Honda Y-E-S Forum 2015

エコテクノロジーで環境汚染問題に取り組む

Tackling Pollution through Ecotechnology

November 18, 2015 (Wed.)

公益財団法人 本田財団
HONDA FOUNDATION

Acknowledgement from Honda Y-E-S Awardee Representatives

Honda Y-E-S Forum 2015 could not be realized without these following people and organizations who helped us in different ways. First of all, we would like to express our deepest appreciation to Honda Foundation that provided the fund and wonderful staff creating this forum.

Special thanks go to the guest speakers who gave meaningful suggestions.

A special gratitude we give to Japan Science and Technology Agency (JST), Urban Environment and Health in Asia (UEHAS), Science and Technology Leadership Association (STeLA) for their support and encouragement, which helped us to coordinate our forum.

We would like to acknowledge Embassies of Cambodia, India, Laos, Myanmar and Vietnam in Japan, Ministry of Education, Culture, Sports, Science and Technology, Japan International Cooperation Agency, participating universities and Y-E-S awardees studying in Japan for paying attention.

Many thanks go to the poster contestants who made full efforts in presenting their research themes.

Furthermore we would also like to acknowledge with much appreciation the Yayoi Auditorium Ichijo hall, The University of Tokyo and the staffs who gave the permission to use all required equipment and necessary materials to complete the task.

We have to appreciate the guidance given by other people who were present in the hall that improved Y-E-S Awardees' skill thanks to their comments and advice.

Last but not least, we would like to give a big thank to all Honda Y-E-S Alumni Members that sacrificed their own time to make this forum significantly.

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2015

Honda Y-E-S Forum

エコテクノロジーで環境汚染問題に取り組む

Tackling Pollution through Ecotechnology

2015年
11月18日（水）
9:30〜17:00

場 所 **東京大学弥生講堂 一条ホール**
東京都文京区弥生1-1-1 東京大学農学部内

November 18, 2015 (Wed) 9:30-17:00
Yayoi Auditorium Ichijo Hall, The University of Tokyo
1-1-1, Yayoi, Bunkyo-ku, Tokyo

主 催 HOF 公益財団法人 本田財団 HONDA FOUNDATION
Organized by Honda Foundation

後援
- 国立研究開発法人 科学技術振興機構
  JST 科学技術振興機構 Japan Science and Technology Agency
- アジア都市環境保健学際コンソーシアム
  UEHAS Urban Environment and Health in ASIA
- ステラジャパン
  STeLA Science and Technology Leadership Association Japan

Supported by
Japan Science and Technology Agency
Interdisciplinary Consortium on Urban Environment and Health in Asia
Science and Technology Leadership Association Japan

Message from the President

ご 挨 拶

現代社会は、急速な技術の発展により、高度の経済成長と飛躍的な繁栄を達成しましたが、その一方で、環境破壊や公害問題などの深刻かつ複雑な問題を発生させることになりました。

先進国は、その発展の過程で直面したこうした問題を乗り越えるべく、制度改革、技術革新などに取り組み、課題の克服に向けて一定の成果を上げてきました。一方開発途上国の一部は、現在その発展の萌芽の時期を脱して飛躍的な成長の段階へ移行しつつありますが、経済活動の拡大に伴う大気、水、土壌などの汚染をはじめとする環境問題も顕在化してきています。今こそ、世界の国々が手を結び、過去の教訓を活かして同じことが繰り返されないように対処することが期待されており、それこそが人類のあるべき進化の姿であると考えます。

今回が初めての開催となる「Honda Y-E-S Forum」は、地域の課題認識、その解決に科学技術が果たすべき役割や、国境を越えた協力関係の構築などについて、日本を含むアジアの若手科学者・エンジニアが中心となって議論を行う場として企画されました。プログラムに関わる各国が協力し合いながら、理工系の人材育成ならびに人的ネットワーク拡大に貢献することがその狙いです。

アジアの、そして世界の国々が、人間を取り巻く環境に配慮しながら、お互いに手を携えてどのように人類の発展の道筋を描いていくのか。これから地球の未来を背負って立つ若い人々の成長に、我々の取組が少しでも貢献できるなら、大変幸いなことであります。

Modern society has achieved spectacular economic growth and prosperity through rapid technological innovation. On the other hand, these achievements have resulted in grave and complex problems, including environmental destruction and pollution.

Confronting these issues in the process of development, industrialized nations have produced results in overcoming them to some extent, through structural reform, innovative technologies, etc. Among some of the developing countries, a transition is taking place with economic development moving away from its initial infancy stage toward dramatic growth. However, environmental issues represented by contamination of the air, water, soil, etc., have become chronic alongside the expansion in economic activities. Now is the time for countries around the world to join hands and take action, to avoid repeating their mistakes and learn from lessons from the past. This is the direction in which we believe humankind should evolve.

The Honda Y-E-S Forum, held for the first time this year, had been organized to provide a place for discussion among the young scientists and engineers of Asia, including Japan, to raise consciousness of issues in the region and the role that science and technology should fulfill in resolving them. The Forum hopes to contribute to the development of human resources in science and technology field, and the growth of human networks in the area through cooperation between countries involved in the program.

How are the countries of Asia and the rest of the world to cooperate and plan together the direction of progress for humankind, with their attention focused on the environment surrounding us? Answering this question is the purpose of this Forum. We hope that through our activities we can do something to encourage young people, since the future of our planet lies in their hands.

公益財団法人 本田財団
理事長

石田寛人

Hiroto Ishida
President, Honda Foundation

Program

プログラム

9:00 開場　Doors Open

9:30 開会あいさつ　Opening Remarks
石田 寛人 本田財団 理事長　Hiroto Ishida, President, Honda Foundation

9:45 Y-E-S奨励賞受賞者によるプレゼンテーション　Presentations by the Y-E-S Awardees

■ベトナム Vietnam　ベトナムの水質汚染に対するエコテクノロジーの適用
Ecotechnological Solutions to Water Pollution in Vietnam

■インド India　深呼吸する覚悟はありますか？
—インドの大気汚染と先進国に学ぶこと—
Dare to Take a Deep Breath?
—Air pollution in India and learning from developed countries—

■カンボジア Cambodia　カンボジアにおける地下水の砒素汚染
Arsenic Contamination in Groundwater, Cambodia

■ラオス Laos　ラオスの環境問題—廃棄物について
Garbage, Main Environmental Problem in Lao PDR

■ミャンマー Myanmar　廃棄物から再生エネルギーを
Planning to Turn Trash into Gas and Electricity

11:25 研究ポスターコンテストプレゼンテーション　Research Poster Contest Presentation

12:20 ランチタイム／研究ポスター観覧・投票　Lunch time / Research Poster Viewing and Voting

13:45 基調講演 1　Keynote Speech 1

■環境保全における科学技術　Scientific Technology for Environmental Conservation
藤田正憲氏　大阪大学名誉教授 工学博士
Masanori Fujita, Ph. D.
Professor Emeritus of Osaka University

14:15 基調講演 2　Keynote Speech 2

■気候変動対策へのリモートセンシングの貢献　How Can Remote Sensing Contribute to Tackling Climate Change?
安岡善文氏　東京大学名誉教授　工学博士
Yoshifumi Yasuoka, Ph. D.
Professor Emeritus of the University of Tokyo

（休憩15分 15-minute Break）

15:00 パネルディスカッション Panel Discussion
モデレーター：角南篤氏　政策研究大学院大学教授　政治学博士
Atsushi Sunami, Ph.D.
Professor of National Graduate Institute for Policy Studies

（休憩20分 20-minute Break）

16:35 研究ポスターコンテスト発表＆表彰
Award Ceremony for Research Poster Contest

16:50 閉会挨拶 Closing Remarks

17:00 閉会 Closing

■Y-E-S奨励賞*とは？
2006年に当財団創設30周年を迎えることを機に始まった、科学技術分野における将来のリーダー育成を目的に、学生に奨励金を授与する表彰制度です。現在はベトナム、インド、カンボジア、ラオス、ミャンマーの5カ国で開催しており、多くの受賞者が日本に留学しています。
＊Honda Young Engineer and Scientist's Award　略称：Y-E-S（ワイ・イー・エス）奨励賞

■ What is Honda Y-E-S Award*
The Honda Foundation started the Honda Y-E-S Award program to foster future leaders of science and technology fields in 2006 as a part of the Honda Foundation's 30th anniversary project. It is Implemented in Vietnam, India, Cambodia, Laos, and Myanmar, and many awardees come to study in Japan.
＊Honda Young Engineer and Scientist's Award

Speaker Profile

Vietnam
ベトナム

Nguyen Trung Kien

2006年ベトナムY-E-S奨励賞受賞者／ハノイ工科大学情報技術専攻／現在、ハノイ工科大学研究員
2006 Y-E-S Awardee in Vietnam
Information Technology,
Hanoi University of Science and Technology
Currently working as a Researcher at the above university

Le Nguyen Kim Hai

2010年ベトナムY-E-S奨励賞受賞者／ベトナム国家大学ホーチミン市校工科大学情報科学専攻／現在、TTT建設&トレーディング株式会社購買マネージャー
2010 Y-E-S Awardee in Vietnam
Computer Science and Enginering,
University of Technology, Vietnam National University, Ho Chi Minh City
Currently working as a Purchasing Manager at TTT Construction & Trading Corp

Ngo Khac Hoang

2013年ベトナムY-E-S奨励賞受賞者／ベトナム国家大学ハノイ校工科大学電子工学・電気通信専攻／現在、仏 パリサクレ大学修士課程
2013 Y-E-S Awardee in Vietnam
Electronics and Telecommunications,
University of Engineering and Technology, Vietnam National University, Hanoi
Currently studying in a master's course at University of Paris-Saclay

India
インド

Rohit Singh Sahani

2009年インドY-E-S奨励賞受賞者／インド工科大学デリー校電力工学専攻／現在、ボストンコンサルティンググループ シニアアソシエイト
2009 Y-E-S Awardee in India
Electrical Engineering,
Indian Institute of Technology, Delhi
Currently working as a Senior Associate at Boston Consulting Group

Mayur Rastogi

2011年インドY-E-S奨励賞受賞者／インド工科大学カラグプール校化学工学専攻／現在、シポヤ社ファウンダー
2011 Y-E-S Awardee in India
Chemical Engineering,
Indian Institute of Technology, Khargpur
Currently working as an Founder at Shipoya

Nishita Mohan

2012年インドY-E-S奨励賞受賞者／インド工科大学マドラス校バイオテクノロジー専攻／現在、米 ハーバード大学博士課程
2012 Y-E-S Awardee in India
Biotechnology,
Indian Institute of Technology, Madras
Currently studying in a doctor's course at Harvard University

Cambodia
カンボジア

Sok Sikieng

2008年カンボジアY-E-S奨励賞受賞者／王立プノンペン大学科学部コンピューターサイエンス専攻／現在、フリーランスWeb Developer
2008 Y-E-S Awardee in Cambodia
Computer Science
The Institute of Science, Royal University of Phnom Penh
Currently working as a Freelance Web Developer

Nget Rachana

2013年カンボジアY-E-S奨励賞受賞者／王立プノンペン大学科学部コンピューターサイエンス専攻／現在、京都大学修士課程
2013 Y-E-S Awardee in Cambodia
Computer Science,
Royal University of Phnom Penh
Currently studying in a master's course at Kyoto University

※所属・役職名は開催当時のものです。
*Organizations and titles are at the time of the Forum.

