and disease management, ways of utilizing unavailable and/or wasted biomass, pollution monitoring, economic issues, and so on.

(b) Development of monitoring and risk management systems for food production fields: We are currently facing several important problems brought about by highly developed technology. Severe problems with residual chemicals and the flow of pesticides and chemical fertilizers exist in both agricultural and natural systems. For these reasons, we need to develop new monitoring systems and provide the governance to regulate them.

Chairperson

Takeshi Kishinami

Executive and Vice President
Hokkaido University

> 【Plenary Session 1】 Wednesday August 9, 2006 / 9:00am-11:30am

ACADEMIC DEGREES:

B. E. 1966 Hokkaido University (Engineering)

M. E. 1968 Hokkaido University (Engineering)

Ph. D. 1971 Hokkaido University (Engineering)

PROFESSIONAL APPOINTMENTS:

1972	Associate Professor, Faculty of Engineering, Hokkaido University
1988	Professor, Faculty of Engineering, Hokkaido University
1995	Professor, Graduate School of Engineering, Hokkaido University
2003	Dean, Graduate School of Engineering, Hokkaido University
2004 -	Executive and Vice President of Hokkaido University

RESEARCH INTERESTS:

The research activities of Prof. T. Kishinami includes the following topics:
-Digital Information Modeling and Technology,
-High Quality Information Modeling for Data Exchange between Design and Manufacturing
-High Level Data Modeling for Next Generation Computer Controlled Numerical Machine Tools,

Keynote Speaker and Panelist

Sheldon Shaeffer

Director
UNESCO Bangkok, Thailand

> 【Plenary Session 1】 Wednesday August 9, 2006 / 9:00am-9:30am
> 【Panel Discussion】 Wednesday August 9, 2006 / 9:30am-11:30am

ACADEMIC DEGREES:

B.A.	1967	Stanford University, U.S.A. (History)
M.A.	1974	Stanford University, U.S.A. (Anthropology)
Ph.D.	1979	Stanford University, U.S.A. (International Development Education)

PROFESSIONAL APPOINTMENTS:

1968 - 1969	Teacher, Saribas Government Secondary School in Sarawak, Malaysia
1970 - 1971	Lecturer, Faculty for Teacher Training at Pattimura University in Ambon, Indonesia
1972 - 1974	Teaching Assistant, graduate programme for South-East Asian educators and for courses in non-formal education at Stanford University
1975 - 1977	Programme officer, education and culture at the Ford Foundation in Jakarta
1980 - 1990	Associate Director, Social Sciences Division at the International Development Research Centre (IDRC) in Ottawa
1990 - 1993	Senior Research Fellow, International Institute for Educational Planning (IIEP) in Paris
1993	Senior Scientist, Social Science Division, International Development Research Centre
1994 - 1998	Regional Education Adviser in Bangkok, UNICEF
1998 - 2001	Chief, Education Section at UNICEF Headquarters in New York

RESEARCH INTERESTS:

Mr. Shaeffer has published and co-edited a number of books and journal articles in the field of education.

Education for Sustainable Development: If Not the Solution, At Least a Start

Sheldon Shaeffer
Director
UNESCO Bangkok, Thailand

Development which is sustainable is meant to "meet the needs of the present without compromising the ability of future generations to meet their own needs." Education for sustainable development (ESD) promotes the social, environmental, economic, and cultural awareness and action which can help make such a future achievable. This requires, however, a fundamental reform of the structure and nature of education, the development of public awareness about what sustainability means, and the building of capacity within education systems and across all other ESD partners. The United Nations Decade of Education for Sustainable Development, which UNESCO coordinates, is attempting to facilitate networking and exchanges among ESD partners, foster education reform fully incorporating ESD principles, and help countries make progress toward attaining the Millennium Development Goals which are essential for a sustainable future. Higher education institutions have a special role to playing in promoting ESD through their ability to promote inter-disciplinary work and re-orient their academic programmes toward sustainable development, enhance the ability of Ministries of Education to prepare curricula and train teachers along ESD principles, and strengthen inter-university research and action.

Coordinator

Norihito Tambo

Professor
President
University of the Air
(Japan Open University)

> 【Panel Discussion】 Wednesday August 9, 2006 / 9:30am-11:30am

ACADEMIC DEGREES:

B.E.	1955	Hokkaido University (Civil Engineering)
M.E.	1957	Hokkaido University (Sanitary Engineering)
Ph.D.	1965	Hokkaido University (Sanitary Engineering)

PROFESSIONAL APPOINTMENTS:

1957 - 1958	Associate Professor,Sanitary Engineering, Hokkaido University
1969 - 1995	Professor,Environmental Engineering, Hokkaido University
1991 - 1993	Dean of the Bureau of Student Affairs, Hokkaido University
1993 - 1995	Dean of the Faculty of Engineering, Hokkaido University
1995 - 2001	President, Hokkaido University
2001 -	President,University of the Air

RESEARCH INTERESTS:

Aquatic Environmental Engineering
Urban Water and Wastewater Engineering

Panelist

John Cusick

Assistant Specialist
Environmental Center
University of Hawai'i at Manoa, U.S.A.

> 【Panel Discussion】 Wednesday August 9, 2006 / 9:30am-11:30am

ACADEMIC DEGREES:

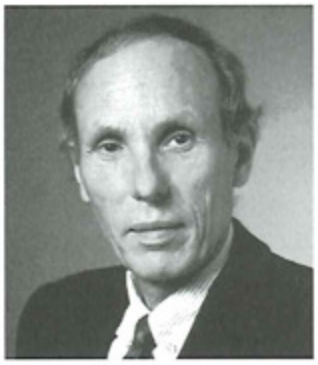
B.A.	1985	California State University, Chico (Geography, Latin American Studies, Spanish)
M.A.	1993	University of Hawai'i at Manoa (Geography)
Ph.D.	2003	University of Hawai'i at Manoa (Geography)

PROFESSIONAL APPOINTMENTS:

1996 - 2003	Lecturer, Geography, University of Hawai'i System
2003 -	Assistant Specialist, Environmental Center, University of Hawai'i at Manoa

RESEARCH INTERESTS:

My research focuses on tourism resources and activities in and adjacent to protected areas recognized as biological and cultural "hotspots." Of particular interest is the increase and expansion of ecotourism as an alternative to mass tourism and as a potential to mitigate negative impacts and improve the effectiveness of protected area management. The primary objective of current projects is to spatially identify ecotourism resources and activities toward establishing long-term monitoring programs in East Maui and the South Island, New Zealand. Current tourist visitation to project areas and the assessment of trends by public and private organizations suggests that ecological and social carrying capacities are concerns for protected area management and gateway community planners. Current strategic plans identify the need for monitoring programs of vital signs to improve resident and visitor relations. These projects will contribute information regarding current visitor activities and impacts to various stakeholder groups involved in environmental conservation and sustainable tourism development.



Panelist

Stephen Lincoln

Professor
Discipline of Chemistry
School of Chemistry and Physics
University of Adelaide, Australia

> 【Panel Discussion】 Wednesday August 9, 2006 / 9:30am-11:30am

ACADEMIC DEGREES:

B.Sc. (Hons). 1962 University of Manchester (Chemistry)
Ph.D. 1967 University of Adelaide (Chemistry)
D.Sc. 1984 University of Manchester (Chemistry)

PROFESSIONAL APPOINTMENTS:

1967 - 1968 Instructor, Department of Chemistry, Washington State University
1969 - 1972 Lecturer, Discipline of Chemistry, University of Adelaide
1972 - 1977 Senior Lecturer, Discipline of Chemistry, University of Adelaide
1977 - 1991 Reader, Discipline of Chemistry, University of Adelaide
1991 - 2006 Professor, Discipline of Chemistry, University of Adelaide

RESEARCH INTERESTS:

Stephen Lincoln's chemical research interests are centred on cyclodextrin chemistry, nanochemistry and molecular sensors. He has published three hundred refereed articles in chemical research journals which have been recognized through the award of medals. He is a Fellow of the Royal Australian Chemical Institute and the Royal Society of Chemistry. He has close research collaborations with Princeton University and the University of New Orleans in the United States.

During his career he has developed an increasing interest in the future of humanity and the habitability of Earth. This has given rise to his book "Challenged Earth: An Overview of Humanity's Stewardship of Earth" published by Imperial College Press in 2006. He is a board member of the Climate Change and Sustainability Research Centre at the University of Adelaide.

Panelist

M. Harun-ur-Rashid

Director
Training & Communication Wing
Bangladesh Agricultural Research Institute (BARI), Bangladesh

> 【Panel Discussion】 Wednesday August 9, 2006 / 9:30am-11:30am
> 【Parallel Session】 Tuesday August 8, 2006 / 1:55pm-2:15pm

ACADEMIC DEGREES:

B.Tech. 1976 Punjab Agricultural University, India
MS 1979 Colorado State University, U.S.A.

PROFESSIONAL APPOINTMENTS:

1976 - 1978	Scientific Officer, Agricultural Engineering Division, BARI
1978 - 1986	Senior Scientific Officer, Agricultural Engineering Division, BARI
1987 - 1998	Principal Scientific Officer, Irrigation & Water Management Division, BARI
1998 - 2002	Chief Scientific Officer, Farm Machinery and Process Engineering Division, BARI
2002 - 2004	Director, Wheat Research Centre, BARI
2004 - Till Date	Director, Training and Communication Wing, BARI
1992 - 1994	Consultant as Irrigation Agronomist, Canadian International Development Agency (CIDA)
1996 -	Deputy Project Manager, Landscape Project, Kuwait.
1990 - 2002	Adjunct Faculty in Bangabandhu Shake Mujibur Rahman Agricultural University & Bangladesh Open University.

RESEARCH INTERESTS:

1. Worked in Irrigation, Arsenic Problem, Agronomy, Farm Machinery, Landscape and Environment fields.
2. Have about 80 publications (Res. articles, books, booklets, workshop proceedings, popular articles, etc).
3. Worked as Teamleader, Research Coordinator/Leader, Principal Investigator, etc in over 10 Projects/Programs.
4. Members in many Professional societies

Chairperson

Oleg Shcheka

Head of Department
Department of International Programs and Projects
Far Eastern Branch of the Russian Academy of Sciences, Russia
Professor, Department of Physics, School of Physics and
Information Technologies, Far Eastern State University, Russia

> 【Plenary Session 3】 Wednesday August 9, 2006 / 1:15pm-3:45pm

ACADEMIC DEGREES:

M.S.	1986	Far Eastern State University (Molecular Physics)
Ph.D.	1990	Institute of Chemistry, FEBRAS (Physical Chemistry)
D.Sc.	2000	Far Eastern State University (Condensed Matter Physics)

PROFESSIONAL APPOINTMENTS:

1989 - 1994	Researcher, Institute of Physics and Technology, Far Eastern State University
1994 - 1998	Director of Professional Programs Training, Administration of Nakhodka FEZ
1998 - 2000	Vice President, Academy for Regional Development
2000 - 2002	Associate Professor, Department of Physical Chemistry, Far Eastern State Technical University
2002 -	Assistant to Chairman, Head of Department of International Programs and Projects, Far Eastern Branch of the Russian Academy of Sciences
2000 -	Professor, Department of Physics, Far Eastern State University

RESEARCH INTERESTS:

Condensed matter physics, Heterogeneous catalysis, Electronic theory of adsorption processes, X-Ray photoelectron and emission spectroscopy, Quantum chemical simulation of pollutant transport and transformation in atmosphere.

Co-Chairperson

Takayuki Shiraiwa

Associate Professor
Research Institute for Humanity and Nature, Japan

> 【Plenary Session 3】 Wednesday August 9, 2006 / 1:15pm-3:45pm

ACADEMIC DEGREES:

B.A.	1987	Waseda University (Geography)
M.A.	1989	Hokkaido University (Environmental Sciences)
Ph.D.	1993	Hokkaido University (Environmental Sciences)

PROFESSIONAL APPOINTMENTS:

1991 - 2004	Assistant Professor, Institute of Low Temperature Science, Hokkaido University
2004 - 2005	Associate Professor, Institute of Low Temperature Science, Hokkaido University
2005 -	Associate Professor, Research Institute for Humanity and Nature

RESEARCH INTERESTS:

Palaeoclimate Reconstruction, Climate and Glacier relationship, Sustainable Development of Amur River Basin and the Sea of Okhotsk

Keynote Speaker

Petr Y. Baklanov

Director
Pacific Institute of Geography
Far Eastern Branch of the Russian Academy of Sciences, Russia

> 【Plenary Session 3】 Wednesday August 9, 2006 / 1:15pm-1:45pm

ACADEMIC DEGREES:

B.A. 1966 Geographical department of the Moscow State University after M.V.Lomonosov, Moscow
B.A. 1967 Economic department of the Moscow State University after M.V.Lomonosov, Moscow
M.A. 1971 Geographical department of the Moscow State University after M.V.Lomonosov, Moscow
M.A. 1972 Economic department of the Moscow State University after M.V.Lomonosov, Moscow
Ph.D 1974 Moscow State University after M.V.Lomonosov, Moscow
Doctor of Geography 1987 Moscow State University after M.V.Lomonosov, Moscow
Academician of the Russian Academy of Sciences since 2002

PROFESSIONAL APPOINTMENTS:

1973 - 1987 Research worker, Head of the Laboratory, Deputy Director on sciences, Pacific Institute of Geography, Vladivostok, Russia,
1987 - 1991 Director of the Economic Research Institute of the USSR Academy of Sciences, Khabarovsk, Russia,
1991 - Director of the Pacific Institute of Geography of the Far Eastern Branch of the Russian Academy of Sciences, Vladivostok, Russia

RESEARCH INTERESTS:

Expert in the field of industry distribution, territorial organization of economy, economic zoning, ecological-economic assessment of natural resources, regional development and management and geopolitics.

Interaction between the Amur River Watershed and the Sea of Okhotsk in a Model of a Sustainable Development

Petr Y. Baklanov

Director

Pacific Institute of Geography,

Far East Branch of the Russian Academy of Sciences, Vladivostok, Russia

The basic features of a model of a sustainable development of the region are identified and considered. The model must reflect a region as a complex natural-social and economic system. A balanced development of the region should be achieved in economic, social and ecological spheres. Indicators, criteria and restrictions of a sustainable development are used with this purpose. Such criteria as economic, social and ecological qualities of a regional development are introduced by us (Baklanov, 2001). Achievement of balanced national and geopolitical interests is important for trans- boundary regions.

The region *the Amur River watershed - the Sea of Okhotsk* is considered as a large regional structure, which consists of two links. The characteristic of the basic spheres of interaction between these links are given.

In natural-resource sphere - interactions in the use of water, fish, power and other resources.

In economic sphere - interactions in water transport, power, fish and food-processing industries, agriculture and forestry, and in other kinds of activity in the Amur River and Sea of Okhotsk watersheds.

In social sphere - interactions in population migration, including international, in policy of preservation of indigenous people, etc.

In ecological - interrelations of the basic technogeneous threats connected with water and atmospheric pollution, with disturbance of forest ecosystems and wetlands. The basic trans-boundary ecological threats and problems are connected with water and atmospheric transfer of technogenious pollution. Variants of extreme situations with trans-boundary ecological problems are under consideration.

Zoning of the territory of the Amur River watershed, the territory and the water area of the Sea of Okhotsk watershed, which we carried out by combinations of natural resources and composed structures of nature use, is given. Such zoning and subsequent estimations of dynamics of natural resources are considered as a natural-resource basis of a sustainable development of the region.

Priorities of a regional development and their conformity to criteria and models of a sustainable development of the region are determined.

Proposals on the development of international programs of sustainable, balanced development of the Amur River and the Sea of Okhotsk watershed and also on the formation of the international monitoring system are put forward.

Speaker

Kalidas Shetty

Professor
Department of Food Science
College of Natural Resources and the Environment
University of Massachusetts, Amherst, U.S.A.

> 【Plenary Session 3】 Wednesday August 9, 2006 / 1:45pm-2:05pm

ACADEMIC DEGREES:

B.S.	1983	University of Agricultural Sciences, Bangalore, India (Agri Microbiology)
M.S.	1985	University of Idaho, USA (Microbiology)
Ph.D.	1989	University of Idaho, USA (Microbiology)
Post-Doctoral	1990 - 91	National Institute of AgroBiological Sciences (Tsukuba, Japan)
Post-Doctoral	1992 - 93	University of Guelph, Canada

PROFESSIONAL APPOINTMENTS:

1993 - 1999	Assistant Professor, Department of Food Science, University of Massachusetts
1999 - 2004	Associate Professor, Department of Food Science, University of Massachusetts
2004 -	Professor, Department of Food Science, University of Massachusetts
2004 - 2005	Jefferson Science Fellow, US Department of State, Washington, DC

RESEARCH INTERESTS:

Biotechnology and Metabolic Biology of Functional Foods and Phenolic Antimicrobials for Food Safety

Specific research interests focus on molecular and physiological regulation of phenolic metabolites and phenylpropanoid pathway by proline-linked pentose phosphate and redox pathways in food plants, food-associated bacteria, fungi and mammalian systems. This focus is contributing substantially to innovative research advances in the areas of Ingredient biosynthesis, Food Safety, Nutrition, Functional Foods and Environmental adaptation of biological systems.

Sustainable Food Production:
Integration of Emerging Global Food, Health and Environmental Challenges

Kalidas Shetty
Professor
Department of Food Science, University of Massachusetts,
Amherst, MA 01003, U.S.A.

Sustainable development requires us as a global community to capture the opportunities in Life Sciences to solve global problems. To achieve this the world needs a look at Biology as an integrated ecosystem. Therefore, Eco-Evolutionary pressures that drive Biological and Biochemical diversity (as genomes are plastic and adapt) are key to understanding individual Biological systems at the Cellular, Molecular and Biochemical levels. From this basic premise the challenges facing this world must be seen within the global human population trends that is projected to grow from the current 6 billion to 9 billion by 2050 with more people living longer. Another significant challenge that has emerged of late are the Food, Health and Wellness issues with more people excessively (excess calories) nourished than mal (under)-nourished. This has resulted in enhanced disease challenges from chronic obesity-linked diseases at a time many parts of the world are still facing the challenges of infectious diseases from mal-nutrition. Therefore, to understand and solve the sustainable development challenges facing humanity (and in particular food production and quality issues), we need to explore the opportunities and impact of Life Sciences. These opportunities have to be integrated with other technological changes emerging such as in the area of information technology and telecommunications in order enhance quality of life for all people within a sustainable ecosystem. These developments will have to be clearly linked to Environmental consequences of the above challenges and sustainability, with primary challenges coming for energy and water management. For all the above challenges we need an integrated approach (Systems Biology) for problem solving and especially in complex Biological Systems that are oxygen dependent (Redox Biology). These challenges and opportunities have to be seen within the perspective of a global economy and sustainable economic diversification that is bringing in new high growth countries such as India, China and Brazil.

Speaker

Bai Zhang

Professor
Director
Northeast Institute of Geography and Agricultural Ecology,
Chinese Academy of Sciences, China

> 【Plenary Session 3】 Wednesday August 9, 2006 / 2:05pm-2:25pm

ACADEMIC DEGREES:

B.A. 1983 Peking University (Physical Geography and Environment Science)
Ph.D. 2005 Graduate University of Chinese Academy of Sciences (GIS)

PROFESSIONAL APPOINTMENTS:

*NEIGAE-Northeast Institute of Geography and Agriculture Ecology, Chinese Academy of Sciences
*CCIG-Changchun Institute of Geography, Chinese Academy of Sciences

1983 - 1988 A.R., Dept.of RS & GIS Application, CCIG
1988 - 1993 Assi. Professor , Dept. of RS & GIS Application, CCIG
1993 - 1996 Asso. Professor, Depute Director, Center of RS & GIS Application, CCIG
1996 - 1997 Professor , Depute Director, Center of RS & GIS Application, CCIG
1997 - 1999 Professor, Chief, Research Project Office, CCIG
1999 - 2002 Professor , Director, Center of RS & GIS Application, CCIG
2002 - 2002 Professor , Director, Center of RS & GIS Application, NEIGAE
2002 - 2006 Professor , Assistant Director, NEIGAE
2006 - Professor, Director, NEIGAE

RESEARCH INTERESTS:

Land use and cover change

Land Use Change and Related Driving Factors in Northeast China from 1980 to 2000

Bai Zhang
Director
Northeast Institute of Geography and Agricultural Ecology,
Chinese Academy of Sciences, China

Human-induced changes in land use/cover form an important component of sustainable development research. Therefore, it is important to study land use/cover and its change. Northeast China is one of the main agricultural regions in China, its yield of corn and soybean now accounting for more than 30% and 40% of the nation's total. In the past two decades, Northeast China has suffered dramatic land use change as a result of activities of human beings. These changes led to aggravating loss of water and soil, decrease in soil fertility in the black soil zone of the central part, wetland loss in Sanjiang Plain, desertification and grassland degradation in western part. There were many efforts to analyze climate change, landscape change, and effects of agricultural activities on local environment in Northeast China. Yet quantitative knowledge on changes in land use and in ecosystem services at regional level for the whole area is few. For this reason, three datasets of land use/-cover produced from 1980 and 2000 Landsat satellite images were overlaid in ArcInfo to reveal changes in land use/cover. In addition, this study aims to elucidate the interactive nature between changes in land use/cover caused by human activities and the environment (e.g., climate) in Northeast China in the past two decades.

From 1980 to 2000, according to study results obtained from Landsat images, widespread changes in land use/cover took place in Northeast China. Grassland, marsh, water body and woodland decreased by 9864, 3973, 1367 and 10052 km^2, respectively. By comparison, paddy field, dry famland, and built-up land expanded by 7339, 17193 and 700 km^2, respectively. These changes bore an interactive relationship with the environment, especially climate change. On the one hand, climate warming created a potential environment for grassland and marsh to be changed to farmland as more crops could thrive in the warmer climate, and for dry farmland to paddy field. On the other hand, the changed surface cover modified the local climate. These changes, in turn, have adversely influenced the local environment by accelerating land degradation in the agro-pastoral belt of western part of Songnen Plain, and exacerbating flooding in the drainage areas of the Songhua River and the Nenjiang River.

Speaker

Dong-Geun Han

Professor
School of Economics and Finance
College of Commerce and Economics
Yeungnam University, Korea

> 【Plenary Session 3】 Wednesday August 9, 2006 / 2:40pm-3:00pm

ACADEMIC DEGREES:

B.A.	1983	Yeungnam University (Economics)
M.A.	1987	Seoul National University (City Planning)
Ph.D.	1994	Purdue University (Economics)

PROFESSIONAL APPOINTMENTS:

1985 - 1988	Research Fellow, Korea Research Institute for Human Settlement
1995 - 1999	Assistant Professor, Yeungnam University
2000 - 2005	Associate Professor, Yeungnam University
2005 -	Professor, Yeungnam University

RESEARCH INTERESTS:

Water Demand Management Policy
Real Estate and Financial markets

An Evaluation of Water Allocation Mechanisms: A Korean Case

Dong-Geun Han
Professor
School of Economics and Finance
Yeungnam University, Korea

According to a report by UN, Korea is classified as a water-shortage country. Annual total amount of rainfall in Korea may not seem insufficient, but the rainfall concentrates mostly in the monsoon season, and there are considerable deviations among different regions.

There is a big debate under way about how to deal with the problem. Some people assert that we need to build more dams to store up the rainwater. Others argue that water management needs to be more efficient and that dam construction is not a sustainable approach, only to destruct environment.

Supporting the demand management approach, my paper is about how to improve the efficiency in allocating scarce water among regions. The study offers two methods of water allocation between upstream and downstream regions; a proportional allocation method and a fixed-amount allocation method. The former method assigns each region with a proportion of the total water available in a river. The latter method allocates a fixed-amount of water to the downstream region, with the leftover being assigned to the upstream region. We apply those methods to Hwang River in Korea and evaluate the performances of each allocation method. This case study shows that, in general, the proportional allocation method is superior from an efficiency point of view, while the fixed-amount method dominates from a risk-equity point of view.

Speaker

Jack Ahern

Professor
Dept. of Landscape Architecture and Regional Planning
University of Massachusetts, Amherst, U.S.A.

> 【Plenary Session 3】 Wednesday August 9, 2006 / 3:00pm-3:20pm

ACADEMIC DEGREES:

B.S.	1974	University of Massachusetts (Environmental Design)
M.L.A.	1980	University of Pennsylvania (Landscape Architecture)
Ph.D.	2002	Wageningen University (Environmental Planning)

PROFESSIONAL APPOINTMENTS:

1986 - 1992	Assistant Professor, Dept. of Landscape Architecture and Regional Planning, University of Massachusetts
1992 - 1998	Associate Professor, Dept. of Landscape Architecture and Regional Planning, University of Massachusetts
1996.	Fellow, American Society of Landscape Architects
1997.	Fulbright Research and Teaching Fellowship, Portugal
1998 - present	Professor, Dept. of Landscape Architecture and Regional Planning, University of Massachusetts

RESEARCH INTERESTS:

Ecological Planning, Greenway Planning and Design, Applied Landscape Ecology, Green Infrastrucutre, Biodiversity in Planning and Design.

Challenges and Strategies for the Planning of Sustainable Landscapes

Jack Ahern
Professor
Dept. of Landscape Architecture and Regional Planning,
University of Massachusetts, Amherst, U.S.A.

Planning of sustainable environments is a complex process addressing the fundamental triad of economic, environmental and socially-equitable sustainability. This paper discusses challenges and strategies related to the environmental area of the sustainability triad, specifically for determining spatial configurations of landscapes that support physical, biological and cultural processes.

Because sustainable landscape planning addresses a great complexity of natural and cultural resources, a collaborative and interdisciplinary approach is needed. To meet this challenge, a transdisciplinary model of collaboration has been developed in which stakeholders are involved in the planning process with multiple scientific disciplines and professionals. A transdisciplinary approach emphasizes the connection between academic researchers and user groups/stakeholders - with all participants contributing tacit and explicit knowledge, sharing information, and jointly deciding policies and actions. Although this transdisciplinary approach appears obvious and logical, it has yet to be widely practiced in landscape planning.

Uncertainty is another major challenge to the understanding of complex landscapes and the testing of innovative policies and recommendations to address sustainability. An adaptive approach to planning defines uncertainty explicitly, minimizes risks, and then proposes actions to "learn by doing" through monitoring, analysis, and revision of plans. While the adaptive approach has been widely used in natural resource management in the USA, it remains a novel, but pro missing strategy for sustainable planning.

A major challenge to planning sustainable environments is the need to demonstrate through pilot projects what sustainability looks like, how it functions, what it costs, and how people respond to it. If sustainability remains only a subject of academic discourse, or abstract governmental policy, it will not change the course of human existence as boldly intended. Pilot projects, from regional plans, to neighborhood districts to individual buildings are all needed to make sustainability a real and tangible model that can be replicated and adapted widely.

Speaker

Toru Miyamoto

Associate Professor
Graduate School of Public Policy
Hokkaido University

> 【Plenary Session 3】 Wednesday August 9, 2006 / 3:20pm-3:40pm

ACADEMIC DEGREES:

B.A. 1990	Tokyo University (Law)
M. A. 1999	The Fletcher School of Law and Diplomacy, Tufts University (Law and Diplomacy)
(Since 2001	Ph. D. Candidate The Fletcher School of Law and Diplomacy, Tufts University)

PROFESSIONAL APPOINTMENTS:

1990 - 2000	Officer, Ministry of International Trade and Industry
1994 - 1996	Deputy Director, Global Environmental Affairs Division, Environmental Protection and Industry Location Bureau
1996 - 1997	Deputy Director, Price Policy Division, Industrial Policy Bureau
1999 - 2000	Deputy Director, Chemical Management Affairs Division,

Basic Industry Bureau

2002 - 2004	Research Fellow, Faculty of Law and Politics, Hokkaido University
2004 - 2005	Associate Professor, Faculty of Law and Politics, Hokkaido University
2005 -	Associate Professor, Graduate School of Public Policy, Hokkaido University

RESERCH INTERESTS:

International Political Economy
Global Environmental Governance
Decision Making Process on Foreign Policy
US/ Japan relations

Creating Effective International Regimes: New Approach of Political Science

Toru Miyamoto
Associate Professor
Graduate School of Public Policy
Hokkaido University

Although the international environmental problems are not new, the creation of regimes for them is relatively new phenomena. This is because we need new science to understand the problem enough to write prescriptions. Therefore scientists play vital roles. But the regime formation is one thing but its implementation is another. Even scientists convince diplomats to agree on multilateral environmental agreements (MEAs), economic activities within borders are difficult to control. Some MEAs are effective in solving the problems, but others are not. We need new approach to design the effective ones.

Political scientists have long defined the fundamental character of international relations as chaos. However, researches on the cases found the reality had been much less pessimistic. Scientists share many things such as respect in knowledge, political positions (i.e. in terms of research funding, or free from responsibility to their interest of domestic industries), despite the difference in nationalities. Therefore, networking among them is possible, which often extended to citizen's groups, environmental activists. This network of "enlightened people," often called the "epistemic community" contributes significantly in global/regional regime formation through framing the national interests in new ways.

However, now we have "congestion" of MEAs. Only some are effective. Activists advocate they should have "teeth" to harness economic activities within state borders. But this is not easy. Looking precisely at effective MEAs, most of them are originally designed, or later amended to be "self-implementable." Confrontational dialog between activists and practitioners rarely bear fruits. We need three new approaches to inquire the new diplomacy. First is the politics of ideas. National interests are not defined only by material interests. Bearing legitimacy is important resource for a country to be influential. The second is that we need to consider the domestic decision making process on foreign policy. The third is the politics of regulation. Regulations create costs as well as benefits. Their pay-off structure shapes the politics on their implementation.

The recognition for the conundrums in the (especially North) East Asia is quite new. But the cold latitudes are fragile. With learning experience, we need act now. Scientists should take the lead.

Chairperson

Takeo Hondoh

Global Manager, Hokkaido University Initiative for Sustainable Development (HUISD)
Professor, Institute of Low Temperature Science
Hokkaido University

> 【Plenary Session 4】 Wednesday August 9, 2006 / 4:00pm-5:00pm

ACADEMIC DEGREES:

B.A.	1969	Hokkaido University (Applied Physics)
M.A.	1974	Hokkaido University (Applied Physics)
D. Engineering	1985	Hokkaido University (Applied Physics)

PROFESSIONAL APPOINTMENTS:

1969 - 1971	Engineer, Hitachi Ltd.
1976 - 1984	Instructor, Faculty of Engineering, Hokkaido University
1984 - 1986	Lecturer, Faculty of Engineering, Hokkaido University
1986 - 1992	Associate Professor, Faculty of Engineering, Hokkaido University
1992 -	Professor, Institute of Low Temperature Science, Hokkaido University

RESEARCH INTERESTS:

Physical properties of ice and clathrate hydrates, physical processes in ice sheets, and physics of ice core records relating to paleoenvironmental reconstructions.