Speaker Profile

Laos
ラオス

Vernsone Phengsoulith

2008年ラオスY-E-S奨励賞受賞者／ラオス国立大学工学部交通運輸工学専攻／現在、ラオス国立大学講師
2008 Y-E-S Awardee in Laos
Transportation Engineering,
Faculty of Engineering, National University of Laos.
Currently working as an Instructor at the above university

Manyda Phothirath

2010年ラオスY-E-S奨励賞受賞者／ラオス国立大学工学部道路交通工学専攻／現在、Lao Transport Engineering Consultant 橋梁技術者
2010 Y-E-S Awardee in Laos
Road-Transportation Engineering,
Faculty of Engineering, National University of Laos
Currently working as a Bridge Engineer at Lao Transport Engineering Consultant

Myanmar
ミャンマー

Ein Kaung

2014年ミャンマー Y-E-S奨励賞受賞者／工科大学モウビ校電子機械工学専攻／現在、SMART Group インターン
2014 Y-E-S Awardee in Myanmer
Mechatronics,
Technological University(Hmawbi)
Currently working as an intern at SMART Group of Companies

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*Organizations and titles are at the time of the Forum.

Speaker Profile

大阪大学名誉教授

藤田 正憲 博士

専門：水質管理工学、生物環境工学

1966年大阪大学大学院工学研究科醗酵工学専攻博士課程退学、1966年大阪市職員、1971年大阪大学工学部環境工学科助手、講師、助教授、1989年大阪大学教授、2005年4月国立高知工業高等専門学校長。その間、ウオータールー大学（カナダ）博士研究員、関西大学客員教授、神戸大学、大阪府立大阪女子大学、山梨大学、大阪産業大学大学院非常勤講師を兼務。
現在は経済産業省排水処理技術検討会委員、環境省環境研究企画委員会委員、大阪府土壌地下水汚染対策審議会委員、兵庫県環境審議会委員を務める。
日本水環境学会、日本下水道協会、日本水処理生物学会に所属。

Masanori Fujita, Ph.D.

Professor Emeritus of Osaka University
Major research fields: Water Science and Environmental Biotechnology, Water Quality Engineering

He left a doctoral degree program for fermentation engineering in Graduate School of Engineering, Osaka University in 1966. He started working for the Sewage Works Division, Osaka City, Osaka in 1966. After serving an assistant and an associate professor at Department of Environmental Engineering, Osaka University, he became a professor of Graduate School of Engineering, Osaka University in 1989. He moved to the National Institute of Technology, Kochi College as a President in April 2005. He was also a post-doctoral fellow in Water-Loo University, Canada, and served as a research associate in Kansai University, a visiting professor in Kobe University, Osaka Women's University, University of Yamanashi, and graduate school of Osaka Sangyo University.
He is currently a committee member of the Wastewater Technology Committee, Ministry of Economy, Trade and Industry, the Environmental Research Planning Committee, Ministry of Environment, the Soil/Groundwater Pollution Countermeasure Committee, Osaka Prefecture, and the Environmental Committee, Hyogo Prefecture.
He is also a member of the Japan Society on Water Environment, the Japan Sewage Works Association, and the Japanese Society of Water Treatment Biology.

東京大学名誉教授

安岡 善文 博士

専門：リモートセンシング、環境工学、
空間情報学

1970年東京大学工学部計数工学科卒業、1975年東京大学大学院工学系研究科計数工学専攻博士課程修了、1987年国立環境研究所総合解析部総合評価研究室長、1990年国立環境研究所社会環境システム部情報解析研究室室長、1996年国立環境研究所地球環境研究センター総括研究管理官、1998年東京大学生産技術研究所教授、2002年日本リモートセンシング学会 会長、2007年独立行政法人国立環境研究所理事。
現在は科学技術振興機構 研究主幹、国際環境研究協会 研究主監等を務める。日本リモートセンシング学会、日本写真測量学会、計測自動制御学会、環境科学会、米国電気電子工学会（IEEE）等の会員。

Yoshifumi Yasuoka, Ph.D.

Prof. Emeritus, the University of Tokyo
Major research fields: Remote sensing, Environmental engeneering, Spatial Information Science

He received the B. Eng., M. Eng. and Ph. D degree in applied physics from the Univ. of Tokyo in 1970, 1972 and 1975 respectively. He was with the National Institute for Environmental Studies (NIES), Japan from 1975 to 1998, serving as a researcher, a senior researcher, and section head. At NIES last two years he served as a Director of the Center for Global Environmental Research. In 1998 he moved to the University of Tokyo as a Professor at the Institute of Industrial Science. In 2007 he moved to the National Institute for Environmental Studies as an Executive Director (Vice President). He is currently with Japan Science and Technology Agency (JST) as a Research Supervisor of the Program "Science and Technology Research Partnership for Sustainable Development (SATREPS)", and with Association of International Research Initiatives for Environmental Studies as a Program Director for the Ministry of Environment Research Fund. His major research field is remote sensing, GIS and spatial data analysis (Geo-informatics) for environment and disaster assessment. He was a president of Japan Remote Sensing Society (2002 to 2004).

※所属・役職名は開催当時のものです。
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Panel Discussion Moderator

政策研究大学院大学教授・学長補佐

角南 篤 博士

専門：科学・産業技術政策論、公共政策論

1988年、ジョージタウン大学School of Foreign Service卒業、89年株式会社野村総合研究所政策研究部研究員、92年コロンビア大学国際関係・行政大学院Reader、93年同大学国際関係学修士、97年英サセックス大学科学政策研究所（SPRU）TAGSフェロー、2001年コロンビア大学政治学博士号（Ph.D.）取得。2001年から2003年まで独立行政法人経済産業研究所フェロー。2003年政策研究大学院大学助教授、2014年教授、学長補佐。
その他、文部科学省 科学技術・学術審議会委員、内閣府総合科学技術・イノベーション会議基本計画専門調査会委員、等。

Dr. Atsushi Sunami

Advisor to the President, Professor,
National Graduate Institute for Policy Studies
Major research fields: Science and Technology Policy,
Public Policy Analysis

Professor Sunami holds BSFS from Georgetown University. He obtained MIA and PhD in Political Science from Columbia University. He is currently Professor, and Advisor to the President at National Graduate Institute for Policy Studies, Japan. Before joining GRIPS, he was a Fellow at Research Institute of Economy, Trade and Industry established by the Ministry of Economy, Trade and Industry, Japan between 2001 and 2003. He also worked as a researcher in the Department of Policy Research at Nomura Research Institute, Ltd. from 1989 to 1991. He was a visiting researcher at Science Policy Research Unit, University of Sussex, and Tsinghua University, China. He is also a member of the Council for Science and Technology in Ministry of Education, Culture, Sports, Science and Technology and the Expert Panel on Basic Policy in Council for Science, Technology and Innovation of Cabinet office.

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*Organizations and titles are at the time of the Forum.

Opening Remarks

Opening Remarks

Hiroto Ishida
President, Honda Foundation

Thank you for the introduction. I would like to thank everyone who joined today's Forum despite your very busy schedule. On the occasion of the holding of this Forum, I would like to deeply express my gratitude for all the support and cooperation offered from various fields, including Japanese universities for joining and applying for the Research Poster Contest.

The Foundation has been developing the grant program "Y-E-S Award" for awarding excellent undergraduate students in science and technology universities in 5 countries, starting with Vietnam 10 years ago, followed by India, Cambodia, Laos, and Myanmar. The representatives of awardees in each country have planned, discussed, and organized today's Y-E-S Forum by further extending the Y-E-S Award program. The main purpose of this Forum is to contribute to developing the skills and abilities of young scientists and engineers in Asia. It also aims to expand the human network through communications among awardees and with Japanese scientists, getting to know Japanese academics and experts, and bringing back what is learnt during the Forum to home countries.

The theme for today's discussion is "Tackling Pollution through Ecotechnology." In these countries which are undergoing transition to a further development stage, environmental problems, such as air, water, and soil pollution, have been growing more prominent as economic activities expand. Recognizing such issues, the role that science and technology has to play in tackling them will be further discussed during this Forum. I am also expecting this Forum to be an opportunity that triggers and accelerates further cooperation among countries beyond national borders.

This is the first Y-E-S Forum and hopefully will be held every year hereafter. Today as the first step, we will endeavor to create this Forum to be more fruitful and meaningful for many young scientists. Since this is the first time, there may be a lot which may be improved. Therefore, we welcome candid and frank opinions so that we can make things better for the next time.