Poster Abstracts

P-1

Research Activities on Environmental Studies in the Pan-Okhotsk Research Center

Naoto Ebuchi, Yasushi Fujiyoshi, Toshihiko Hara, Sumito Matoba, Humio Mitsudera, Tomohiro Nakamura, Takeshi Nakatsuka, Kay I. Ohshima, Takayuki Shiraiwa, Kunio Shirasawa

Pan-Okhotsk Research Center, Institute of Low of Temperature Science, Hokkaido University,

This poster introduces research activities concerning environmental studies in the Pan-Okhotsk Research Center, Institute of Low Temperature Science, Hokkaido University.

The Sea of Okhotsk is one of the southernmost seasonal sea ice zone in the Northern Hemisphere. Thus, it is expected that the generation of sea ice in the Sea of Okhotsk is very sensitive to the global environmental changes, such as global warming. Aiming to properly evaluate role of the Sea of Okhotsk in the global environment, the Pan-Okhotsk Research Center (PORC) was inaugurated in the Institute of Low Temperature Science, Hokkaido University in April 2004.

The Center covers physical, chemical and biological aspects of the environment in the Sea of Okhotsk and its surrounding areas. Field observations and monitoring have been conducted using various instruments, such as the dynamic monitoring system for sea ice areas, which enables simultaneous observations of the oceanic currents, sea ice drift and atmospheric circulation above the ice-covered sea, unmanned meteorological monitoring towers, and research vessels.

Moreover, researchers at the center have been developing numerical models of the Atmosphere- Ocean-Land-Biosphere-Cryosphere system to clarify physical, chemical, and biological mechanisms of the environmental variations in the Pan-Okhotsk area and to predict them.

Properly evaluating the impact of and predicting the future of climate change require conducting intensive observations and developing predictive models based on the collected data. Moreover, the establishment of observation and research networks is also indispensable for continuing long-term, extensive observations.

This Center has been proceeding with comprehensive monitoring and modeling efforts for the Pan-Okhotsk region in collaboration with universities and research institutions not only in Japan, but also in Russia, Canada, the U.S., China, Korea, and numerous other nations.

P-2, 3

International Antarctic Institute project in Hokkaido University

Takeo Hondoh [1], Shin Sugiyama [1], Shigeru Aoki [1], Masanobu Yamamoto [2], Testuo Sueyoshi [1], Sohey Nihashi [1], Hiromi Kimura [1],

1/Institute of Low of Temperature Science, Hokkaido University,

2/Faculty of Environmental Earth and Science, Hokkaido University

The international Antarctic Institute (IAI) is an international, multi-campus program of education in cryosphere science. The institute was firstly proposed by the University of Tasmania and now 16 universities and institutions from 11 countries are involved as international partners. IAI aims to offer international standard education programs at undergraduate and graduate level with a special emphasis on Antarctic and cryosphere sciences. The universities and institutions share their curriculums within the framework of IAI partnership so that the students are able to take lectures and courses internationally. For those students who completed an agreed portion of the curriculum, bachelor and master degrees will be offered by IAI in addition to the degrees given by their home institutions.

Hokkaido University is enrolled in the IAI program as one of the leading universities in the field of cryosphere science. Institute of Low Temperature Science and Faculty of Environmental Earth Science have initiated a project to tailor and newly establish lectures and field courses for the purpose of IAI program. To offer a curriculum with an international standard, we collaborate internationally with Swiss Federal Institute of Technology (ETH) and University of Tasmania, and domestically with National Institute of Polar Research and Tokyo University of Marine Science. In May 2006, a glacier field course in Switzerland has been conducted for the first time with 15 students from Graduate School of Environmental Science. Another field course studying sea ice is planed in February 2007 at lake Saroma, East Hokkaido. Two lectures are commonly offered in Hokkaido University and in ETH by using a text book jointly published by professors in the universities, and also by e-learning systems. The curriculum is specially prepared with an English environment to accept students from all over the world.

P-4

Environmental role of methane Hydrate formation near sea bottom offshore Sakhalin, Okhotsk Sea

Hitoshi Shoji, Nobuo Takahashi, Hirotsugu Minami, Akihiro Hachikubo, Hirotoshi Sakagami,
Alexey Krylov, Masato Kida
Kitami Institute of Technology

Fluid venting from depths of sea sediment will transport a significant amount of methane gas into sea water, and eventually to the atmosphere, contributing to enhance greenhouse gas activity for global warming. Gas hydrate formation near sea bottom may act as negative factor for the global warming by fixing methane gas in a solid crystalline form as gas hydrates. However, the details of this gas seep and fixation processes near the bottom are not understood quite well at present.

Side-scan-sonar survey with high-resolution seismo-acoustic profiling was performed offshore Sakhalin, Okhotsk Sea by the members of CHAOS (hydro-Carbon Hydrate Accumulations in the Sea of Okhotsk) project by Japanese, Russian, German, Belgium and Korean scientists in 2003. The survey results revealed characteristic distributions of gas hydrate accumulations with unique images of gas seepage structures and vertical fluid channel at/near sea bottom. More than 40 seepage structures were found within a 10 x 20 km survey area. The maximum size of seepage structure observed is about 600 m in diameter. Methane gas released from the seepage structures into the above water was detected as flare images by hydro-acoustic profiling. Investigations for an understanding of methane hydrate formation mechanisms and monitoring of hydrate formation activities are required to understand the role of near-bottom hydrate formation for methane gas budget in the atmosphere and to discuss about future actions against long-term trend of increasing greenhouse gas contents.

P-5

Sustainable Farming System and Natural Resource Utilization: Evidence from the Rice-prawn Gher Fariming System of Bangladesh

Basanta Kumar Barmon, Takumi Kondo, Fumio Osanami
Laboratory of Development Economics Department of Agricultural Economics, Graduate School of Agriculture, Hokkaido University

This present study attempts to examine the economic evaluation and sustainability of rice-prawn gher farming system using indigenous natural resource use in Bangladesh. Experimental data and field survey data were used in the present study. Soils were collected after prawn production (before paddy production) and after paddy production (before prawn production) and tested in the Soil Resource Development Institute (SRDI) laboratory in Khulna, Bangladesh. The findings of the study indicated that the farmers used less chemical fertilizers in MV paddy production under the rice-prawn gher farming system compared to MV paddy production in Bangladesh and were statistically significant between the two agricultural systems. The main reason is that farmers apply various combinations of feed to gher plots during the prawn production and the leftover feeds make the land fertile for MV paddy production. Moreover, various types of algae and weeds grow on the bottom of the canal as well as the mid field of the gher farm, helping to make the land fertile for MV paddy production after prawn production. The cost of chemical fertilizers for MV paddy farming was about six times higher than MV paddy production under the rice-prawn gher farming system. However, per acre MV paddy production of MV paddy farming was almost same to MV paddy production under the rice-prawn gher farming system. The rice-prawn gher farming is a cost-saving technology for MV paddy production.

P-6

Problems in controlling invasive alien raccoons in Hokkaido, Japan

Tohru Ikeda, Go Abe, Yuji Masuyama, Shiro Tatsuzawa
Research Group of Regional Science, Division of Human Sciences, Graduate School of Letters, Hokkaido University

Irresponsible release and escape of pet raccoons (Procyon lotor) has caused their naturalization in Hokkaido, Japan. Raccoons had naturalized in cattle breeding area at first, where they could find food easily, then spread throughout Hokkaido.

Raccoons have opportunistic and omnivorous feeding habits, taking crops and fruit in agricultural areas and predating indigenous species such as the Japanese crayfish (Cambaroides japonicus) and the Ezo salamander (Hynobius retardatus) in

forests.
Nuisance control harvests of invasive alien raccoons were conducted in some areas in Hokkaido, but raccoons show high reproductive power and potentially rapid rate of population growth, thus it will be impossible to control invasive raccoons only by nuisance control harvesting. Intensive extermination under scientific control programs on the basis of adaptive management is indispensable to controlling invasive alien raccoons. As public awareness of invasive alien raccoon issues is low, except in some areas where agricultural damage is serious, educational efforts will be needed regarding invasive alien raccoon issues, especially irreversible impacts on native ecosystems.

P-7

Toward Sustainble Managemant in Japanese National Parks: Recreational impacts on natural resources and visitor experiences

Tetsuya Aikoh [1], Yasushi Shoji [1], Kazushige Yamaki [2], Kazuo Yamaguchi [3], Akihiro Kobayashi [4]
1/Hokkaido University, 2/Tohoku Research Center, Foresty and Forest Products Research Institute, 3/Consultant for Natural Resources Developments Inc., 4/Senshu University, Hokkaido College

Increasing number of visitors on outdoor recreational areas are threatening inherent conditions of such areas like national parks, national forest and world heritage registered sites in Japan. Soils are eroded, and alpine flowers are trampled by hikers on trails. Human waste and papers are found around shelters and campgrounds. Water contamination and disturbance of wildlife habitats are concerned. Also, quality of visitor experience are degraded. There are some conflicts among different type of visitors, such as hikers and bikers, kayakers and anglers, etc. Expected quiet atmosphere are loosing, because visitors are gathered at some summits, trailheads and accommodations, especially in some famous park like Mt. Fuji or Shiretoko.
To achieve sustainable management in natural recreational areas, some planning and management frameworks has been developing in North America, Recreational Opportunity Spectrum, Carrying Capacity, Limit of Acceptable Change, Visitor Experience and Resource Protection, etc. Those frameworks need to establish the management objectives which show the purposes and visions of such area, and the evaluation and monitoring of natural resource conditions and visitor experiences. On the other hand, Japanese National Park system seems to lack such type of planning and management framework. Lacks of reasonable planning and management framework is one of causes that park management are not effective. This series of posters describe the necessary of planning framework, the method to get exact recreational use statistics, and the importance of information about visitor choice behavior, toward sustainable management in Japanese National Parks.

P-8

Understanding Visitor Flows in Daisetsuzan National Park: Toward Sustainbale Management in Japanese Nationial Parks

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Visitor monitoring is fundamental to the sustainable management of recreation areas. Without this information, landowners or recreation managers cannot develop appropriate action plans to maintain natural resources and to manage quality of visitor experiences. In North American and European countries many studies have been conducted and a great deal of knowledge and techniques has been accumulated. In contrast to these countries, little attention has been given to the understanding of visitor monitoring in Japan.
Simple aggregation of self-registration books has been the main source of visitor counting in Japan. Most of mountain recreation areas, landowners or recreation managers request trekkers to write their information on self-registration books at trailheads, and it is said that not a few trekkers are willing to cooperate with it. Therefore, the official number of trekkers, which is reported by the Ministry of Environment, has also largely depended on simple aggregation of these self-registration data.
However, the number is fundamentally underestimation since there always exists some uncooperative trekkers, in addition a trend toward reluctance to cooperate with it against leaking of personal information has affected the registration rates. Thus, these ungraspable trekkers have evolved into an uncertainty on management of mountain recreation areas in Japan. Toward sustainable management, this paper examines closer annual visitor flows in the Omote-Daisetsu area, Daisetsuzan National Park, Japan, combining data from self-registration books and infrared trail traffic counters.

P-9

Understanding Hiker's choice behavior in Daisetsuzan National Park: Toward Sustainble Managemant in Japanese National Parks

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The information about visitors' choice of the sites for hiking is useful to manage trails in recreational areas.
Based on such information, managers will be able to take effective management actions to achieve the sustainability of the park. Visitors' choice behavior are known as the composition of several attributes such as personal factors, information sources and site attributes, etc. Increasing number of visitors and the change of access has caused the concentration of visitors on some popular routes, therefore natural resource impacts and the change of wilderness experience has been reported in Daisetsuzan National Park. Managers and stakeholders are seeking some management strategy to modify such situation.
Hikers were asked to rate the importance of 21 attributes about the routes, the trailheads and the camp sites. We also asked the information sources, the motivation, their experience and their willingness to next visit. The result of factor analysis showed that visitors considered the convenience of camp site, the walkability of route, the convenience of trailhead, the condition of natural resource and the less visitors. Those factors had relationships with their motivation, information sources and their experience of hiking and Daisetsuzan National Park. We found the significant relationships among visitors' personalities and site attributes which they had considered. Those information will be helpful for managers to control visitor flows and to choose the information they offer.

P-10

The industrialization of agricultural villages and the employment structure in the Sunan area of China - A follow-up research of Kaixiangong village -

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In China, reform of the ownership system of enterprises was promoted on a large scale in the late 1990's. Due to the increase of private enterprises, "Sunan model", which was owned by the town and village enterprises, has become a "Wenzhou model". This paper clarifies the real state and characteristics of farming village industrialization, centering on one of the villages in the Sunan area. In addition, by making clear the present status of progress of home-based industry, this presentation ascertains the change in the agricultural work structure in the economic development area, based on the existing study materials and actual condition survey.

P-11

Analysis of Indemnity for Community related to the World Natural Heritage Site — on Fisheries Management in Shiretoko —

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On July 14, 2005, Shiretoko was finally registered as the World Natural Heritage Site.
Now, dynamic ecosystem of Shiretoko which contains both the land and sea become well known to the world.
On the other hand, Shiretoko shows through Japanese fisheries management that it is a difficult and delicate problem to balance up interests of communities in the Site.
This research tries to find the best way to indemnify for communities which suffer losses from ecosystem conservation policies which implemented in the World Natural Heritage Site.
The history of Japanese fishing rights began with the Fisheries Law of 1902(Meiji era) which licensed fishing rights for the first time. Since postwar amendment of 1949(Showa era) adopted a concept of "adjustments for fishing", Japanese fishing

rights have had natures both property right as legal and environmental right as essential. Shiretoko fisheries management raises the question of where shall we find the common ground when the nature of environmental right restricts the exercise of fishing rights.
In the context of a new conflict between fishing rights and environmental right, change in the substance of "environmental right" might exist which is influenced by the stream of International Environmental Law that regards ecosystem conservation as most important.
It is necessary to establish strict fishery resources management system developed from old concept of adjustment for fishing to reach both goals of "marine ecosystem conservation" and "sustainable development in the sea" that is to say on one hand to meet the IUCN(International Union for Conservation of Nature and Natural Resources) demand to regard ecosystem conservation as most important among diverse values which the World Heritage Convention(1972) brings and on the other to continue Shiretoko fishing based on fishing rights. Thereby it is appropriates to outline the way to indemnify for communities in Shiretoko World Natural Heritage Site in three phases as follows:
Ⅰ establish strict fishery resources management system,
Ⅱ adopt administrative fisheries controls as a part of above system,
Ⅲ and allow those whose fisheries rights are injured bringing actions(administrative/ civil) for their damages.
Actually, Shiretoko fisheries management raises our environmental awareness which shift from the amenity improvement stage to the Global Environment Facility stage.

P-12

Why could be small villages inside of dolines in China sustained for centuries?

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Among the thousands dolines distributed in the limestone area in Western China, around one thousand of dolines have been inhabited for the past several hundreds years. The very steep limestone walls surrounding the village limited the villagers' activities to exchange materials with the outside of the dolines. There is no river above ground in the villages. Therefore, the villagers have been mostly dependent on the products inside of the dolines including basic life-supporting materials like water and foodstuff.
In order to elucidate the reasons why these life-supporting systems were sustainable for several centuries, we tried to analyze the material-cycling systems in the village in collaboration with the local scientists in China. The followings are the main findings obtained;
1) The solar energy was almost sole source of the energy to support the villagers' lives and activities. They obtained the essential energy from the food (mainly corn, beans and vegetables with occasional intake of meat) and the wood (for fuel and timbering) produced inside of the dolines.
2) Two types of mineral nutrient cycling routes were recognized in the system; the closed cycling route passing mainly fields and rather open cycling route passing through forest. The both route joined in the human life and the nutrients were incorporated in the fields as ash minerals.
3) Since almost all the materials including human bodies were incorporated in the recycling systems, there were not found any waste materials.
4) The people were very diligent and healthy, and passing constant daily life.
Though the way of living is not applicable to the industrialized countries, the fundamentals underlying those findings may be helpful for us to develop a sustainable society.

P-13

Wildflowers in Hokkaido as a natural resources - their conservation, creation, sustainable management, and use-

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Although most parts of the mainland Japan have been developed, some areas in Hokkaido with several natural resources still remain. In particular, habitats of wildflower species with beautiful flowers are characteristic and important natural

features in Hokkaido. Some of these habitats have been conserved, and are used as sightseeing destinations or for recreation purposes, already.
In this study, personal interview surveys and field investigations were conducted at nine sites at which are wildflower habitats to determine the site characteristics, vegetation type, maintenance methods used, and utilization patterns.
Five sites were public domain land, two sites were on company-owned land, one site was in the precincts of a Shinto shrine, and one site was on the campus of a university. Most of the plant species that were conserved were spring ephemerals that are peculiar to the Northern region in Japan. Eight sites were managing pre-existing habitats, and one site was managing a habitat created by transplantation of individuals. All the sites were managed by mowing understory once or twice a year during summer or autumn. The duration of mowing ranged from 5-45 years. The site of each habitat of wildflower was used as a sightseeing location, for a stroll, or for nature observations.
We assume that, in Hokkaido, there are many promising wildflower habitats that are being suppressed by competitive species such as Sasa senanensis. We will be able to establish aesthetic wildflower habitats by suitable management of them, and also create new aesthetic wildflower habitats by transplantation of wildflower individuals. Aesthetic wildflower habitats that are maintained sustainably by appropriate maintenance strategies will be useful for a sightseeing location, for a stroll, or for nature observations.
The evaluation of such wildflower communities will be also necessary in the future.

P-14

Sustainable coastal management for recreational use and natural resource conservation: The case of Ishikari Coast, Hokkaido

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The purpose of this study is to consider and propose sustainable coastal area management method for their recreational use and natural resource conservation. Ishikari coast, 10km long at middle part of Hokkaido, was used by a lot of people for recreational use (e.g. swimming, barbeque, fishing, ATV, PWC) in summertime. Such a concentration of recreational use caused the impact of natural resources and the conflict between recreational users, especially motorized vehicle users and others. This poster resulted in the necessity of future vision and environmental education for sustainable coastal management, which Ishikari coast does not have established yet. Future vision means a framework of decision making for management planning. To establish the vision, application of natural park system were proposed.
Environmental education has great potential to enhance knowledge in the short run and to prompt attitude change in the long run. This research showed that the visitor landscape preferences were different according to their purpose. Such a "gap" may cause the conflict between visitors who have different purpose. This result showed that the effort to fill in the gap, called environmental education (share of the information, sign board, guides, etc.) is important. This poster was concluded that the application of natural park system is suitable to this area for the sustainable coastal management.

P-15

Design Viewed from the Perspective of Sustainalbe Development

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Design is indispensable to achieve a society that promotes sustainable development. Products surrounding us affect our daily life physically, mentally, aesthetically, economically, and environmentally.
The way we design products reflects our approach to society. In other words, our daily actions and judgments in making and selecting products reflect our society's sense of values.
Therefore, we propose, as an extension of our freshman semiar course entitled "Power of Design", to reevaluate materials indigenous to Japan and re-examine traditional designs and techniques associated with these materials.
Among the various natural materials that will help us return to a "cradle to cradle" society, we will focus on bamboo and diatomaceous earth. We will first analyze their properties and current uses, and then present functional and beautiful designs suitable for these materials. Through the use of daily products made of such natural materials, we will learn to appreciate the beauty that nature bestows on us.

Such happy experiences will raise individual awareness of ecology and encourage responsible social behavior that does not overload our environment.

P-16

Effect and effectiveness of vaccination: pertussis in NZ as the case of sudy

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In some cases vaccination is unreliable. For example vaccination against pertussis has comparatively high level of primary and secondary failures.
To evaluate efficiency of vaccination we introduce the idea of effective vaccination rate and suggest an approach to estimate it. We consider pertussis in New Zealand as a case study. The results indicate that the level of immunity failure for pertussis is considerably higher than was anticipated.

P-17

Research and Development of ubiquitous information services for sustainable fisheries operation and management in the offshore around Japan

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This paper presents an overview of a newly developed ubiquitous fisheries information system using satellite remote sensing and geographical information system (RS/GIS). The system was developed to aim for providing high value-added fisheries oceanographic information in anytime and at anywhere. We also make this system to come into wide use for especially fishermen and managers in fisheries cooperation or fisheries experimental stations. All users can operate all products dynamically such as overlaying, measuring distance from nearest port or fishing grounds on the GIS. This system can help to support effective fishing activities such as economy with time for fishing ground destination or nearest landing port. This ubiquitous information services promise to promote sustainable fisheries operation and management in the offshore around Japan.

P-18

Organochlorine Pesticide Residues in the Pasture Environment, Meat and Milk of Philippine Buffaloes (Bubalus bubalis) from Angat, Bulacan

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The levels of OCP residues in environmental samples (soil, sediments, water and forage) as well as in meat and milk of Philippine Buffaloes from Angat and CLSU were determined. From Angat, Barangays Laog and Banaban were chosen because of its history of pesticide use and a preliminary study revealed the presence of several OCP residues. CLSU-PCC was chosen as the pseudocontrol area because although pesticide use was stopped more than a decade ago, contamination of the area cannot be ruled out.
Samples were collected from August 2002 to October 2003 and were taken to the Research and Analytical Services Laboratory of the Natural Science Research Institute (RASL-NSRI), University of the Philippines, for analysis. In the laboratory, soil, sediments and meat samples were extracted with DCM and hexane by Soxhlet apparatus for 8-16 hours. The extract was cleaned up using column packed with fully activated silica. Forage samples (grasses, legumes and feed concentrate) were extracted with acetone by sonication and cleaned up with silica and alumina. Milk samples were extracted with hexane and ethyl alcohol by sonication with reflux. Each sample was spiked with a surrogate standard (teterachloro-m-

xylene), OCP mix and internal standard mix (pyrene-d-10, phenanthrene-d-10) to assess performance of the method. A recovery of 60- 120% was considered acceptable. Method Detection Limits (MDL) was also determined for each compound and was computed based on US EPA method. Levels below MDL were reported as <MDL.

Analysis of water samples revealed residue levels below MDL indicating low levels of contamination. However almost all of the studied OCPs were detected in soil samples from Banaban and Laog with Banaban having the highest amount of contamination, 39.89 μg/kg. It is followed by Laog (37.97 μg/kg) and CLSU (6.48 μg/kg). It is possible that the longer use of OCP in Laog and Banaban than in CLSU resulted to higher level of contamination in soil from these areas.

The contaminants detected in soil samples were also the same contaminants detected in sediment samples. Laog contains the highest amount of contamination (104.20 μg/kg) followed by Banaban and CLSU (51.54 μg/kg and 1.72 μ g/kg, respectively). The higher amount of contamination in Laog sediments may be due to the more intensive use of irrigation in Laog than in Banaban and CLSU.

Analysis of OCP residues in forage samples revealed that endrin ketone was the predominant contaminant being present in all forage samples in high amounts. CLSU feed concentrate was also found to contain higher residue levels than grasses and legumes taken from the three areas. In meat, almost all of the studied OCP were present with the cyclodienes, heptachlor, dieldrin and endrin aldehyde as the predominant contaminants. But although many residues are found in the environment and meat of carabaos, only a few residues were present in milk samples. This may be because body burdens were not high enough to be incorporated in the milk. Comparison with the Codex EMRLs for meat and milk revealed that all of the detected residues were below their respective EMRLs suggesting that it is relatively safe to consume these animal products.

P-19

Determination of the presence of Organochlorine Pesticide Residues in the Einvironment of IPO Dam

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The levels of OCP residues in environmental samples (soil, sediments, water) from Ipo Dam were determined. Samples were collected in September, 2005 and taken to the Research and Analytical Services Laboratory of the University of the Philippines, Diliman. Analysis of the water samples revealed that the levels of all of the studied OCP residues were below the Method Detection Limits (MDL), suggesting very low levels of contamination. In sediments, only residues of endrin aldehyde and endosulfan 2 were detected in Ipo Dam and comparison with the data from Laog , an agricultural community revealed Ipo Dam contained less OCP residues. This study also found out that the levels of OCP residues in sediments were higher in Laog, than in Ipo Dam (total OCP mean concentration: 6.0 ug/kg in Ipo Dam and 67.71 ug/kg in Laog). This may be due to the more intensive use of chemicals and irrigation in Laog. The analyzed soil samples revealed that only residues of endosulfan sulfate was present in soil samples from Ipo Dam. Comparison of the total OCP mean concentration in soil revealed that Laog has a higher amount of contamination than Ipo Dam (16.15 ug/kg in Ipo Dam and 4.24 ug/kg in Laog). Since pesticide use was not allowed in the watershed area, the presence of endosulfan sulfate residues may mean that Ipo Dam has received inputs of the persistent OCP residues from the surrounding agricultural areas.

P-20

21st Century Center of Excellence Program 'Prediction and avoidance of an abrupt change in bio-geoshpere system'

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"Global warming by CO2", "ozone depletion", "forest destruction by exploitation" and "pollutants" are not influencing the environment independently. A possible feedback loop is that "Low absorption of CO2 caused by forest destruction" promotes "global warming", and then, "global warming" in turn enhances "forest destruction". They interact each other. Therefore, we need to understand these phenomena as a coupled system and to predict a future change. We are trying to understand and predict the phenomena by clarifying on the basis of bio-geoscience and intercomparison between the high latitude region and the low-to-mid latitude region. Our final objective is to avoid the abrupt change by not controlling nature but helping it from the cycle between natural ecosystem and material circulation.

P-21

The Land Use Changes and Modern Landscape Structure of the Russian-Chinese Transboundary Geosystem

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Anthropogenic impacts on the adjacent territories of North-eastern China and the Russian Far East are considerably different. But a number of such territories have similar natural conditions and are the parts of integrated formations - transboundary natural geosystems. Both ecological and economical conditions of every transboundary territories depend on one another. Therefore transboundary territory's researches have large theoretical and practical value for the planning their sustainable development.

The territory of our research is the transboundary low mountain region with common geologic and geomorphologic structure, similar soils, vegetation and climate. The Ussuri River, on which the state boundary of Russia and China passes, divides this territory into two almost equal parts. The Chinese part of the transboundary geosystem is situated in Heilongjiang province, the Russian one is in Primorskii and Khabarovskii krais.

To conduct the ecologic-geographical analysis of the transboundary geosystem, the map of its modern landscapes was compiled, the main features of landscape structure were determined. Statistical economic data and tendencies of resource's use were also analyzed. It allowed us to define the main stages of economic and land use development of Russian and Chinese part of geosystem. Studying of land use changes from 1990 to 2000 showed the major trends of modern landscape transformation and the basic ecological problems in the different parts of the transboundary geosystem. Some measures on improvement of their ecological situation were offered. The obtained data were mapped.

In conditions of deficiency of the unified information about the Russian-Chinese geosystems, the received information is the important basis for further planning of the sustainable territorial development of the near-boundary administrative formations of both countries.

P-22

Global Warming

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Precipitation patterns are likely to change in many parts of the world and globally averaged annual precipitation is projected to increase during the next century, and some regions will experience a decline.

Precipitation changes could lead to further water shortages and affect water quality in some regions of the world. Soil moisture will also be affected. And a cause of an overall reduction in global food production potential due to lack of soil moisture. Effects on climate, rainfall availability hence droughts. So a need to find long term solutions for the uprising threats.

P-23

Germination and growth responses of some key plant species from Horqin sandy land of China to the simulated desertificated conditions

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There is little knowledge on the germination and growth response of key plant species in Horqin sandy land, to environmental stress conditions. This study aim to investigate the effects of different temperatures and light intensities on the germination of 7 key plant species, and the influence of interaction of varied nitrogen/phosphorus regimes simulated different degrees of degraded soil on the growth of 4 key plant species grown in desertificated area in Horqin sandy land.

P-24

Effect of Soil chemical and biological properties along a chronosequence of Caragana microphylla plantations in the Horqin Sandy Land, Northeast China

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Soil chemical and biological properties along a chronosequence of Caragana microphylla plantations were studied in the Horqin Sandy Land, Northeast China. Results showed that shrub growth altered microclimate, increased litter input and hence improved soil water holding capacity, organic carbon, total N, microbial biomass C and N, electrical conductivity, soil enzyme activities, soil nematode diversity, and decreased soil bulk density.

P-25

STUDIES ON DYNAMIC CHANGES OF SOIL ORGANIC CARBON UNDER DIFFERENT LAND USE TYPES IN SANJIANG PLAIN

Yi Shi

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The vertical distribution of SOC and the relationships with pH and nitrogen in the marshy soil with different reclamation histories in Sanjiang Plain.

P-26

Decentralized Cooperation for Sustainable Development: Toward Paradigm Shift for International Cooperation Framework

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For many years, nation states have made significant efforts to resolve diversified and complicated global issues in cooperation with international organizations, NGOs and private companies. Despite these experiences, accumulated under existing international cooperation framework, global issues remain unsettled.

Then, what is an effective international cooperation framework to cope with global issues? One alternative framework, decentralized cooperation (cooperation decentralisee), sets out to give us an answer to this question.

Decentralized cooperation is a form of grass-roots international cooperation, institutionalized by French government in 1992, between French municipalities and their counterparts in developing countries. Under this framework, French municipalities offer techniques, knowledge and know-how to their partner cities in almost every field concerning public administration (environment, education, public health, urban and rural development, etc.).

Why have existing international cooperation frameworks failed? One of the main reasons has been insufficient effort aimed at strengthening the basis of democratic public administration systems in developing countries. In other words, without reinforcing self-resolving capacity against local problems, sustainable development of recipient communities can not be assured. In this meaning, decentralized cooperation seems useful for recipient communities, assuring transfer of public administration experience from French municipalities to their external counterparts.

Furthermore, we can remark other advantages of decentralized cooperation, compared with classical international cooperation frameworks: First of all, we can observe a less hierarchical relationship between supplier and recipient of decentralized cooperation. Because, in general, decentralized cooperation is concerned with the benefits of the vast existing sister city network established between French and foreign municipalities, respecting the reciprocal and equal partnership. Secondly, sister city relationships assure also long-term cooperation, one important element for sustainable development. Thirdly, long-term and equal partnership enables French municipalities to reply precisely to local needs, which is often needed by recipient municipalities.

Therefore, decentralized cooperation should be considered as a new paradigm for the international cooperation framework.

P-27

Life Cycle Assessment of Fishery Products - Case studies of Squid and Scallop production -

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It is indispensable to incorporate environmental measures into fishery production process in addition to a resource and economic viewpoint to achieve sustainable fishery. Life Cycle Assessment (LCA) is an important and useful tool to evaluate the environmental effects and potential impacts associated with a product and a service throughout its life span. Up to date, however, few data have been reported concerning the environmental burden of fisheries. In this research, we quantitatively calculated the environmental burden of the entire squid and scallop fishing systems in Hokkaido and assessed the environmental impacts using LCA. Squid and scallop were chosen for this case study because they are important fishery products for the Japanese food supply. Moreover, we suggested the evaluation procedure, while applying LCA to the fishery. As to squid related fishery, squid jigging fishery exhibited the largest environmentally burden, followed by off-shore trawl fishery, and large scale set-net fishery. The results suggested the largest value of the squid jigging fishery was mainly due to the use of fuel oil by fish gathering lamps. As to the scallop cultivation industry, on the other hand, the value indicated the ground sowing method was superior to the hanging method. We demonstrated that LCA was applicable to fishery, and this new methodology was to be useful toward the improvement of the environmental aspects of fishery.