I would like to conclude my greeting by asking for your continued cooperation with the Foundation in the future. And please spend nice time in this lovely hall at the University of Tokyo. Thank you.

Opening Remarks

Nishita Mohan
2012 Honda Y-E-S Awardee in India

Konnichiwa and Goodmorning to distinguished guests, Honda prize laureate, Honda Foundation officials and fellow preparatory committee members. I am Nishita Mohan from India. As a Y-E-S awardee and an organizing team member for the Y-E-S Forum 2015, I couldn't be more delighted to welcome you all to the Honda Y-E-S Forum 2015. My friends Hai and Rachana have done a delightful job in describing the goals of the Forum. I just wish to add a couple of thoughts of my own and describe what a rewarding experience this has been for each one of us in the preparatory committee.

The idea behind the Forum was that when you bring together individuals of different backgrounds with experience in different areas, you can make innovation possible. Each year the Forum will strive to bring together students, professors, researchers working in different areas of ecotechnology, to brainstorm and discuss the common environmental issues that we are facing in the society and to come up with solutions. For this purpose, we need as many ideas and solutions from each one of us in the room today.

The topic that we have chosen for today is pollution and we will get to hear the perspective of each country today, from different individuals in the room and we hope that everyone will walk out of the room with an idea of what type of pollution everyone is facing in their respective countries and how they are tackling this problem.

We hope that the discussion will be fruitful to all of us, and we definitely hope to see you again at the Forum in the coming years. We urge you to participate and raise many, many questions and also look forward to hearing your valuable feedback.

I would like to end with a quote- Coming together is beginning, keeping together is progress but working together is success.

Thank you.

Presentations by the Y-E-S Awardees

Vietnam

Nguyen Trung Kien
2006 Honda Y-E-S Awardee in Vietnam

Ecotechnological Solutions to Water Pollution in Vietnam

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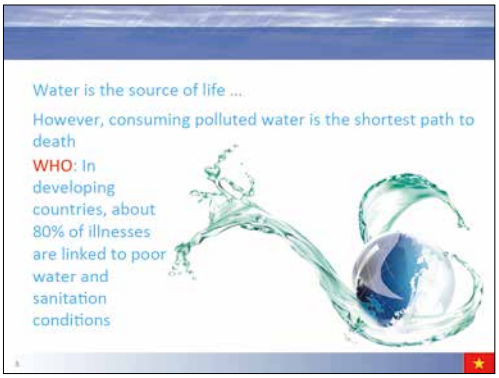
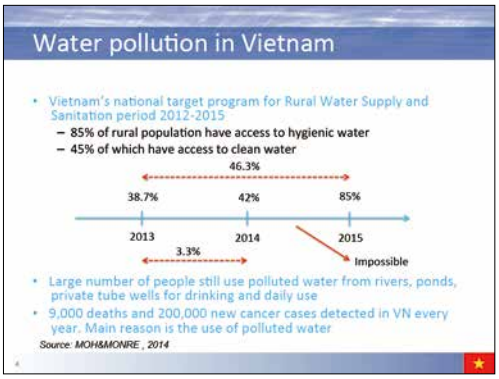
2

We all know that water is the source of life. However, consuming polluted water is the shortest path to death. According to WHO, in developing countries, 80% of illnesses are linked to poor water and bad sanitation conditions.



3

Be well-aware of the importance of clean water to human health, Vietnam government has already approved a national target program for rural water supply and sanitation in period 2012 -2015.
In which, 85% of the rural population will have access to hygienic water, 45% of which will have access to clean water.
But according to a recent report in 2013, there is only 38.7% of the population in the rural area having access to hygienic water and the percentage in 2014 is 42%, so the difference is only 3.3% in one year. And that makes the target at the end of 2015 (85% of rural population will have access to hygienic water) an impossible mission.
Therefore, the large number of people still relies on polluted water from rivers, community ponds and private tube wells for drinking and daily use.
According to a recent study by Ministry of Health and Ministry of Natural Resources and Environment of Vietnam, there are about 9,000 death and 200,000 new cancer cases detected in Vietnam every year. Main reason is the use of polluted water.



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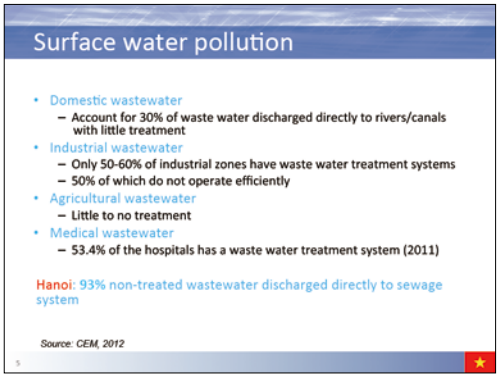
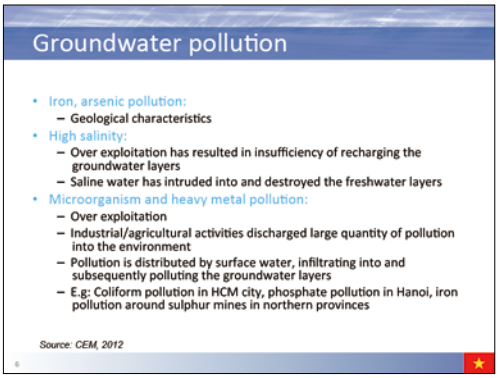
Water pollution can be divided into two categories: surface water pollution and ground water pollution.
The main sources of surface water pollution are domestic wastewater, industrial wastewater, agricultural wastewater and medical wastewater. The problem in VN is that the wastewater is discharged into the environment with little to no treatment.
In Hanoi only, 93% of the non-treated wastewater is discharged directly to the sewage system.



5

The polluted surface water accompanied by the over exploitation of the ground water is the main source of the micro-organism and heavy metal pollution of the ground water, beside the natural sources of pollution including geological characteristics of the strata and high salinity which is caused by over exploitation of ground water and rising sea level.



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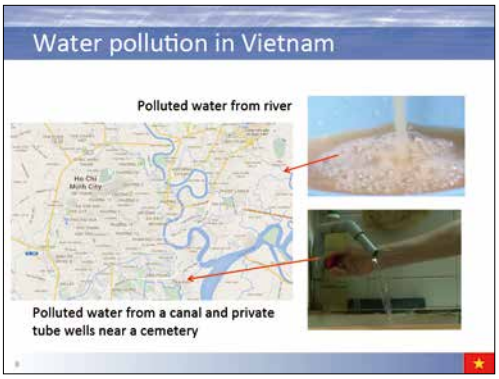
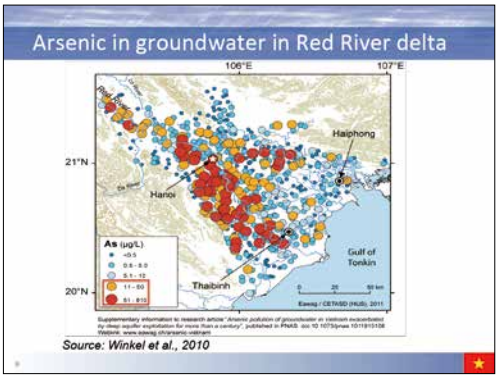


8

Beside the surface water, 17% of Vietnam's population is dependent on groundwater from private tube-wells as drinking water supply according to estimation by UNICEF in 2002. And this leads to another bigger problem called chronic arsenic poisoning. High concentrations of arsenic occur naturally in the soil in some areas of Vietnam. The Red River Delta, where Hanoi capital is located, has high arsenic concentration level similar to the level found in Bangladesh. The measurements from the Red River Delta revealed arsenic concentration to be up to 810 µg per litre of groundwater that is 80 times the concentration allowed in drinking water source according to WHO guideline (10 µg per litre).

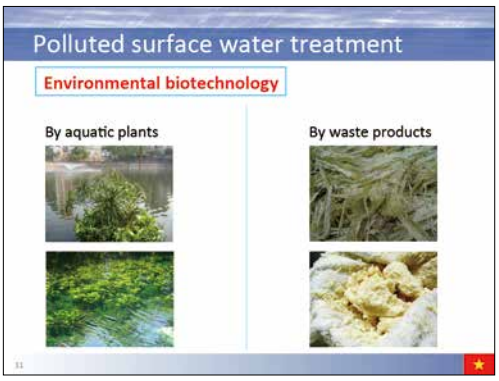


9

So as you can see, we are facing the pollution to both surface water and ground water. And some ecotechnologies have already been applied in Vietnam to solve this situation. The first example is the product called Hudavil that are versatile probiotics made from waste product of sugar manufacturing. It has been using to manipulate the water in aquaculture ponds to raise shrimp and catfish.

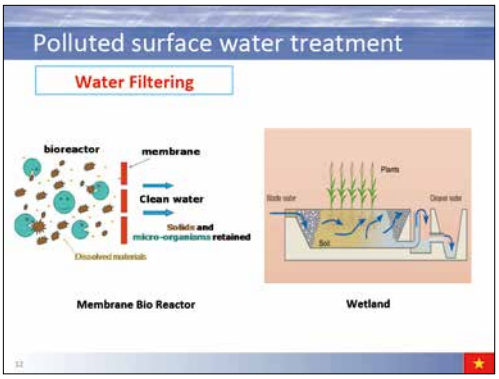
10

Second example is the use of aquatic plants and waste products such as bean pulp and bagasse to absorb the pollutants in the community ponds and purify the water.



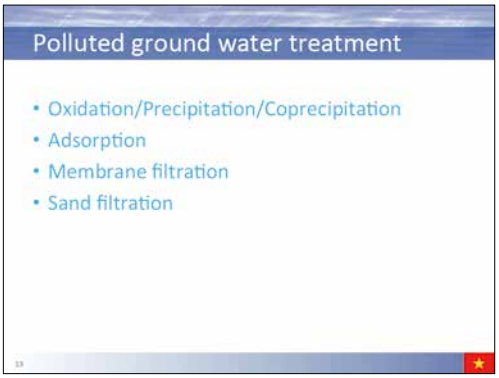
11

Also, in recent years, there are some emerging technologies that have been researched and applied to treat the wastewater in Vietnam. Two of them are Membrane Bio Reactor and Wetland. Membrane bioreactor is the combination of a membrane process with a suspended growth bioreactor. The bioreactor dissolves the pollutants, while the membrane retains the solids and micro-organisms and gives the clean water. In a constructed wetland, water passes through the habitat of aquatic plants that have the ability to absorb pollutants such as organic matter, ammonia, heavy metals, ... and this gives cleaner water.