P-28

Rabies in Sri Lanka: Knowledge, attitudes, practices and beliefs among community-dwellers

Matibag GC [1], Kamigaki T [1], Kumarasiri PVR [2], Wijewardana TG [3], Kalupahana AW [3], Dissanayake DRA [3], De Silva DDN [3], Gunawardena GSP DeS [3], Obayashi Y [1], Taniguchi T [4], Sawa H [5], Umemura T [6], Tamashiro H [1]

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[Background]
Although Sri Lanka had adopted its national program for the elimination of rabies during the mid-1970s, this fatal disease still remains endemic in all provinces.
Objective
To assess the knowledge, attitudes, practices and beliefs of the study population about rabies.
[Materials and Methods]
This cross-sectional study, performed on 8-25 May 2006, utilized in-person interviews using structured and pre-tested questionnaires in the urban, rural and estate sectors of Kandy District, Central Province. After randomized selection, the sample consisted of 6,925 persons from 1,570 households of the 26 survey areas, which represented 0.5% of the population of Kandy District.
[Findings]
Most respondents knew that dogs are the most common reservoirs in Sri Lanka (90%) and that rabies is a fatal disease (79%). Eighty-eight percent knew that rabies could be prevented by regular animal vaccination while nearly half knew the universal pet registration law (55%). Majority preferred to seek treatment from physicians if bitten (95%) while the most common reason for not consulting was the distant location of health practitioners (49%). Although most pet dogs were vaccinated (76%), only 44% of immunization cards were shown during the interview. Ninety-three percent would send their pets for free immunization, however, 46% would send them immediately and 40% would send upon respondents' time availability. Although only 43% were aware that the head of the suspected animal should be sent to diagnostic laboratories for confirmation, 58% were willing to send the specimen. While 85% favored animal population control, common reasons against it were personal beliefs (44%) and religion (38%). Most pet dogs were fed more than 3 times per day (85%) and were free-roaming (33%).

[Discussion and Conclusion]
Public health education, awareness and advocacy are vital for disease eradication. Intensified animal welfare programs and responsible pet ownership, especially in inaccessible areas, would be most valuable to increase community participation.

P-29

Rabies in Sri Lanka: Assessing health-seeking behavior following animal bite injuries

Matibag GC [1], Kamigaki T [1], Kumarasiri PVR [2], Wijewardana TG [3], Kalupahana AW [3], Dissanayake DRA [3], De Silva DDN [3], Gunawardena GSP DeS [3], Obayashi Y [1], Taniguchi T [4], Sawa H [5], Umemura T [6], Tamashiro H [1]

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[Background]
Although Sri Lanka had adopted its national program for the elimination of rabies during the mid-1970s, this fatal disease still remains endemic in all provinces with an annual dog bite incidence of 2,000/100,000 and human deaths at 4/100,000. Data on health-seeking behavior after animal bites have not been properly studied at the community level.
Objective
To establish the benchmark data on medical care-seeking behavior and treatment compliance among animal bite victims in selected localities of the Central Province, Sri Lanka.
[Materials and Methods]
This cross-sectional study, performed on 8-25 May 2006, utilized in-person interviews using structured and pre-tested questionnaires in the urban, rural and estate sectors of Kandy District, Central Province. After randomized selection, the sample consisted of 6,925 persons from 1,570 households of the 26 survey areas, which represented 0.5% of the population of Kandy District.
[Findings]
A total of 357 animal bite cases (5,155/100,000) and 2 cases of rabies deaths (29/100,000) have been encountered 12 months prior to the survey. One was a documented case while the other died at home. Eighty-eight percent of injuries fell within 6 to 64 years of age (mean: 33.84 years; 95% CI: 31.73-35.95). Bites in males (54%) were more than in females (46%). Bites on the legs and feet were the most common (60%). Dogs were the most frequently attacking animals (93%) and were mostly pets (75%) that were previously vaccinated (53%). Half the cases occurred at home. Most patients have consulted physicians for treatment (96%). Most patients (86%) received post-exposure vaccine less than five times upon physicians' advice (50%) and upon observation that the animal remained healthy and with prior immunization history (9%).
[Discussion and Conclusion]
Our results showed that the incidence of annual animal bites and human rabies are well above the reported national average. It is of paramount importance to carefully examine the existing surveillance and reporting systems. We highlight the importance of universal registration and immunization coverage especially for owned pets to prevent potential rabies transmission.

P-30

Environmental Impact on Wildlife

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Chlorinated / brominated persistent toxic substances (PTS), such as polychlorinated, -dibenzo-p-dioxins, -dibenzofurans, -biphenyls, -organochlorine pesticides, hexachlorobenzene, 2,2-bis(p-chlorophenyl)-1,1,1-trichloroethane (DDTs), hexachlorocyclohexane and -brominated diphenyl ethers, are ubiquitous contaminants in the environment. Due to the high lipophilicity / resistance to biological degradation, wildlife animals and humans accumulate notable levels of them through

food chain. Our research subject is to elucidate the biological effects of these environmental pollutants on wildlife, such as crabs, fishes, birds and mammalians.
Especially, we detected the high level of PTS accumulation in top predators, e.g., seals, Steller's Sea Eagle and White-tailed Sea Eagle. The residues of PTS caused the suppression of thyroid hormone and induced xenobiotic metabolizing enzyme, which was biomarker enzyme for the contamination of planar compounds.
In the meantime, until to day, there is few document reported contamination of PTS in terricolous wild animals. Norway or Brown rats (Rattus norvegicus) inhabit over world especially close to human population. The Brown rats are useful indicator for the effects of environmental contamination on land-wildlife due to their position in food-chain. In recent study, we found the high concentration of PTS in liver of wild Brown rats, and the contaminants affected the gene expression profiles in testis and liver.
We concluded that our environment is polluted enough to find animals with altered hormone levels.

P-31

Sustainability cannot be realized without the Environmental Governance and the Participation of Indigenous Peoples

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Sustainability is a concept which postulates the environmental safety over the generations. If the environment is destroyed for the convenience of the present life, it is not sustainable. This corresponds to the idea of the Native American's saying that the Earth is not the heritage from the Ancestor, but we rent it from the future generation. Although the sustainability is a global concept, we have to act locally to realize it. Here I will take two cases in which we are acting in Hokkaido as environmental scientists to realize the sustainability of our planet.
1: Conservation of natural river ecosystem
The natural river is rare even in Hokkaido where the dam construction and all kinds of concrete works have destroyed the natural river ecosystem especially the migration of salmonids through the 20th century. Hokkaido Development Agency has planned the construction of a big dam (46m high, 300m wide) in the Sanru, a tributary of the Teshio, the second longest river in Hokkaido. The dam not only cuts the migration but breaks the spawning habitat of cherry salmon which is important fishing resources. Major purposes of dam construction are flood control, power generation and water supply. But they are satisfied by alternative ways which do not destroy the environments. Free and open discussion is needed to evaluate the alternatives, but it is not realized by the policy of Hokkaido Development Agency. Change of the decision making system is necessary for such environmental issues. Environmental governance is urgently introduced.
2: Participation of Indigenous Peoples
Sustainability cannot be realized in a society where the equality is not certified. The Ainu, the indigenous people in Japan, is still in the position not equal to the other Japanese people. They lost the rights of caching salmon, shooting brown bears and deer, and land rights. Public education of their language has never been done for a long time. Their land names of the Ainu language have been changed to the Japanese. Recovery of the Ainu's rights and culture should not be neglected when we talk of sustainability.

P-32

Amur-Okhotsk Project 2005-2009

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Recent studies in the northern North Pacific have revealed that biological productivity was limited by iron availability there. Because iron can be hardly dissolved in water, phytoplankton largely relies on the iron supply from land via the atmosphere and/or rivers. In contrast to the central region of the northern North Pacific, the phytoplankton productivity is very high in the Sea of Okhotsk, probably due to the sufficient supply of iron from the Amur River. Riverine iron cannot keep dissolved in the seawater without being a complex with humic substances created in forest and wetland. Therefore, changes in land uses on the Amur basin such as deforestation, forest fire, cultivation, urbanization and/or reduction of wetland may reduce the biological productivity in the Sea of Okhotsk and the northwestern area of North Pacific Ocean.
In this project, we try to answer the following questions; 1) how large is the discharged flux of materials such as iron

from the Amur River, how far the iron is transported offshore and to what extent the iron is contributing to the biological productivity in the Sea of Okhotsk; 2) what are the factors controlling the release of materials such as iron from the land to the Amur River in the natural and/or artificially altered land surface conditions in the Amur basin; 3) to what extent the economic and political systems around Northeast China and Far East Russia change the land uses in the Amur basin in the past, present and future; 4) how variable are the water and material cycles around the Amur basin and the Sea of Okhotsk in the natural conditions.

P-33

A Lower Trophic Ecosystem Model Including Iron Effect in the Okhotsk Sea

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The Okhotsk Sea is one of the most biologically productive regions in the world, and it supports high fisheries production. The micronutrient iron plays a key role in limiting phytoplankton growth rates and structuring plankton communities over much of the world ocean. Recent studies have shown that iron is an important factor controlling phytoplankton in the western subarctic Pacific Nitrate is depleted after the spring phytoplankton bloom in the Okhotsk Sea. This fact suggests that iron supply is higher in the Okhotsk Sea than in the western subarctic Pacific and, that phytoplankton growth is not limited by iron availability in the Okhotsk Sea. However, it is not well known whether iron limits phytoplankton growth or not, or what is the main source of iron in the Okhotsk Sea. We applied a three dimensional ecosystem - physical coupled model including iron effect to the Okhotsk Sea. In order to clarify the sources of iron, four iron compartments were added to Kawamiya et al. (1995)'s model (KKYS) to create our ecosystem model (KKYS-Fe). We hypothesized that four processes supply iron to sea water: atmospheric loadings from Northeastern Asia, input from the Amur River, dissolution from sediments and regeneration by zooplankton and bacteria. We simulated 1year, from 1 January, 2001 to 31 December, 2001, using both KKYS-Fe and KKYS. KKYS could not reproduce the surface nitrate distribution after the spring bloom, whereas KKYS-Fe agreed well with observations in the western subarctic Pacific because it includes iron limitation of phytoplankton growth During spring bloom, the main source of iron at the sea surface is from the atmosphere. The contribution of riverine iron to total iron utilized for primary production is small in the Okhotsk Sea. Atmospheric deposition, iron flux from sediment and regeneration of iron in water column play an important role in maintenance of high primary production in the Okhotsk Sea.

Keywords: ecosystem model, Okhotsk Sea, phytoplankton, iron, primary production

P-34

Evaluation of the impact of water dilution within the eutrophic Lake Barato, Japan

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Lake Barato is a eutrophic and subarctic 4.37 km2 lake in Hokkaido, Japan. This lake is an oxbow lake that was isolated from the Ishikari River following the development of flood-protection measures on the river. Although environmental criteria for water quality in Japan are defined as total nitrogen (TN) less than 71 ?mol L-1 and total phosphate (TP) less than 3.2 ?mol L-1, levels in Lake Barato exceed these standards by a factor of three (TN: 229 ?mol L-1; TP: 6.3 ?mol L-1). To dilute eutrophic water in Lake Barato, an Inlet Project was carried out during the summer of 2005 via a 1 m3 s-1 inlet from the Ishikari River. In this study, field data and three-dimensional numerical simulations are used to evaluate the impact of water dilution on eutrophication. River water was discharged from the margin of the upper section of the lake to dilute the water. We undertook a numerical simulation of total nitrogen (TN) and total phosphate (TP) distribution and its impact on the emergence of cyanobacteria considering five inlet cases. Model results suggest that the most effective and feasible way to achieve dilution is via a 5 m3 s-1 inlet and open the Shinko Gate, which connects the lake and Ishikari Bay through the channel. Following this scheme, TN and TP concentrations were reduced by 28% following 30 days of discharge according to the simulation results.

Keywords: Lake Barato, dilution of a eutrophic lake, numerical model

P-35

COMPARISION OF PERFORMANCE AND MEMBRANE FOULING CHARACTERISTICS BETWEEN PRESSURIZED AND SUBMERGED PVDF MICROFILTRATION MEMBRANES

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As a means of complying with current and anticipated regulations, membrane technologies have been widely adopted in the world. Especially, the low-pressure driven membrane techniques such as microfiltration (MF) and ultrafiltration (UF) have attracted a considerable amount of attention in drinking water treatment to remove particulate by size exclusion and usually produce a filtrate free of turbidity and bacteria from river, lake, and underground waters.

There are two different configurations (i.e. pressurized and submerged modules) of membrane filtration technology. Submerged module has become a major feature in wastewater application of membrane technology. Many researchers reported that this module remarkably reduced the power consumption of recirculation pumps used in a membrane bioreactor. However, there were no available reports comparing the pressurized and submerged membrane modules in water treatment. The goal of this study was to compare process performance and fouling characteristics between pressurized and submerged PVDF (polyvinylidene fluoride) hollow fiber membranes having 0.1? nominal pore size (MicrozaR, Asahikasei Chemical co., Japan) treating Chitose River water having relatively high turbidity and humic substances under the same operating conditions (permeate flux of 0.65 m/d, recovery rate of 92%, and physical cleaning using permeate and the compressed air for 90 s).

As a result, turbidity (100%), Al (> 84%), and Fe (> 95%) were removed very well by both membrane modules. However, humic substances and Mn were not effectively removed by the membranes. On the other hand, different fouling characteristics of the two membranes were observed during the experimental period.

In case of the submerged membrane, fouling could be effectively mitigated by backwashing and air scrubbing. In contrast, fouling of the pressurized membrane could not be easily recovered once it increased rapidly. Focused on this point, characteristics of foulants in both membranes were studied. As a result, it was found that relatively large amounts of organic matter (especially carbohydrates and humic substances) and Fe were extracted from the cake layer of the pressurized membrane than that of the submerged membrane.

In addition, from the surface analysis, it was observed that the cake layer formed on the pressurized membrane surface was intensely smoother and thicker than that formed on the submerged membrane surface. Finally, it was recognized that interaction between organic matters and Fe in the pressurized membrane improved significantly the cake compressibility and stability deteriorating membrane fouling.

Keywords: drinking water treatment, pressurized and submerged modules, PVDF, membrane fouling, surface analysis

P-36

Development of a super high-rate ANAMMOX reactor and in situ analysis of biofilm structure and function

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The anaerobic ammonium oxidation (ANAMMOX) process is a new efficient and cost effective method of ammonium removal from wastewater. Under completely anoxic conditions ammonium is oxidized with nitrite as electron acceptor to dinitrogen gas and small amounts of nitrate. This process has many advantages as it demands no oxygen and no organic carbon source and produces small amount of sludge and could make the reactor footprint smaller than that of conventional systems. However, it is difficult to cultivate the ANAMMOX bacteria due to their low growth rate (the dabbling time is approximately 11 days). This indicates that rapid and certain start-up of ANAMMOX process is apparently the key to practical application. However, there is still little information on the efficient screening method of appropriate seeding sludges for ANAMMOX process. Therefore, in order to screen a good seeding sludge for the ANAMMOX process, we developed the real-time quantitative polymerase chain reaction (RTQ-PCR) assay with newly designed primers for the quantification of the ANAMMOX bacteria in the sludge. Thereafter, we successfully obtained a seeding sludge with high abundance of ANAMMOX bacteria and inoculated this sludge into an upflow anaerobic biofilter (UAB). The UAB was operated for more than one year, and the performance of ANAMMOX process was monitored. As a result, we successfully achieved the highest nitrogen removal rate of 26.0 kg-N/m3/day, which has never been reported. In addition, the

ecophysiology of ANAMMOX bacteria (spatial distribution and in situ activity) in biofilms was analyzed by combined use of a full-cycle 16S rRNA approach and microelectrodes to be improved and stabilize the performance. As a result, the microelectrode measurement clearly revealed that a successive vertical zonation of the partial nitrification (NH4+ to NO2-), ANAMMOX reaction, and denitrification was developed in the biofilm in the UAB. This result agreed with the spatial distribution of corresponding bacterial populations in the biofilm. The coexistence of ammonium oxidation bacteria (AOB), ANAMMOX bacteria, and denitrifiers gives mutual advantages, such as that AOB and Eubacteria give the ANAMMOX bacteria an advantage by consuming dissolved oxygen and organic matter derived from ANAMMOX reaction. We will link micro-scale information (i.e., single cell and/or biofilm levels) with meso-scale information (i.e., the reactor level) to understand the details of ANAMMOX reaction occurring in this UAB.

Keywords: ANAMMOX, RTQ-PCR assay, a full-cycle 16S rRNA approach, microelectrodes.

P-37

SUBCRITICAL CRACK GROWTH IN ROCK

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Knowledge of the time-dependent properties of deformation and fracture behaviors in rocks is essential to ensure the long-term stability of structures in rock mass, such as underground power plants or sites for radioactive waste disposal. Subcritical crack growth is one of the main causes of the time-dependent behaviors in rocks. Under low homologous temperatures and atmospheric pressure, stress corrosion is the main mechanism of subcritical crack growth in rocks. In silicate rocks, stress corrosion is a weakening process due to a chemical reaction between the siloxane bond structure near the crack tip and water. The author has studied subcritical crack growth in rock and investigated the effects of surrounding environment and rock fabrics on subcritical crack growth.

The relation between the crack velocity and the stress intensity factor was determined by using a fracture mechanics testing method called "Double Torsion (DT) method" and effective agents on subcritical crack growth in rock were investigated. It was shown that subcritical crack growth in granite was anisotropic and affected by the preferred orientation of pre-existing micro-cracks. When the crack growth occurred in the direction parallel to the plane in which the density of pre-existing micro-cracks was the highest, the crack velocity at the same stress intensity factor was the highest in the same environmental condition. Dependence of the crack growth on the water vapor pressure was clarified in air. The crack velocity at the same stress intensity factor increased with increasing the water vapor pressure. It was also clarified that the crack velocity at the same stress intensity factor and temperature was higher in water than in air.

Preparing thin sections from the rock specimens used for DT test and observing the crack paths, the relation between the geometry of the crack path and the crack growth behavior was investigated by the fractal analysis. It was clarified that the density of pre-existing micro-cracks affected strongly the geometry of the crack path.

Subcritical crack growth was also observed for micro-cracks by raising the temperature and relative humidity of surrounding environment. By the measurement of P-wave velocity in granite with the change of temperature and humidity, the decrease of P-wave velocity was observed when the relative humidity increased under high temperatures. This result is due to the stress corrosion crack growth for micro-cracks.

From this study, the effects of environment and rock fabrics on subcritical crack growth have been clarified quantitatively.

Keywords: subcritical crack growth, stress corrosion, Double Torsion method, preferred orientation of micro-cracks, water vapor pressure, crack path.

P-38

MICROBIAL COMMUNITY ANALYSIS IN PILOT-SCALE MEMBRANE BIOREACTORS TREATING DOMESTIC WASTEWATER

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Membrane separation technology is increasingly becoming an important innovation in biological wastewater treatment. Membrane fouling particularly biofouling, is a major factor affecting the efficient and economic operation of membrane bioreactors (MBRs) and properties of biomass (sludge) in the MBR. We therefore, analyzed the microbial community structure of pilot-scale submerged membrane bioreactors treating municipal wastewater by applying a full cycle of 16S rRNA approach including clone library analysis and fluorescence in situ hybridization (FISH) and related to membrane fouling. FISH analysis revealed that the population Chloroflexi, belonging to subdivision 1 and 3, accounted for ca. 24% of total bacteria present in the mixed liquor, and they seem to be a key player in formation of microbial flocs and in degradation of soluble microbial products derived from biomass decay in the MBR. When the population of Chloroflexi decreased, soluble polysaccharide concentrations increased and trance membrane pressure (TMP) also accordingly increased. We further conducted the identification and characterization of this group of bacteria by using microautoradiography combined FISH (MAR-FISH) analysis. It was found that Chloroflexi was able to uptake N-acetyl-[1-14C] D-Glucose (NAG) as a major constituent of bacteria cell wall peptidoglycan and lipopolysaccharide. This implied that they were terminal organic degraders (scavengers) of dead biomass.
In addition, we observed the biofilm attachment and growth on the hollow fiber membrane surface by the SEM, Live/Dead staining and FISH anlysis. The number of active bacteria attached on the membrane surface increased with time, resulting in an increase in TMP. FISH analysis revealed that this biofilm was composed of mainly Betaproteobacteria, accounting for ca. 70% of total bacteria in the biofilm. Furthermore, we analyzed the microbial community structure in this biofilm by 16S rRNA gene clone libraly analysis followed by FISH. In the clone library, most of the clones belonged to only two bacterial lineages: Betaproteobacteria (detection rate; 32/47) and Gammaproteobacteria (detection rate; 8/47), which agreed with the result of FISH analysis. This biofilm microbial community structure was complete4ly different from that in the suspended mixed liquor sample. This indicate that bacteria belonging to the Betaproteobacteria have a special ability to attach to the membrane surface and form mature biofilms.

Keywords: Membrane Bioreactor (MBR) ; membrane fouling ; biofouling ; microbial community ; Chloroflexi ; Proteobacteria ; Fluorescence in situ hybridization (FISH).

P-39

Development of mathematical model for a landfill cell

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Many studies have been done in laboratory scale or even field scale experiments to obtain detailed information on the fate and transport of pollutants from municipal solid waste (MSW) landfills. However, such studies can only get a result for a specific set of parameters. In this regard, a numerical model can be a powerful tool to understand the behavior of pollutants according to various conditions: time scales, the type of waste, the dimensions of landfill, landfill structure as well as climatological conditions.
In past years, most landfill models were to simulate organic-rich landfills, so these models have addressed the fate of carbon compounds such as acetate, CO2, CH4. And solid calcium carbonate (CaCO3(S)) has been generally used as main buffer mineral in landfill. However, Japan has promoted the incineration of MSW over 30 years. Consequently, the quality of landfilled wastes has been changed from organic waste to inorganic wastes such as incineration residues.
Therefore, we developed a mathematical model of the fate and transport of pollutants from inorganic-rich MSW landfills as well as organic-rich MSW landfills. For this, we considers the precipitates of CaCO3(S), Ca(OH)2, and CaSO4(S) as main buffer mineral in landfills.
Our model is based on compartment model (or a box model), in which one compartment represents a unit cell of the landfill. This allows simulation of a landfill of various cells by using different parameters values in different landfill cells. In addition, the model is able to switch anaerobic conditions into aerobic conditions and vice versa, depending on the local

oxygen concentration. Furthermore, the influence of environmental factors, such as moisture content, pH, and temperature on reaction rates has been also incorporated.
Although the validation of model parameters is needed by applying to various field data, simulation results show a typical pattern of biogas and leachate composition as observed in actual landfill sites. In the near future, the model is scheduled to be improved by validating model parameters with field data, by including chemicals such as heavy metals and dioxins, and by expanding the one cell model to a multi-cell model to simulate actual landfilling operations and different structural designs.

Keywords: mathematical model, landfill, pollutant, simulation, municipal solid waste (MSW).

P-40

HUMAN DNA MICROARRAY ANALYSES FOR THE EVALUATION AND DIFFERENTIATION OF HEAVY METAL TOXICITY

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Current approaches to risk assessment of toxic chemicals focus on a single end point and are inadequate for the evaluation of environmental water including a large number of unspecified substances. DNA microarray technology, which makes it possible to analyse chemically induced alteration of gene expression, has become an important technique in toxicology and may provide new multiple bioassay method for detection of environmental chemicals. In this study, we evaluated and differentiated the toxicity of seven heavy metals on the basis of tentative elemental toxicity: oxidative stress, protein denaturation, and carcinogenesis through a comparison of the gene expression profiles in human hepatoma cell line, HpG2. Using 8795 gene array, gene expression changes following high-dose exposures (60-80% cell viability after 6 hr treatment) of arsenic, cadmium, mercury, chromium, nickel, antimony or manganese were examined along with those of model chemicals: hydrogen peroxide (oxidative stressor), phenol (protein denaturing agent), 12-O-tetradecanoylphorbol-13-acetate (TPA, tumor promoter), dimethylnitrosamine (DMN) or mitomycin C (MMC, tumor initiator). As the result of t-test with p<0,05, a total of 1230 genes with treatment : control ratios ? 2.0 or ?2.0 were identified. The hierarchical clustering analysis showed that gene expression profiles after exposure of five heavy metals (As, Cd, Hg, Cr, Mn) were closely related to that of H2O2, while the expression patterns induced by Ni and phenol were grouped together. These results suggested that high-dose exposure of five heavy metals and Ni induce oxidative stress and protein denaturation respectively. We further examined the dose-dependent toxicity of arsenic. The gene expression pattern induced by low-dose (78% cell viability after 48 hr exposure) arsenic was significantly different from high-dose exposure and closely related to three carcinogens (TPA, DMN, MMC). Thus, comparison of gene expression profiles, using DNA microarray allowed us to evaluate and differentiate heavy metal toxicity. This method has potential for predicting the major toxicities caused by chemicals in water environment and will provide information about toxic risks in humans.

Keywords: DNA microarray, heavy metal, oxidative stress, protein denaturation, carcinogenesis.

P-41

Recovery of nitrogen from source separated feces and urine in onsite wastewater differentiable treatment system

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Source separation of feces from urine has been studied to improve the present issues in Bio-toilet system that is the key technology in Onsite Wastewater Differentiable Treatment system (OWDTS). We need to apply urine diverting composting toilet system (UDCTS) to treat human waste in OWDTS. Source separated feces is treated in the sawdust matrix as conventional. Source separated urine is stored in urine storage and treatment unit (USTU). It is still not studied well in literatures how we recover the nitrogen from feces and urine in UDCTS. The aim of this study is to provide basic knowledge and to contribute the discussion for the nitrogen recovery from human waste in decentralized wastewater treatment system.
We have two topics in this study: Topic 1) we need to characterize feces nitrogen in the composting material for a control

of the recovery rate of nitrogen. Topic 2) the hydrolysis of urea in stored urine should be controlled for higher recovery rate of nitrogen. Urea hydrolysis proceeded by the activity of urease producing bacteria (UPB) from feces. We therefore focused on the fate of the UPB by feces contamination in the toilet bowel in UDCTS. The UPB in contaminated urine by feces (2g-feces/l-urine) was indirectly estimated: the UPB was described by ammonification rates. According to the theory for enzyme reaction, ammonification rate could be determined by three factors without inhibition factor: reaction temperature, concentration of urea and concentration of the UPB.

It was cleared that feces contained the 75% of NXS (biodegradable) and 25% of NXI (originally inert), and 9% of NXIB (inert produced by endogenous respiration) respectively. We therefore concluded that approximately 34% (sum up of NXI and NXIB) of feces nitrogen can be recovered from the composting toilet. We found that the urea hydrolysis depended on the UPB concentration and effect of inhibition factor. However it was not cleared nitrogen recovery rate from stored urine. We still need to study the inhibition factor by NH3(aq) for the UPB to control the urea hydrolysis for stable condition in stored urine.

Keywords: nitrogen recovery, composting toilet, source separation, nitrogen transformation during the composting process, urea hydrolysis

P-42

Development of the prediction models of concrete structure for structural performance during service life

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The objective is constructing the deterioration model of the concrete structure. Moreover, the durability of the concrete structure that will be constructed in the future is predicted, and an appropriate design and the repair time are clarified. It approaches from the materials level that composes concrete. The deterioration prediction model from the microstructure model with the cement-based materials is constructed, and it proposes the best material and the design for construction. Especially, the permeability and diffusion of the cement-based materials that greatly influences deterioration is examined, and the mechanism is clarified from microstructure.

For this purpose, the technique that the amount and the distribution of each phase in hardened cement paste is evaluated by using backscattered electron image and the element image measured by energy dispersive X-ray analysis, was developed. Moreover, it was also cleared the microstructure of cement paste mixed with fly ash and the blast furnace slag applying this technique. In addition, the technique for predicting the elastic modulus by using the phase distribution image was developed. And the technique that the amount and the distribution of pores in hardened cement paste are evaluated by using Gallium intrusion method with electron probe microanalysis, was developed. It is cleared that chloride penetration depth of hardened cement paste is evaluated by this method.

To evaluate the amount of chloride in a concrete structure existing by nondestructive because the deterioration diagnosis of an existing building is very important, we developed the prediction method of the difference of the amount of chloride contained in concrete by using the spectrum analysis of the received waveform of the electromagnetic radar.

Keywords: Concrete structure, Durability, Microstructure, Hydration, Transport, Elastic behavior

P-43

Development of analytical model for predicting deterioration process coupled with heat, moisture and substances transfers and chemical reactions of various concretes

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Neutralization of concrete occurs as a result of CO2 gas from the air dissolving in the absorbed water, which contains alkaline substances such as Ca(OH)2. Therefore, the ad- or absorbed water is essential to neutralization, and the rate of the neutralization strongly depends upon the moisture regime. When a concrete wall is exposed to rain, it is generally believed that the neutralization is slow because CO2 gas cannot diffuse into concrete. Although rain is assumed to be pure water, rain in Japan is usually acid with a pH of less than 5.6. In this situation, neutralization may proceed faster because CO2

has already dissolved in the atmosphere, and the acid substances can move due to advection of the solution.
From this point of view, permeability is one of the most important parameters in discussing the neutralization of a concrete wall. Furthermore, if the permeability varies depending upon the position in the wall, the neutralization rate may also differ from place to place.
In this study, the permeability of concrete was measured at atmospheric pressure in order to clarify the vertical distribution. The measured result in a test piece with 20 cm height showed clearly a non-uniform vertical distribution of the permeability. The water permeability in the upper part was about two times larger than that in the center part.
Next, a neutralization process in a small-scale concrete wall was simulated under cyclic infiltration of rain and drying, with an assumed vertical distribution of water permeability. The results showed that neutralization was accelerated due to acid rain in regions with a high permeability and retarded in regions with a low permeability. Thus, it can be concluded that the influence of acid rain on neutralization process may differ depending on the position in concrete structure.
After this, proposed analytical model will be extended for application to concrete treated with silane agent, and recycled concrete.

Keywords: concrete, durability, water permeability, advection, chemical reaction

P-44

Feasibility Study of a Low Energy System Utilizing Urban Exhaust Heat With Ground Water as Medium of Thermal Transport

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In order to recreate utilizable water resource and maintain area based society, it is necessary to establish small-sized sewage-disposal plants, which can release treated sewage into closed-hand area. In addition, it is possible to utilize exhaust heat from black water by construction of the sewage-disposal plants. As the method, for example, a system utilizing ground water as medium of thermal transport, which cultivates treated sewage into the ground and recovers the exhaust heat in the downstream, is suggested. Since there are a lot of heat demand for heating and hot water supply, to construct such a system is effective from the viewpoint of energy saving, especially cities in the cold region like Sapporo.
In this paper, in order to evaluate the system, a method to calculate ground temperature with ground water flow s shown based on comparing the thermal response for cylindrical heat source calculated by numerical calculation with one for line heat source calculated by the moving line heat source theory.
Next, the outline of the system is proposed and the feasibility study is carried out with the tool including developed method.