12

The above technologies are being used to treat polluted surface water, to treat polluted ground water, and there are 4 popular technologies applied in Vietnam. They are Oxidation/Precipitation/Co-precipitation, Adsorption, Membrane filtration and Sand filtration. Out of these 4 technologies, the sand filtration is cost effective and can be easily constructed by the households to remove Iron and Arsenic from the groundwater.



13

A sand filtration system consists of a tube, a filter tank, a storage tank and an electric pump. The filter tank consists of 4 layers: crushed-brick layer at the top, yellow sand layer, coarse-grained yellow sand layer and pebble layer at the bottom. When the water is pumped from the ground through this system, the sprinkler can help increase the dissolved oxygen content in groundwater, oxidize the Fe(II) into Fe(III) and oxidize the As(III) into As(V). Fe(III) has strong adsorption affinity to As, so Fe(III) and As will co-precipitate. As(V) can be absorbed more easily than As(III), therefore oxidation of As(III) into As(V) can enhance the subsequent adsorption process in the filter tank. In reality, people also plant umbrella grass on the surface of the sand filter to enhance the removal efficiency and lengthen the working period of the sand filter.

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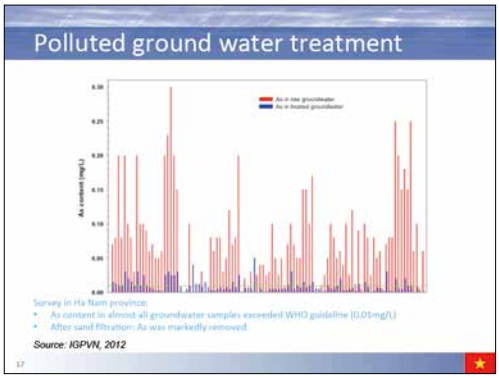
16

A survey has been conducted in Ha Nam province, Vietnam to compare the Arsenic content before and after sand filtration. The graph in the slide shows Arsenic content in raw water by red lines, Arsenic content in treated groundwater by blue lines and the max content in drinking water as guided by WHO by green line. After filtered by sand filtration systems, 80% of the samples have the Arsenic contents less than 10 µg per litre and all of the samples have Arsenic contents less than 50 µg per litre, which can be considered as potable water in Vietnam due to the very high Arsenic content in groundwater.



17

We have already applied some technologies to solve the pollution situation in water in Vietnam. However, we are still facing some challenges. First, we are struggling between developing economy and protecting the environment. Second, 80% of the industrial zones do not have wastewater treatment systems and since many multi-national companies are now moving to Vietnam for manufacturing, this will become a bigger problem. Third, we still have an out-dated agriculture that discharges a lot of pollutants into the environment. Forth, we have some cross border rivers like the Red river and Mekong river. Therefore, solving pollution cannot be done by a single country. And last but not least, we are lacking of budget and experience.

As you may have known that the Sumida river in Tokyo experienced 50 years of deterioration and it took the German more than 30 years to solve the pollution of Rhine. So, we hope that with your experience, you can help us shorten the time to clean the water in Vietnam, to protect the environment and save human lives.

18

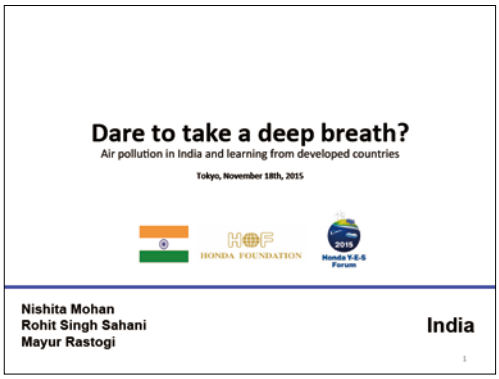
19

India

Nishita Mohan (Left) 2012 Honda Y-E-S Awardee in India
Rohit Singh Sahani (Right) 2009 Honda Y-E-S Awardee in India

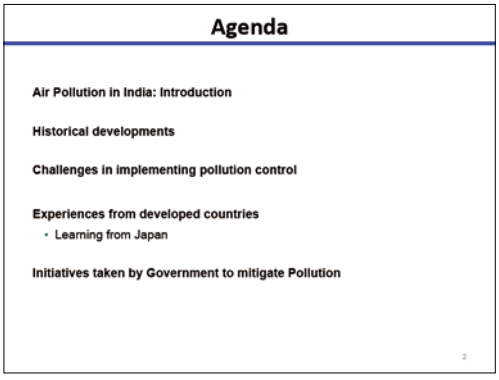
Dare to Take a Deep Breath?
—Air pollution in India and learning from developed countries—

Namaste!! Good Morning!! Ohayou gozaimasu!!
It is a great pleasure for us to represent the Indian delegation at the Honda Young Engineer and Scientist's Forum 2015 being held in Tokyo, Japan. We are here to speak about one of the biggest threats that endangers Indian people – Air Pollution. The title of our presentation is "Dare to take a deep breath? – Air pollution in India and the global impact".



1

We will bring to limelight the extent of air pollution in India, the steps taken by Indian Government for pollution abatement and learning that can be taken from the experiences of developing countries, like Japan, in dealing with the air pollution problem.

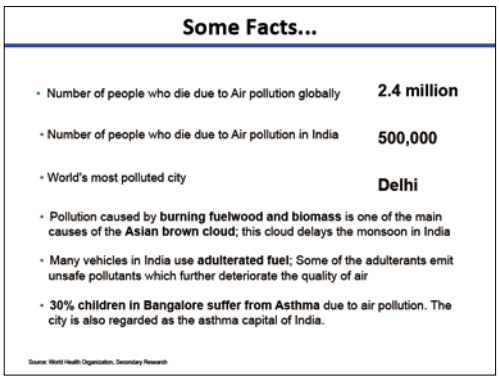


2

Here we show 4 images, taken from different parts of India, which reflect the plight of Indian populace in the face of unsustainable development. The first image shows 2 boys from the city of Patna, Bihar who have covered their faces with handkerchief to save themselves from vehicular smoke. The second image shows the non-purified smoke and steam emanating from power plant. Third image represents frequent traffic snarls that jam Delhi roads. Delhi has recently become the most polluted city in the whole world. The vehicular density in Delhi is maximum in the whole of India. The fourth image tells another common story from Indian villages, where the sooty and poisonous smoke from traditional cook stoves kills hundreds each year.

In a recently concluded Environmental Performance Index (EPI), a study published by Yale and Columbia Universities, Delhi led the table as being the most polluted city in the world, surpassing Beijing, which until now was the most polluted city in the world. The other cities that made in the top five were Cairo, Santiago and New Mexico. The story is similar in the rest of the country. Air pollution, globally is believed to cause 2.4 million deaths each year, of these 500,000 fatalities per year happen in India. Some data sources claim that over 30% of children suffer from asthma in the Silicon Valley of India – Bangalore, a city that generates maximum employment opportunities for educated young Indians and is expected to become the country's biggest metropolis in the near future. The scenario is so grim in certain regions of India that even the monsoon (annual rainy season) gets delayed. This usually happens because of Asian brown clouds formed due to incessant burning of fuel-wood and biomass in traditional cook stoves. Further many auto rickshaws and taxis in India use adulterated fuel which causes even higher pollution.

3



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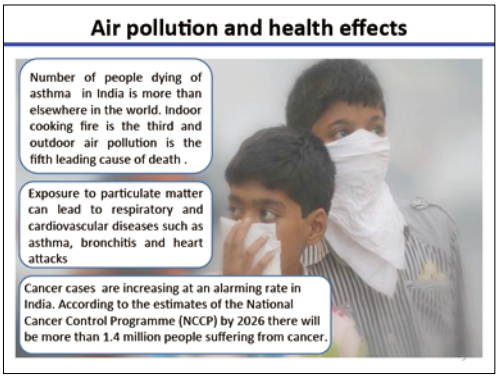
People in rural India, who account for about 70% of the population, are affected by carcinogenic cocktail of aromatic hydrocarbons, COx and particulate matter due to use of conventional cooking stoves that burn biomass as a cooking fuel. The exposure to indoor air pollution leads to cardiovascular and respiratory diseases amounting to deaths of over 1.6million per year in developing nations. According to National Cancer Control Program, India, by 2026 there will be more than 1.4 million people suffering from cancer in India. The situation is so bad that number of deaths due to Asthma in India is more than elsewhere in the world. Indoor cooking fire is the third and outdoor air pollution is the fifth leading cause of death in India.

If we look at the performance of India on few measures of air pollution, namely PM_{10} and CO_2 emissions, then India has been on the right track of improvement, but there are still miles to go before it gives its citizens a safe and conducive environment to live and grow. From 1995 to 2008, India observed a 5% decrease in PM_{10} levels, a fall from 109 ($\mu g/m^3$) to 59 ($\mu g/m^3$). Also during the same year range, CO_2 emissions (kg per 2005 PPP of GDP) fell from 0.7 to 0.5, a fall of 3%. On a comparative note, in Sweden in 2008, PM10 level was just 11 ($\mu g/m^3$) while the CO_2 emission level was 0.2 (kg per 2005 PPP of GDP)

The plight of India and developing countries is not new; the developed countries too faced similar challenges during their growth phases and by setting up appropriate processes and systemic changes they were able to control the pollution. Having said that, the cleanup task in front of developing countries is challenging, albeit not impossible. One look at the environment improvement journey of developed nations shows that they were able to bring about a change because of strict environment legislations along with quantifiable pollution targets having transparency in information disclosure. They transformed their industry and energy structure to control industrial pollution. Their governments and think tanks advocated low carbon lifestyles by strengthening city and traffic emissions management. They even encouraged public participation in pollution control.