Keywords: Urban Exhaust Heat, Ground Thermal Energy System, Feasibility Study, Design Method, Ground Water Flow

P-45

OPTIMAL SPEED LIMIT BY COST ANALYSIS

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This study is aimed at determining the optimal speed limit for dry summer conditions on Hokkaido roads by using cost analysis including the effects from traffic signal intensity and traffic congestion. In the cost analysis, the components that were involved include time cost, vehicle operating cost, pollution cost, and accidental cost. The unit here was in yen per kilometer per day. Initially, traffic volumes on Hokkaido roads were determined. Then, the relationships between average speed and each cost component was calculated. After that, the summations of overall costs of each average speed were verified so that the optimal average speeds were obtained from the minimum total costs. Then, the effects from traffic signal intensity and traffic congestion were required to calculate the optimal speed limit from the optimal average speed. Finally, the optimal speed limits were obtained, i.e. 60 km/h on urban national highways, 70 km/h on rural national highways, and 90 km/h on urban and rural expressways. This is in contrast to the current existing speed limits of 50 km/h on urban national highways, 60 km/h on rural national highways, and 80 km/h on urban expressways and 100 km/h on rural

expressways. In conclusion, it was shown that traffic congestion had less of an effect on average speed due to the low traffic volume of Hokkaido roads. From the cost analysis, time costs and accidental costs had major effects on the results. As the cost analysis included all major components for determining optimal speed limit, these new speed limits can contribute towards improved road safety, increased energy efficiency and a healthier roadside environment. Eventually, as a practical measure, public hearings are necessary to support the new speed limits which are also included in the further study.

Keywords: optimal speed limit, cost analysis, traffic signal intensity, traffic congestion

P-46

Characteristics of irreversible membrane foulant in Ultrafiltration of surface water

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Water treatment using microfiltration (MF)/ultrafiltration (UF) membranes are gaining in popularity all over the world. Although use of membranes in drinking water treatment has various advantages, a major drawback associated with this technology, membrane fouling, has not been addressed yet. Membrane fouling can be divided into two types: reversible fouling and irreversible one. The former can be defined as the fouling that can be cancelled by physical membrane cleaning, whereas the latter needs chemical membrane cleaning to be canceled. Currently, there is still a lack of information as to which constituents contained in feed water would cause irreversible fouling and therefore it is not possible to establish an efficient way to prevent it. In this study, to obtain the information about the constituents that would cause irreversible fouling in/on Polyacrylnitrile membrane (molecular weight cut-off: 100,000 Da), pilot studies were conducted for 30 days from the beginning of October, 2005. As expected, the development of irreversible fouling was observed in increase in trans-membrane pressure in spite of conducting the physical cleaning routinely. After 30 days of continuous operation, to elucidate what constituents caused the irreversible fouling, membrane specimens were taken out from the pilot unit and various types of chemical cleaning were examined. A series of chemical cleaning demonstrated that acid or chelate worked better in flux recovery, whereas sodium hydrate was not effective. This result implied that irreversible fouling might mainly induced by inorganic matter. Based on the chemical analysis, HCl extracts contained a large amount of iron. Consequently, it was found that one of the major foulant that caused irreversible fouling in this study was iron. Also interestingly, not only iron but also a large amount of organic matter was desorbed by HCl solution. The FTIR spectra of the foulants contained in HCl solution exhibited a large carbohydrate peaks around 1080 cm-1, which indicated that carbohydrate could be pointed out to be one of the major foulant as well. Therefore, it could be considered as fouling mechanisms that (1) complexes of iron and carbohydrate plug the macropores or (2) iron and carbohydrate accumulated on/in the membrane, respectively.

Keywords: Ultrafiltration, Irreversible membrane fouling, iron, carbohydrate

P-47

LIFE PREDICTION FOR CONCRETE UNDER FATIGUE LOADS AND FREEZING-THAWING CYCLES

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Background
In order to develop sustainable infrastructure system, rational design method for structures against long-term deterioration is required. Hence, we should know when and how structures are damaged and improvement of current life-prediction methods is required. This study focuses on fatigue and frost damage, which are typical deterioration of concrete structure. The aim of this study is to develop new design method, which can consider deformation, damage distribution and combined effect of fatigue and freezing-thawing action during structural service life.
Research plan
This study is composed of five stages. As the first step, macroscopic constitutive model of concrete under fatigue loading is developed. Secondly, mesoscopic fatigue analysis system using Rigid Body Spring Model (RBSM) will be developed. Here, time-dependent mesoscopic constitutive law is proposed. Thirdly, freezing-thawing analysis system using RBSM with

truss network will be developed. Here, mesoscopic damage is related to water and temperature change in concrete based on microscopic structure. At the fourth step, both the analytical systems will be combined, and then deterioration of concrete under combined action of fatigue and freezing-thawing can be simulated. Lastly, fatigue life prediction formula, which can take frost damage into account, will be developed for design purposes.

Macroscopic deformational model under fatigue loads (STEP1)

Fatigue loading tests were carried out and they were analyzed with previous experimental data. This activity corresponds to the first step. As a result of summarizing and organizing the experimental data, it was found that concrete under fatigue loading has non-damaging strain as well as damaging strain. Besides, stress-strain model was developed, and then deformation of concrete under fatigue loading could be numerically expressed. However, remaining issue was found, which is, amount of time-dependent plastic strain has not been quantitatively expressed under macroscopic level.

Time-dependent analysis of mortar by RBSM (STEP2)

Time-dependent analyses of mortars by RBSM were carried out as a basic study of fatigue analysis. In general, there are two visco-elastic models, which are Maxwell and Voigt model. In this study, characteristic of each model on results of RBSM analysis were examined through mortar analyses. Consequently, differences of strength and stiffness change from static case between Maxwell and Voigt model were found.

Keywords: concrete structures, life-prediction, fatigue, freezing-thawing, combined action, mesoscopic analysis

P-48

Fate of Pharmaceuticals in Human Excrement During the Composting Process of Feces

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We have proposed the Onsite Wastewater Differentiable Treatment System. In this system, household wastewater is separated into three fractions (blackwater, higher load graywater, and lower load graywater), and each is treated separately. The blackwater that may contain pharmaceuticals (PhACs) is treated by a composting toilet using sawdust as a matrix. Our objective in this study is to understand the fate of PhACs in the composting process varying the feces loading ratio on the toilet reactor. The variation of oxygen utilization rate (OUR) indicated the degradation rate of feces in the composting process, and the OUR profiles showed that feces were almost treated in early stage of this process. We also observed the decay of the selected PhACs in this process. The reduction profiles imply that the degradation of PhACs has small relation to the treatment of feces. The degradation rates of all PhACs were almost the same if the feces loading ratio was 5%, and the degradation rates of acidic PhACs were almost the same regardless of the increasing of the feces loading ratio. But the higher feces loading ratio gave higher degradation rates of basic PhACs. During the process higher feces loading ratio gave the higher ammonia concentration in the sawdust matrices and this resulted in higher pH value. In this experiment, the pH ranged from pH7 to pH9 and in this pH range, acidic PhACs are present as an ionic form. At pH 7, the basic PhACs exists as an ionic form, but at pH 8.5 and 8.8, where we observed the rapid degradation of the basic PhACs, about 10% of the basic PhACs exists as non-ionic form. Therefore we infer that the degradation of the selected PhACs is affected by the dissociation condition. To conclude this study, we obtained following knowledge; (1)Easily biodegradable organic matter (like feces) does not interfere the degradation of the PhACs; (2)The structural difference among the selected PhACs in this study gives insignificant effect on the degradation rate; (3)The dissociation condition may have a significant effect on the degradation rates in the composting process.

Keywords: Composting process, Degradation of Pharmaceuticals, Treatment at source

P-49

Simultaneous Power Production and Wastewater Treatment Using a Microbial Fuel Cell

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A microbial fuel cell (MFC) converts chemical energy, available in a bio-convertible substrate, directly into electricity. To achieve this, bacterial are used as a catalyst to convert substrate into electrons. Electrons are transferred through an

external circuit while the protons diffuse through the solution to the cathode, where electrons combine with protons and oxygen to form water. The objective of this study is to optimize the operation conditions of MFC for simultaneous power production and wastewater treatment.
In this work, the MFC comprised anode and cathode chambers. Between the compartments, a Nafion proton exchange membrane was installed. Glucose (5 mM) was used as carbon source and loading rate was 2.0 ml/min. Electrodes of anode and cathode were consisted of woven graphite. The anode was continuously purged with nitrogen gas to maintain anaerobic condition, while the cathode was sparged with air. Current (I) was calculated at a resistance (R) from the voltage (V) as I=V/R. Power was calculated as P=IV.
Power generation was measured using a series of resistors (1-100000 Ω) to determine the maximum power output as a function of current. The highest power density of 5.0 mW/m2 was achieved at the current density of 23.5-26.0 mA/m2, which was obtained with the resistance of 900 and 800 Ω, respectively. The maximum coulombic efficiency was 11.6 % with a resistance of 500 Ω. The DOC removal rate was 30%. These results suggested the possibility of using MFC to generate electricity and simultaneously treat wastewater, but further progresses in the design and operation of MFC are required in order to accomplish greater overall MFC performance.

Keywords: microbial fuel cell, power density, current density, coulombic efficiency

P-50

Complexation Reactions of Anions on Hydrotalcite Surface

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Hydrotalcite is one of the naturally occurring minerals with a formula of [Mg1-xAlx(OH)2] [An-x/n·yH2O]. An- denotes an anion of which the valence is n. It comprises positively charged brucite-like octahedral layers and interlayers filled with anions and water molecules. The positive charge in the octahedral layers is formed by partial substitution of Al3+ for Mg2+. Stacking of the layers occurs and the balancing interlayer anions can be exchanged.
Recently, hydrotalcite has received considerable attention in a variety of fields because of their considerable anion-exchange capacity. It has been used as a sorbent in the removal of various pollutants in aqueous solutions. The mechanism involved has not yet been elucidated specifically surface complexation reactions. This study focuses on anion sorption mechanism in hydrotalcite with a specific regard on surface complexation reactions.
Chloride, nitrate, carbonate, sulfate, phosphate and silicate ions are the sorbates considered in the experiments. Zeta potential and pH measurements were used to monitor the sorption reactions with these ions.
The change in zeta potential of hydrotalcite in distilled water is similarly observed in chloride and nitrate-sorbed hydrotalcite in this study. It indicates that chloride and nitrate ions inspired simply sorption by anion-exchange reaction onto hydrotalcite because that reaction has little influence on zeta potential.
On the other hand, the zeta potential trends for carbonate, sulfate, phosphate and silicate-sorbed hydrotalcite are in contrast. These exhibited lower zeta potential values which would suggest that the point of zero charge (PZC) also shifted to lower pH compared to a pHpzc of more than 11 for hydrotalcite in distilled water. These results suggest that the ions considered in this study formed inner-sphere surface complexes on hydrotalcite surface probably via ligand-substitution reaction. Such reactions are expected to change the physico-chemical properties of hydrotalcite (i.e. increased or decreased stability).
Hydrotalcite has two possible sorption sites indicating that sorption mechanism would vary for different anion species.

Keywords: Hydrotalcite; Sorbent; Zeta potential; Complexation reactions

P-51

Weathering resistivity interpreted from the textures of plutonic rocks

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Void structures observed in weathered Inada granite and Kuroishiyama gabbro were examined using quantitative methods such as multifractal analysis, pore size distribution measurement, and effective porosity measurement. And values characterizing the void structures were correlated with uniaxial compressive strengths (UCS) to reveal the weathering resistivity of the plutonic rocks.
Slope of q-Dq-UCS curved surface showing a relationship of generalized dimension spectra and UCSs is steeper in the granite. It means that the UCS of the granite decreases more drastically than the gabbro when their heterogeneities increase similarly.
The granite has granular texture. Continuous and linear void structures occur through weathering, and their fracture density is relatively small. That is why the void structures in the granite largely contribute to the decrease in UCS but influence on the heterogeneity of the void structure is not so strong. On the one hand, the gabbro is characterized by poikilitic texture. Intra-granular fractures in plagioclase are densely distributed and contribute to the increase in the heterogeneity of the void structure. However, the skeleton of amphibole is not so affected by weathering and thus the strength of the gabbro is maintained.
The results show that the UCS of the granite decreases more easily by weathering than the gabbro when the two plutonic rocks are compared based on their void structures. This indicates that the gabbro has higher weathering resistivity than the granite even though the granite is composed of minerals which have relatively high weathering resistivity such as quartz, and it is attributed to their microscopic void structures.

Keywords: weathering, void structure, multifractal analysis, plutonic rock

P-52

Chloride ion diffusion coefficient of stressed fiber reinforced concrete under loading conditions

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To examine the chloride penetration into concrete is one of the most important to assess the durability of concrete structures. The concrete structures are always subjected to various loads, prestressing as well as traffic, earthquake and so on. Many cracks exist in the stressed concrete, and it is considered that these cracks accelerate the deterioration caused by chloride ion or other substance penetration. However, only few attempts have been made so far for the chloride penetration into concrete under loading condition. Therefore, it is needed for the durability of concrete structures to examine the effect of loading for the chloride penetration into concrete.
In addition, admixing short fibers into concrete can improve the properties of concrete. As a result of admixing fibers, the concrete can alter development of crack that was caused by loading or environmental effects. Therefore, it is considered that the chloride penetration into concrete can be reduced due to the mix of short fibers into concrete.
In this study, the chloride penetration into short fiber reinforced concrete under several loading condition was examined. From the results, it was found that the chloride diffusion coefficient (Dnssm) reduced at low stress level under static compressive loading condition, and the Dnssm at around 50% stress level changed to increase, and then the Dnssm increased with the increase of static compressive loading level after that. On the other hand, the change of Dnssm under tensile loading was differed from that under compressive loading level. The Dnssm subjected to tensile stress showed the increase with the increase of tensile stress level after subjected to low tensile stress.
The change of Dnssm for short fiber reinforced concrete showed almost same behavior under both loading conditions, however, the change ratio of Dnssm with the change of stress level differed from that of non- fiber concrete. And it was found that mixing short fibers into concrete could lead to the improvement of chloride penetration resistance under loading conditions.
From these findings, it was confirmed that loading affects the chloride penetration into concrete. And it was suggested that mixing short fibers into concrete could improve the durability of concrete structures due to the increase in resistance of chloride penetration.

Keywords: Short Fiber Reinforced Concrete, Chloride Ion, Diffusion Coefficient, under Loading

P-53

THE CONTRIBUTION OF RPOS TO FORMATION OF ESCHERICHIA COLI BIOFILMS

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It is now apparent that microorganisms undergo significant changes during the transition from planktonic to biofilm growth that possess enhanced resistance to various stresses such as chlorine treatments and antimicrobial agents. It has been suggested that the creation of starved, stationary phase zones in biofilms seems to be a significant factor for biofilm formation. In this study, the role of rpoS gene in Escherichia coli biofilms was investigated which is known to be expressed during entry into stationary phase and stress conditions. To assess the importance of rpoS gene for biofilm formation, we used E. coli MG1655 rpoS mutant strain to perform flow chamber experiment. We found that the rpoS mutant can only form thin biofilms. To further assess the role of the rpoS gene in E. coli, we performed DNA microarray analysis, and it revealed that gene expression pattern of rpoS mutant was different from that of wild type strain. In stationary phase, 193 genes were significantly down-regulated in rpoS mutant, which included genes induced in starvation conditions, genes encoding heat shock proteins, genes induced at high temperature, and osmotically inducible genes. These results suggest that the rpoS mutant is less capable of response and adaptation to stresses than the wild type strain in stationary phase, which might be the reason for the formation of only thin biofilms. In addition, they also suggest that the rpoS mutant shows too much motility even in the stationary phase. It could explain the presence of the actively moving and rotating cells in the early stages of biofilm formation, which might be the reason for E. coli rpoS mutant to be incapable of establishing mature biofilms. Based on these results, we concluded that rpoS gene which is induced in the stationary phase and stress conditions is important for formation of mature biofilms.