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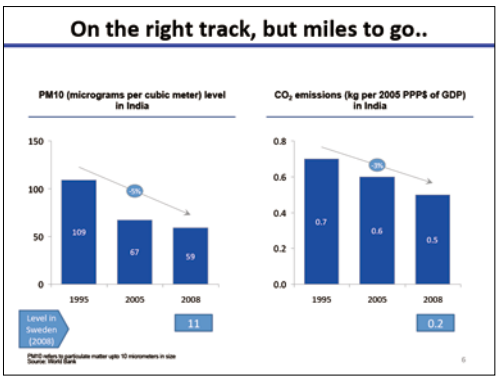

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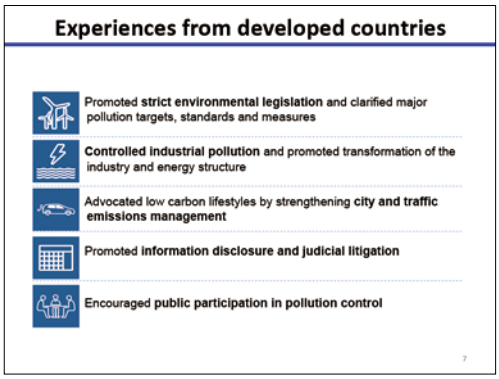
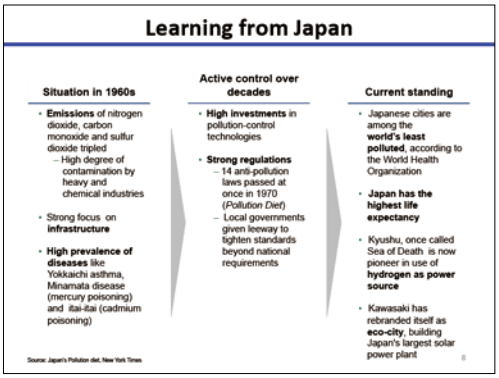


7

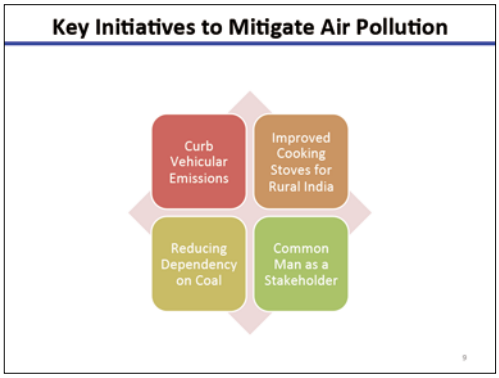
The over 50-year tryst of Japan with pollution too ended in the positive. In the 1960s, the emissions of NOx, COx and SOx tripled due to higher concentration of heavy and chemical industries. The region even documented high prevalence of diseases like Yokkaichi asthma, Minamata disease (mercury poisoning) and itai-itai (cadmium poisoning). Over the years the government invested heavily in pollution-control technologies and stringent regulations were put in place to tax the defaulters. 14 anti-pollution laws were passed in 1970s giving local governments power to tighten the string around polluting industries. 50 years after the era of high pollution levels, the Japanese cities are rated amongst the cleanest cities in the world by WHO. Kyushu, once called Sea of Death is now a pioneer in use of hydrogen as power source while Kawasaki has rebranded itself as an eco-city, building Japan's largest solar power plant. The success stories of the developed nations give us a ray of hope and inspire us to implement similar systems and technologies to clean our cities and control the air pollution. A concerted effort by the people, industrial body, government, non-governmental organizations and research bodies is required to usher an era of clean and green India.



8

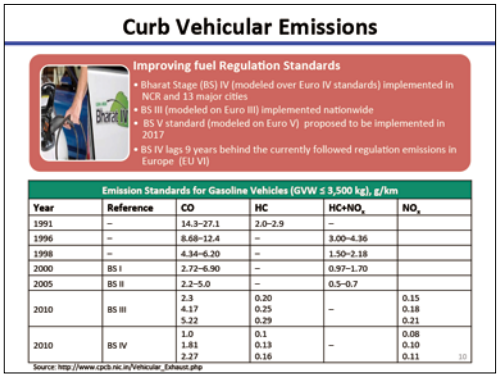
India over the years has taken multiple steps to mitigate the effects of pollution and eliminate the root causes. In 1990s National Air Quality standards were defined and emission standards for vehicular and industrial pollution were declared. The key initiatives taken by Indian governments to mitigate air pollution. These measures have been lumped into 4 major steps namely,

i. Curb vehicular pollution
ii. Improved cooking stoves for rural India
iii. Reducing dependency on Coal
iv. Common man as a stakeholder



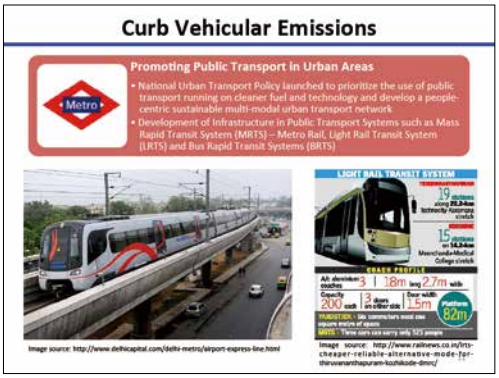
9

Of the steps taken by the government and industry bodies, the important ones were improvement in vehicle fuel standards, promotion of public transport in the country, research into the development and use of biofuels, national biomass cookstove project in rural areas, promotion of use of renewable energy and bringing in more transparency in measurement and reporting of air quality. Vehicle fuel quality index was launched and named Bharat Stage (BS) standards. BS standards regulate the quality of petrol and diesel fuel in vehicles and emissions thereafter from the vehicle engines. Currently BS IV has been launched in 13 major cities in India, BS III has already been implemented in rest of the nation and BS V will be launched in 2017.



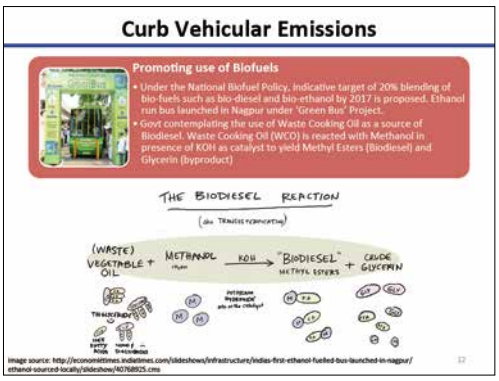
10

Under the National Urban Transport Policy, development of public transport system has been promoted. Systems such as Mass Rapid Transit System (MRTS) – Metro Rail, Light Rail Transit System (LRTS) and Bus Rapid Transit Systems (BRTS) are already in place in a number of cities.



11

Under the National Biofuel Policy, the government has targeted to reach 20% blending level of ethanol in petrol by 2017. Government has contemplated the use of Waste Cooking Oil as a source of Biodiesel. Waste Cooking Oil (WCO) is reacted with Methanol in presence of KOH as catalyst to yield Methyl Esters (Biodiesel) and Glycerin (byproduct).

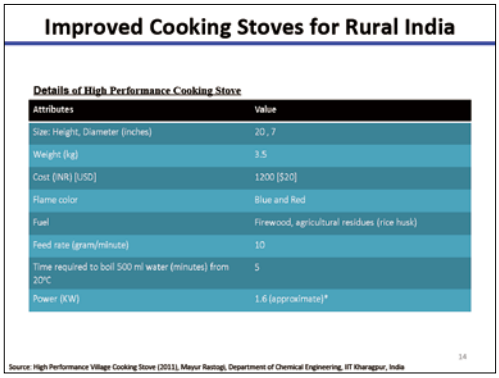


12

Biomass – fuel wood, agricultural residue and animal waste – is used in 87% of rural households and 26% of urban households for cooking. These fuels are burned in outdated cook stoves as a result of which they emit harmful pollutants, contributing to indoor air pollution in rural areas. To curb the indoor air pollution, National Biomass Cookstove Program was launched which has already covered a big percentage of rural areas. The program included dissemination of improved cook stoves and imparting lessons on good cooking practices to the villagers. One of our co-delegates Mayur too developed one such cooking stove, which was distributed in tribal villages of West Bengal.

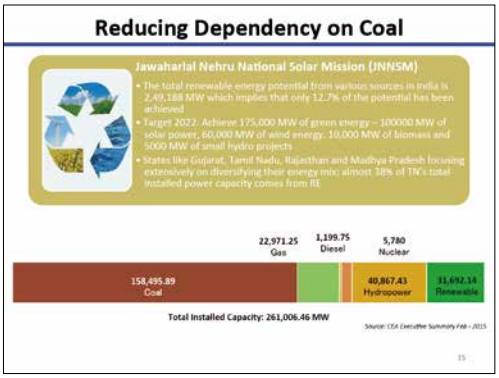
13

This slide shows the detailed specifications and results of the cooking stove designed by Mayur.



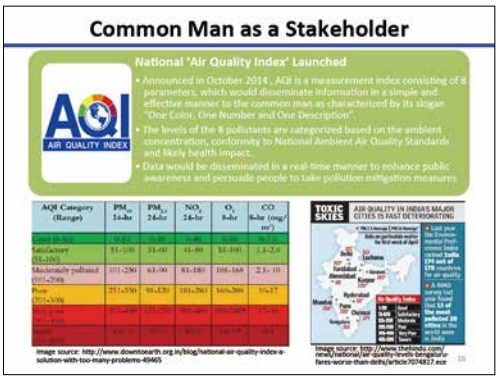
14

Recently government took two ambitious initiatives – Jawarlal Nehru National Solar Mission (JNNSM) and National Air Quality Index. Under JNNSM, the government targeted to achieve 175,000 MW of green energy by 2022. Of the 175,000 MW the energy allocations are 100,000 MW of solar power, 60,000 MW of wind energy, 10,000 MW of biomass and 5,000 MW of small hydro projects.



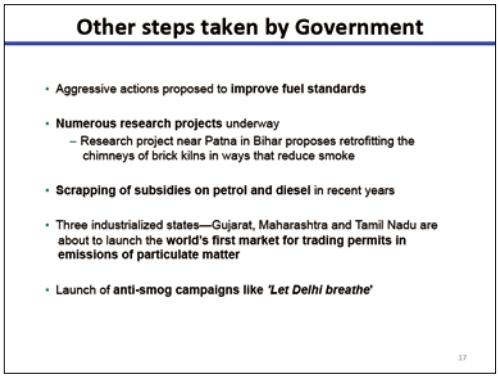
15

National Air Quality Index, announced in October 2014, is a measurement index consisting of 8 parameters, which would disseminate information in a simple and effective manner to the common man as characterized by its slogan "One Color, One Number and One Description". The Data would be disseminated in a real-time manner to enhance public awareness and persuade common man to take air pollution mitigation measures.



16

India too has taken its baby steps in the direction of pollution abatement. These steps would over a period of time start to reflect an improvement in air quality. India has been aggressively promoting the use of upgraded fuel quality. Think tanks have even suggested scrapping of subsidies on petrol and diesel to cut down their consumption. Numerous research projects are underway to decrease the pollution. One such remarkable project has been to retrofit the chimneys of brick kilns in Patna, Bihar with pollution controlling elements. Three industrialized states—Gujarat, Maharashtra and Tamil Nadu are even about to launch the world's first market for trading permits in emissions of particulate matter. Every major city will now continuously measure its air quality and involve its residents in the fight against pollution, one such case is the anti-smog campaign "Let Delhi breathe".



17

Thank you for giving us your time and attention.

18

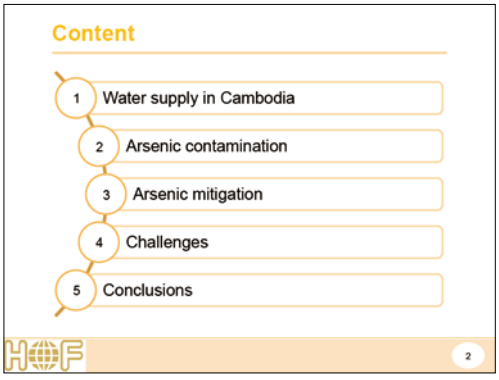
Cambodia

Sok Sikieng
2008 Honda Y-E-S Awardee in Cambodia

Arsenic Contamination in Groundwater, Cambodia

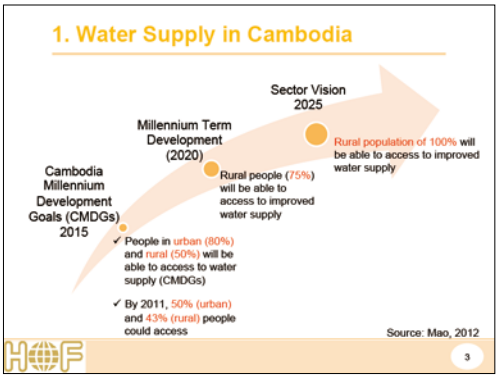
On behalf of Cambodian Honda Y-E-S Awardees, it is a pleasure to make a presentation on "Arsenic Contamination in Groundwater in Cambodia" to the 1st HONDA Y-E-S Forum 2015. The presentation is divided into four parts including water supply in Cambodia, arsenic contamination and mitigation and challenges.

1



2

To start with, there are some data of water supply in Cambodia. Cambodian Millennium Development Goals (CMDGs) targets 80% of the people in urban and 50% in rural areas would access to safe water supply by 2015. By 2011, accessibility to the supply reached 50% in urban and 43% in rural areas. It shows that the CMDGs will be achievable in the near future; however, it would take 15 more years to get 100% of rural people access to improved water supply countrywide.



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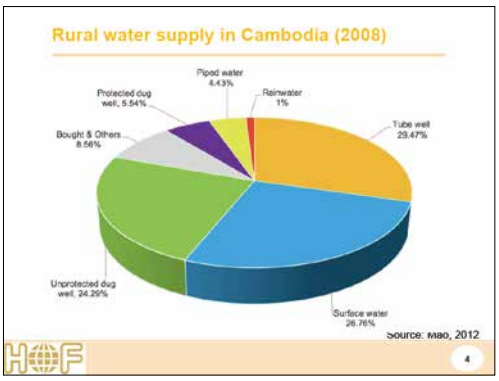
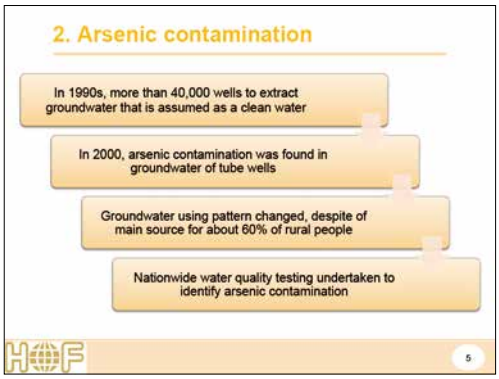
If we look at rural water supply in Cambodia, it is clear that groundwater is a main water source and tube wells share about 29.47% followed by surface water, 26.76%. Surprisingly, there is only 4.43% of piped water supplied in rural Cambodia.



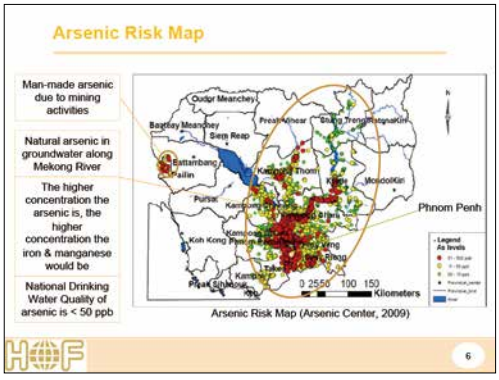
4

In 1990s when the piped water was not available, more than 40,000 wells were built to extract groundwater for daily uses. It was assumed clean and safe. Unfortunately, groundwater contaminated with arsenic was found in 2000 in especially the tube well water. The finding has changed water use patterns in rural communities and national water quality tests have been undertaken continuously.



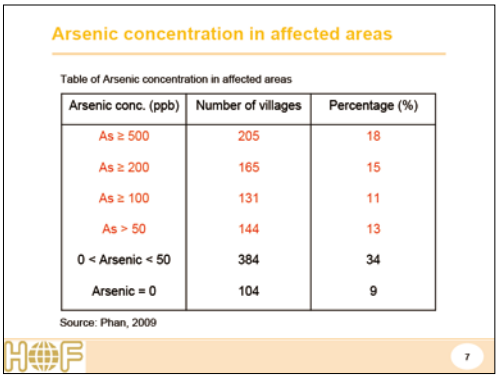
5

In 2009, arsenic risk map could be drawn with national drinking water quality standard of 50 parts per billion (ppb). The map presents groundwater in some provinces along the Mekong and Tonle Sap River was exposed to the natural arsenic. Only one province was exposed to manmade arsenic because of mining activities.



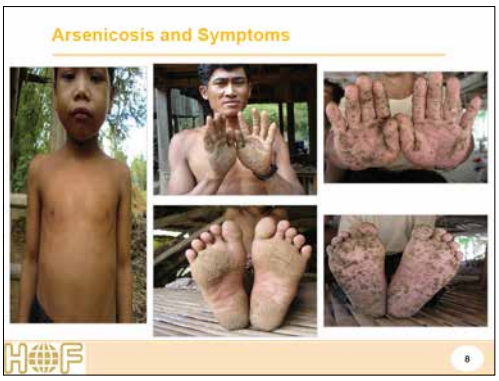
6

Nationally, about 645 villages were affected including 205 villages where arsenic concentration could be higher than 500 ppb.



7

More seriously, arsenicosis cases, a kind of skin cancer caused by long-term drinking water contaminated with arsenic, and its symptoms were identified in 139 households, or 331 people. It included 135 female and 56 children.



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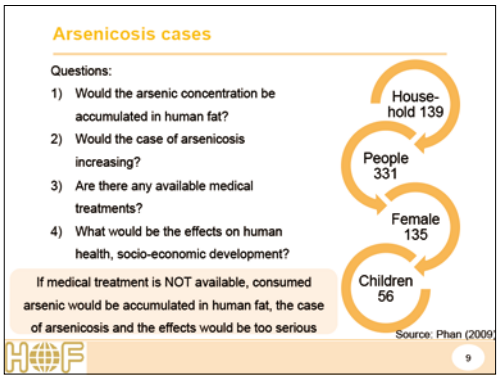
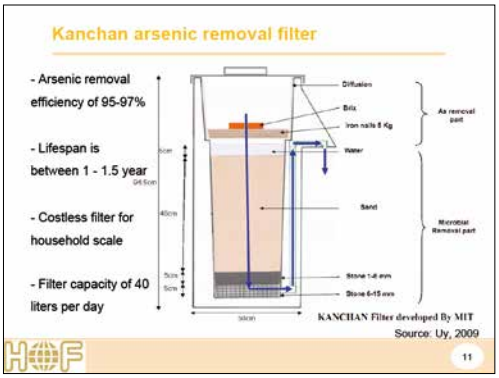


9

To respond, such arsenic mitigations have been implemented accordingly. Tube wells where groundwater is contaminated with over 50 ppb arsenic are labelled red that means they are not recommended for drinking and cooking. On the other hand, green-labelled tube wells are safe for consumption. Awareness is also raised among the local communities to convince them to utilize arsenic-free alternatives including rainwater, dug well and especially the piped water instead of tube wells.

10

Moreover, some technologies were experimented to treat arsenic. Kanchan is an arsenic removal filter by using bio-sand. The filter could efficiently remove the contamination by up to 97% with maximum capacity of 40 liters/day. It is costless for household scale; but the sand must be replaced regularly every 1 to 1.5 year.