Keywords: biofilms, gene expression, rpoS, Escherichia coli, stress response

P-54

Evaluation of char derived from solid waste for fuel recovery and final disposal in landfill

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Carbonization is a kind of thermal treatment process to produce carbonaceous materials, so-called char, under inert atmosphere. In this work, chars derived from various municipal and industrial solid wastes were evaluated from the standpoint of fuel recovery and thermal pretreatment before landfilling.

The quality of char as a fuel definitely depends on the composition of input wastes. The higher the ratio of woody biomass in raw wastes, the better the quality of the char produced. The estimation equation of char heating value by using its weight fraction of fixed carbon (FC) and volatile matter (VM) was derived; estimated heating values showed a good correlation with measured ones (R2=0.957). Regarding quality improvement of char, the pulverization and sieving method effective in separation of incombustibles rather than ash. From the application of coal cleaning or separation techniques (ex: sink-floatation, froath floatation, and oil agglomeration in liquid) for ash removal from char, char particles existed as compounds of combustibles and ash. Moreover, char particles have a tendency to coagulate in water. These characteristics indicate that wet separation using an aqueous solution likely reduces efficiency due to particle coagulation. Further ash separation should be studied for improving char quality. On the other hand, most char met a 0.5 wt% chlorine criterion allowing it to be utilized as shaft blast furnace fuel after water washing.

Carbonization has an excellent effect on reduction of organic matter disposed in landfills. Releasing of heavy metals such as chrome, cadmium, and lead decreased remarkably by carbonization regardless of the type of raw waste at JLT-13 leaching test. However, it was found that metal leaching from carbonization residue could be changed somewhat by landfill environment such as aerobic or anaerobic condition through column tests.

From these results, carbonization might be considered as a feasible option for pre-treatment before landfills, as well as for fuel recovery.

Keywords: Carbonization, char, quality improvement, pre-treatment for landfilling

P-55

Advanced Application of Jig Separator for Plastic Material Recycling

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Development of mechanical separation of different plastics is essential in planning and constructing a recycling plant that processes scrapped electric appliances or automobiles. The authors have improved TACUB jig as a plastic separator. Jig separation for plastics of smaller sizes (0.5-3 mm) but similar specific gravities was performed using polyvinyl chloride (PVC), polyethylene (PE), acrylonitrile butadiene styrene (ABS), and acrylicplastics from scrapped plastic rods and electric wires. At the minimum difference in the specific gravities of 0.03, a higher grade product over 99% was still obtained. The pulsation of frequency and amplitude for smaller size plastics is lesser than that for coarser plastics. Based on the results, jig separator was applied to the following process.
For the plastics from scrapped copy machines containing polystyrene (PS),ABS, and polyethylene terephthalate (PET), high grade (>99%) of each plastic was recovered in the two cells of the jig, where PET is recovered from the first cell as bottom product, and ABS and PS from the second cell as bottom and upper layer products, respectively. Their sizes ranged from 3.5-10mmand their specific gravities were 1.03, 1.22 and 1.71 for PS, ABS, and PET respectively. Based on the results a recycling plant for processing scrap office and home appliances had been constructed.

Keywords: Jig, Gravity Concentration, PVC, Waste Plastics, Recycling

P-56

Value material collection by wet process sorting method from various shredder dusts

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----no abstruct

P-57

Sustainable Development

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A flow chart is presented which shows a model of the interdependencies in sustainable development which may be used in education. The model is centered on population. Current projections suggest that population will level out about 10 billion a little before 2100 and that a decline will occur thereafter. In seeking to sustainably support the present population and its anticipated growth many interdependent factors must be considered [1]. These factors are collected into four major components for convenience: water, food, energy and disease. The interdependence of these components occurs through a wide range of factors exemplified by deforestation, climate change, biodiversity, zoonolysis, biotechnology, fertilizer use, fossil fuel use and alternative energy sources. These considerations are presented in a pattern useful for giving an overview of sustainable development to students at universities.
[1] S.F. Lincoln, Challenged Earth: An Overview of Humanity's Stewardship of Earth, Imperial College Press, London, 2006.

P-58

Point and Non-point Source Pollution of Dahuofang Reservoir Catchment Based on a GIS Model and Its Integrated Water Management

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As a strategic and critical surface water resource for the Liao River basin, Dahuofang Reservoir is also an important water resource for Shenyang in Liaoning Province.China. However, in recent years, eutrophication has been reported in its water due to both point and non-point source pollution.

This research was performed to identify the main factors influencing its water quality. In this research, an ArcView hydrology extension script was employed to construct a point and non-point source pollution model based on basic information that has been collected.

The current situation and the future tendency of water pollution in the catchment were identified and suggestions were proposed to enhance the integrated water management which aims to improve the water quality for Dahuofang Reservoir.

P-59

Soil organic carbon, nitrogen and microbial biomass under Larix gmelinii forest in different latitude of Northeast China

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Larix gmelinii forest plays a very important role in both environmental protection and economic development in northern China. We compared soil organic carbon (SOC), nitrogen (N), and microbial biomass in L.gmelinii forest along the latitude in northeast China. Surface SOC, total N and microbial biomass of soil samples collected from L. gmelinii forest along the latitude grads ascending decreased significantly. Surface SOC content decreased from 10.56% to 5.30% along the latitude, and N decreased from 0.88% to 0.29%. In surface soil, the highest microbial biomass carbon (MBC) was 4805.16 mg/kg which located in N44° 22′ , and the lowest MBC was 161.49 mg/kg which located in N53° 33′ . Surface soil microbial biomass nitrogen (MBN) also varied from 1038.54 mg/kg to 99.55 mg/kg with latitude ascent. The ratios of microbial biomass to SOC and N In the southern study sites were significantly higher, when compared to the northern study sites' ones. Differences among sites became less pronounced in subsoil. There were positive and significant correlations between SOC, total N and microbial biomass. The study showed that the tested soil characteristics, both abiotic and biological, significantly liner correlated with the latitude.

Keywords: Larix gmelinii; Latitude; Soil organic carbon and nitrogen; Microbial biomass

P-60

Sustainable production in aquaculture: innovation of closed recirculation aquaculture system and its ripple effects

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The present human industrial activities have great impacts on our environment through emissions of carbon dioxide and other chemical pollutants. Such 'environmentally high-cost' human activities now threaten sustainability of our food production. This general undesirable formula is also applicable to the present fishery production.

In 2003, total fishery production was reported to be 132.2 million tones, of which 41.9 million tones from aquaculture practices and 90.3 million tones from capture. Because of decreasing and/or conservation of fishery resources, aquaculture production has been extremely growing compared to capture, about 67 % growth in volume from 1990 to 2003. However, present aquaculture operations (open water system) have serious environmental impacts, such as water pollution by wasted feeds and feces. Although aquaculture production in the last decade has given it increased importance in the modern food supply, there are growing needs to introduce environmentally low-impact system for sustainable food production.

Recently, closed recirculation aquaculture system is concerned as most desired technology for future aquaculture. There are

a lot of benefit of environmental preservation, cost saving and prevention of fish diseases. Further more, in spite of global climate change or regional weather change, stable production is engaged in this system. However, a lot of issues appear to be resolved to practically introduce this system. For one, closed recirculation system are much more expensive to construct, install, and maintain than the open water system.
In this study, the issues of introducing closed recirculation system will be raised and discussed from the aspect of fisheries, environmental sociology and international economics.

P-61

Science, participatory research and sustainable land use

William Smith
The University of Auckland

Illustrating on-going research to integrate science into decision-making by farmers on sustainable land use.

P-62

A Study on the Wetland Dynamic and Its Relation with Cropland Reclamation in Sanjiang Plain, China

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Using remote sensing interpretation, we obtained four periods of land use data sets from 1976 to 2005. Based on these data sets, this study analyzed the dynamics of the wetland land cover and the conversion between wetland and other land use types of Sanjiang Plain in the past 30 years with GIS spatial analysis. It shows that the wetland in Sanjiang Plain has been severely damaged; the wetland area decreased by 37.72% from 1976 to 1986, by 15.54% from 1986 to 1995, and by 30.97% from 1995 to 2005, which shows that the situation of wetland loss had much slowed down in1986 to 1995, but in recent years, the reclamation speed still very high. It was showed by conversation matrix that most wetland losing was the result of reclamation, and only small part of lost wetland was converted into grassland and forest. Still, it found that cropland contributed the main part for wetland area increasing for aimless reclaimed cropland was converted into wetland during flood inundation. Both demographic and resource management policies reason were analyzed for the wetland reduction. The result showed that population increasing was the main reason for wetland reduction in the past decades since P.R. of China foundation. Though the speed of wetland loss decreased during the later period, the reclamation of wetland still happened, so the practicable protection measurement of the wetland in Sanjiang Plain should be reinforced further.

Keywords: Wetland, Sanjiang Plain, remote sensing, GIS

P-63

Salinized wasteland monitoring in Daan County, Northeast China, Using GIS and remote sensing

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Western part of Northeast China has suffered substantial land degradation during past decades, due to human impact under climatic variations. We presents an integrated study of expansion process of salinized wasteland in Daan County, a typical salt-affected area in Northeast China, by using Geographical Information System (GIS) and remote sensing. Our study explored that, from 1954 to 2004, the salinized wastland in study area have increased by 135995 ha, and now cover 32.31% of the total area, in the meantime grassland has decreased by 104697 ha and covers only 13.15% of land area. Grasslands, croplands and swamplands were found the three main land use types converted into salinized wasteland. Land use/cover changes show that between 1954 and 2004, 48.6% of grasslands, 42.5% of swamplands, and 14.1% of croplands were transformed to salinized wasteland, respectively. Lastly, the major factors influencing salinized wasteland expansion and land use/cover changes are also explored. In general, climatic factors supplied a potential environment for soil saliniztion. Human-related factors, such as policy, population, overgrazing, and intensified and irrational utilization of land and water resources are the main causes of salinized wasteland expansion.

Key words: Salinized wasteland expansion; Land use change; GIS; Remote sensing; Daan County, Northeast China

P-64

International trade of Recyclable Resources in Thailand

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Japan Society for the Promotion of Science

Recently, in Asian Regions there has been active trade of Recyclable Resources. Several Studies have been made on International trade of Recyclable Resources from Japan to China, but little is known about that other Asian countries. This paper is intended as an investigation into International trade of Recyclable Resources in Thailand and the efforts of the Thai government. As a result, it has been understood as follow. First, Thailand was received the influence of the demand for Recyclable Resources in China. Second, there are some second-hand goods import limitations in Thailand. However, third, Thai government is doing flexible correspondence to International trade of Recyclable Resources under certain conditions. To put it briefly the concept of International trade of Recyclable Resources in the future, Thailand shows some suggestive cases.

P-65

Today's Development of a sustainable agro system in dry areas of Mongolia

Eldevochir Sukhee
Khash Tsagaan Arslan Co., Ltd.

How to use this restored pasture that was completely barren 5 years ago will be one of the problems to be solved.

P-66

Biotechnology Innovations and Patent Protection

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Is patenting biotechnology desirable to encourage biotechnology innovations in the light of economic perspective? To answer to this question, it is necessary to consider both the characteristics of biotechnology innovations and the impact of patenting biotechnology (e.g. DNA, gene fragments, etc) to the biotechnology industry as well as the international relationship between developed and developing countries.

P-67

Temporal Variability of the Volume Transport through the Korea Strait and the Tsugaru Strait and the Tsugaru Strait

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The volume transports (VT) through the Korea Strait and Tsugaru Strait are estimated from linear regressions between transport data and the sea level difference (SLD) across the straits. As the sea level data along the Korean and Japanese coasts have been measured for several decades, the VTs can be estimated for a long period during which the sea level data are available. For the Korea Strait the SLD was calculated between Pusan and Moji. The transport data by the submarine cable was used to get the conversion equation from the SLD to the VT (Lyu and Kim, 2003). The atmospheric pressure effect and the baroclinic part of SLD were removed before computing the conversion equation. For the Tsugaru Strait Tappi and Yoshioka were selected to calculate the SLD. The conversion equation for the Tsugaru Strait was obtained by using the transport data from the vessel mounted ADCP (Ito et al., 2003). The mean value of the VT from 1984 through 2004 is 2.5 Sv for the Korea Strait and 1.5 Sv for the Tsugaru Strait is 1.5 Sv. It is found that variance of the VT through the

Korea Strait during this period is partitioned 33 %, 23 % and 44 % for seasonal, interannual and intraseasonal time scales respectively. Partition for the Tsugaru Strait is 59 %, 16 % and 25 % for the same temporal scales. Forcing for these temporal variation is under investigation by examining statistical relations between transports and various atmospheric and oceanic parameters.

P-68

Argo for long-term ocean variability and climate research

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Argo is a global array of 3,000 free-drifting profiling floats that measures the temperature and salinity of the upper 2000 m of the ocean. This allows, for the first time, continuous monitoring of the temperature, salinity, and velocity of the upper ocean, with all data being relayed and made publicly available within hours after collection.
We are increasingly concerned about global change and its regional impacts. Sea level is rising at an accelerating rate of 3 mm/year, Arctic sea ice cover is shrinking and high latitude areas are warming rapidly. Extreme weather events cause loss of life and enormous burdens on the insurance industry. Globally, 8 of the 10 warmest years since 1860, when instrumental records began, were in the past decade. These effects are caused by a mixture of long-term climate change and natural variability. Their impacts are in some cases beneficial (lengthened growing seasons, opening of Arctic shipping routes) and in others adverse (increased coastal flooding, severe droughts, more extreme and frequent heat waves and weather events such as severe tropical cyclones).
Understanding (and eventually predicting) changes in both the atmosphere and ocean are needed to guide international actions, to optimize governments' policies and to shape industrial strategies. To make those predictions we need improved models of climate and of the entire earth system (including socio-economic factors). Lack of sustained observations of the atmosphere, oceans and land have hindered the development and validation of climate models. An example comes from a recent analysis which concluded that the currents transporting heat northwards in the Atlantic and influencing western European climate had weakened by 30% in the past decade. This result had to be based on just five research measurements spread over 40 years. Was this change part of a trend that might lead to a major change in the Atlantic circulation, or due to natural variability that will reverse in the future, or is it an artifact of the limited observations? In 1999, to combat this lack of data, an innovative step was taken by scientists to greatly improve the collection of observations inside the ocean through increased sampling of old and new quantities and increased coverage in terms of time and area. (from www.argo.ucsd.edu)

P-69

Issues and opportunities in sustainable management of water through the community based organizations in South Asian Countries - A case study in Sri Lanka -

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In developing countries there are lots of problems in managing the water supply schemes. The Community based organization (CBO) has came into consideration as a solution for problems. But there are enough experiences for identifying issues and opportunities that can be used as a lesion to have sustainable water management schemes in the region. This study was based on the evaluation on the CBO's.

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