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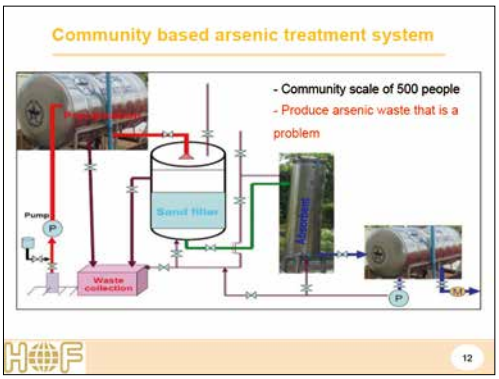
Another one is community-based arsenic treatment system. The system is mainly a combination of precipitation, sand filter and absorbent whose removal efficiency is about 95 to 97%. It could serve 500 people locally; yet produced arsenic residue is a concern of the system.



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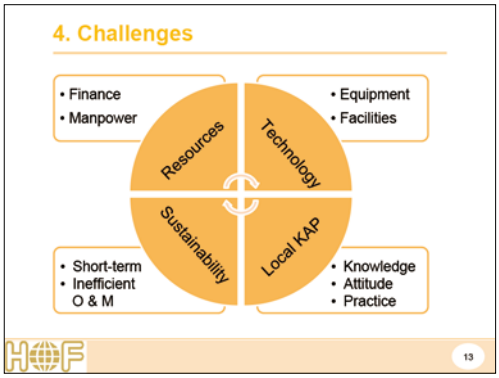
Despite the mitigations taken, there are still challenges regarding financial and human resources, technology and local knowledge, attitude and practices (KAP). These challenges are related and none of them should be left behind because it would cause the activities unsustainable. For example, sustaining the removal system would not require only resources for maintenance, monitoring and evaluation, but also participation of local people who are the end-users. In some cases, they are well-informed of the arsenic risk; but their socio-economic situation makes it unaffordable to access to safer alternatives.



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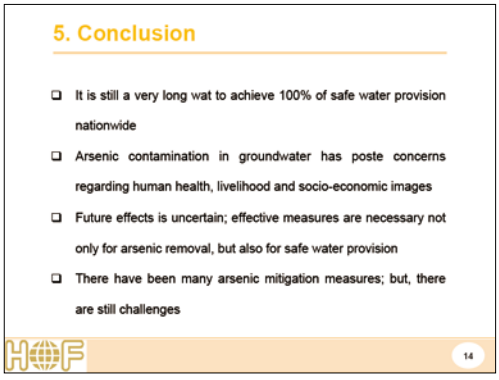
In conclusion, it is still a very long way to achieve 100% of safe water provision nationwide. Arsenic contamination has posted concerns to human health, livelihood and socio-economic images. Future effects is uncertain; effective measures are necessary not only for arsenic removal, but also for water supply. There have been many arsenic mitigation measures; but there are still challenges to be closely considered.



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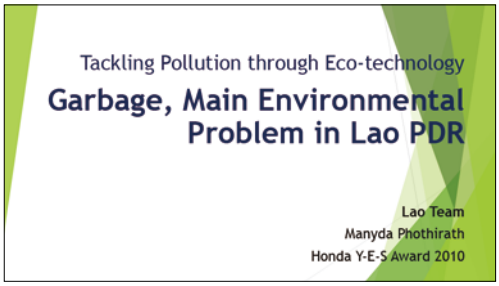
Laos

Manyda Phothirath
2010 Honda Y-E-S Awardee in Laos

Garbage, Main Environmental Problem in Lao PDR

Good morning Ladies and gentleman in this hall.
My name is Manyda Phothirath from Laos. I am representative of Lao team. Today, I will show you about the garbage issue which is the main environmental problem in Lao PDR.



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In this presentation I will introduce the region of Lao country, where the garbage is from, the effect by the garbage and solving the garbage problem in real situation and the challenges for my country.

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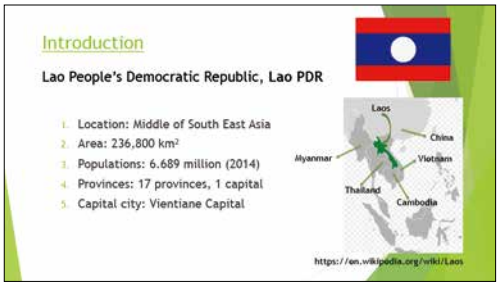
Lao People's Democratic Republic or Lao PDR is located in the middle of South East Asia. We have 5 neighboring countries; China, Vietnam, Cambodia, Thailand and Myanmar. We have 17 provinces and 1 capital called Vientiane.



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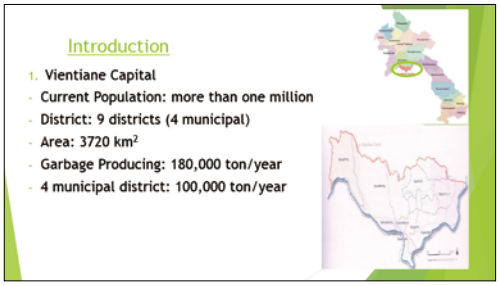
Vientiane capital has 9 districts. Inside that, there are 4 municipal districts. The area of Vientiane capital is around 3,720 km², the current population is more than one million and the amount of disposed garbage is about 180,000 tons per year.



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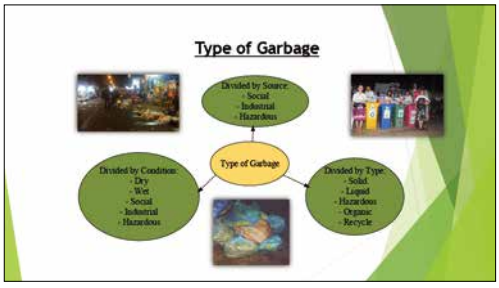
There are various ways to divide the garbage, by source, by condition and by type. When we divide by source, they are from social, industrial and hazardous. When divided by condition, we have dry garbage, wet garbage, garbage from social, industrial and hazardous. And the last, when it is divided by type, there are solid garbage, liquid garbage, hazardous garbage, organic garbage and recycle garbage.



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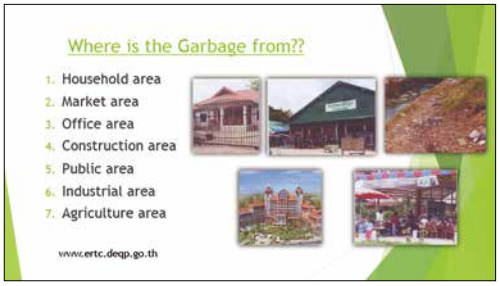
First of all, we should know that where the garbage is from. The garbage is from house, market, office, construction area, public park, industrial area and agricultural area.



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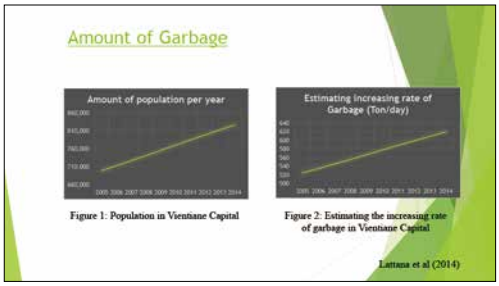
In this presentation, we will demonstrate the case in Vientiane capital, which is the most crowded city in Laos. As the figure 1, you can see the population until 2014, Vientiane capital has more than 800,000 people. And when we estimate the rate of garbage disposed in Vientiane capital at 0.75 kg per person per day, it is about 620 tons per day in total.



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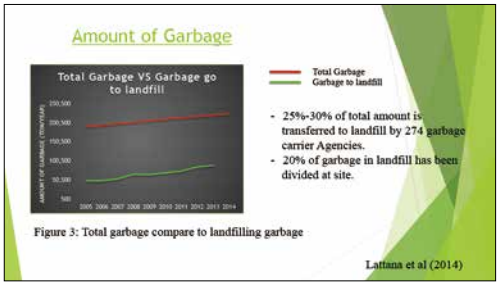
When we calculated it as per year, the total amount of garbage in red line is more than 200,000 tons per year. While the garbage that had been delivered to landfill as green line is only 30 percent of total amount, such garbage was delivered by 274 companies within 9 districts. From that amount, only 20 percent had been divided to be recycled at the landfill. From the last slide, we can see that the left garbage around 70 percent is still in our society.



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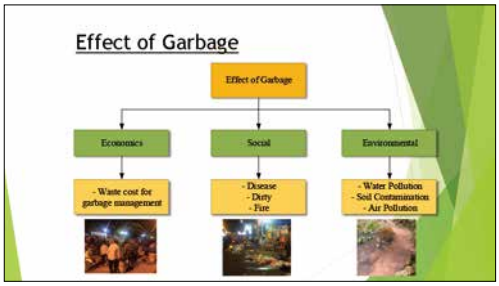
It can affect us in 3 types, Economics, Society and Environmental. For economics, it causes wasting money and time to manage the garbage. In addition, it also affects the society as dirty scene and disease cause. Moreover, the environmental part is the main effect from the garbage. It causes the water pollution such as the water from landfill, the air pollution as bad smell and soil contamination by buried hazardous garbage.



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As other countries, there are 5 ways to manage the garbage; dumping, burying, burning, compositing and recycling method.

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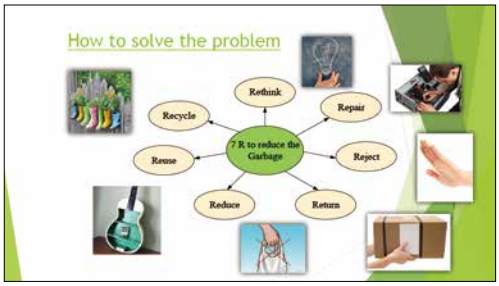
Moreover, 7R method is another way to reduce the garbage: rethink, repair, reject, return, reduce, reuse and recycle.



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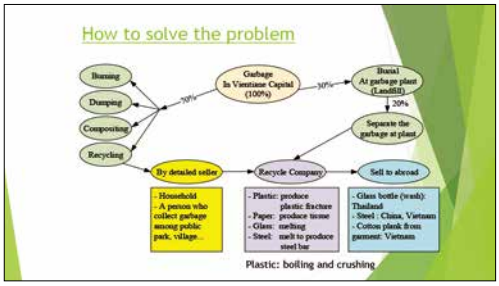
Let me explain about garbage management system in Vientiane. 70 percent of garbage will go through burning, dumping, compositing and recycling. Some people composite the garbage especially the organic garbage from food and vegetable to be an organic fertilizer. Moreover, it can be used to make the bad smelled waste water getting better. It needs about 3 months to composite. For recycle garbage, it is collected by household or collector, and then it is sold to the recycle company to be separated by the type such as paper, glass bottle, steel and plastic. Then, they are sold to local production company and sold to abroad. Normally, we sell the garbage to our neighboring countries, glass bottle that are washed and cleaned are sent to Thailand, steel are sent to Vietnam and China, cotton plank from garment is sent to Vietnam. 30 percent of total garbage is buried at the landfill. Among such amount, 20 percent are divided at the plant as recycle garbage and then they are sold to the recycle company.



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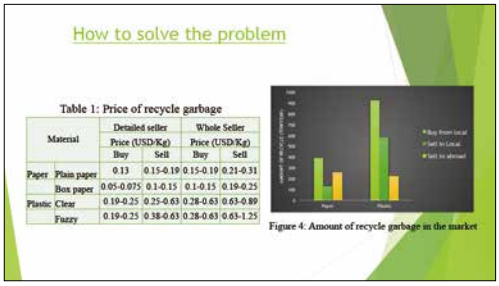
Everyone will wonder that how much the price of the garbage is and it is worth encouraging people to recycle the garbage. The table shows the price of recycle garbage as paper and plastic. The figure 4 shows the amount of recycle garbage in the market share.



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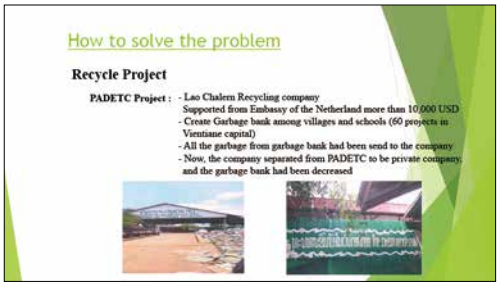
Among those solutions, we have some organizations that help us handle the garbage problem. Let us start with PADETC Project. PADETC Project is supported by Embassy of Netherland with around 10,000 USD. They created 2 small projects. First, they created the garbage bank among schools and villages in Vientiane, there were more than 60 groups joined this project. Then, they created Lao Chalern Recycle Company to support the garbage bank. The company buys the garbage from garbage bank, then sell it out. For now, the company was separated from PADETC Project into individual company. Then the number of garbage bank has been decreased.



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Next, we would like to inform you all about Asean Eco-school Award. This award is held every three years. This award is given to selected primary and secondary school in recognition for their effort in promoting and implementing environment activities. The 1st Asean Eco- school Award was held on 17th July 2012 in Kuala Lumpur, Malaysia. Two Lao schools won the 2 nd Asean Eco- school, Thongkang primary school and Xaysettha secondary school. Asean Eco- school Award selects 18 institutes in Asian member including two Lao schools adopted by Asian environment minister. The Asian environment year (AEY) 2015 celebration was with the theme of empowering the young for a green Asian community. The ceremony was held on July 29-30 in Nay Pyi Taw, Myanmar.

15

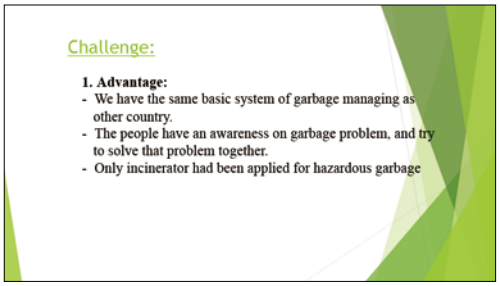
We have Thim Khoi Long Thang ("Drop me to trash bin") project for managing and promoting how to solve the garbage problem. This project is promoted by the social network such as Facebook to communicate with the people who have the same idea on saving the environment.

16

Another project is garbage project, it was held at Boat Racing festival, on 28 October 2015 along Mekhong river bank.

17

We can conclude the advantage and disadvantage of the garbage problem as the following:
Advantage: We have same basic system of garbage managing as other country; people have awareness on garbage problem and try to solve that problem together and only incinerator, garbage burning stove had been applied for hazardous garbage.



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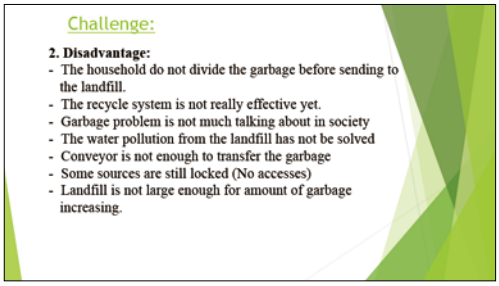
Disadvantage: The household do not divide the garbage before sending it to the landfill; the recycle system is not effective yet; garbage problem is not much talked about in society; the water pollution from landfill has not been solved; conveyor is not enough to transfer the garbage; some sources are still locked (no access) and the landfill is not large enough for the amount of garbage increasing.



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Thank you for your attention

21

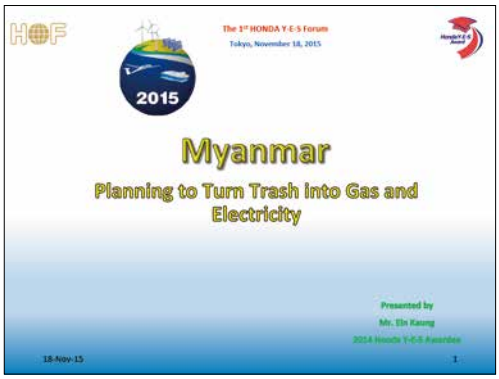
Myanmar

Ein Kaung

2014 Honda Y-E-S Awardee in Myanmer

Planning to Turn Trash into Gas and Electricity

Minasan Ohayogozaimasu. Myanmar kara kimashita. Namae wa Ein Kaung to mo shi masu. Dōzo Yoroshiku Onegai-shimasu. Let me speak in English. My name is Ein Kaung. I am going to present what is going on about garbage in Myanmar on behalf of the Myanmar team.



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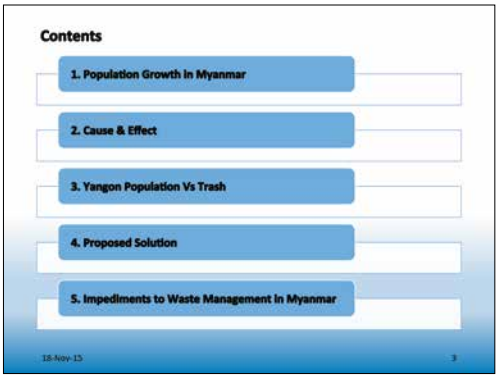
First, welcome to Myanmar! Please come and visit our country! This is the picture of the Shwedagon Pagoda and these are the today's contents.

2



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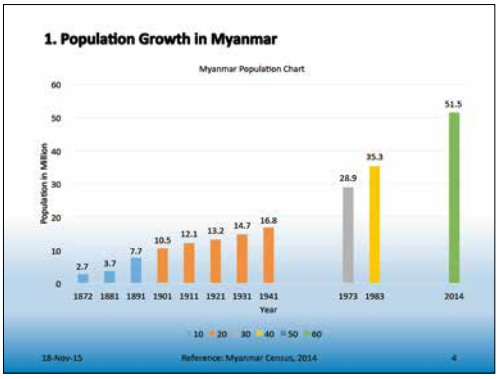
Let's go to the population. Could you please, anyone, guess the population of Myanmar?
According to the Myanmar Census conducted in 2014, Myanmar's population has reached over 50 million. And the first survey was conducted by British Government in 1872 and it has now reached about 25 times the first conducted survey. But you might see the gap right here because at that time, there were no surveys conducted.



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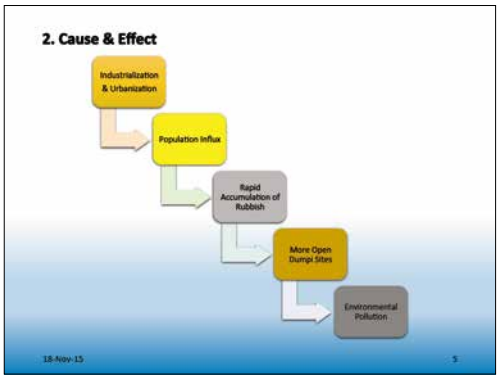
Then, let's move to why garbage is very intensive matter in Myanmar. But I would like to focus on just the major city because lots of people just move to Yangon (Rangoon) and also there is a great significant incidence of industrial expansion. That is why, more people come to Yangon. More people, more garbage. The only way in Myanmar is to pile the rubbish on the dump site. Even you can observe this anywhere, maybe every downtown and district and that is why, this has led to environmental pollution.



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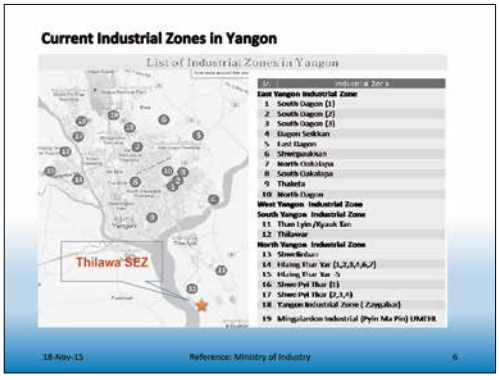
There is a total of 18 main industrial zones and out of these industrial zones, 4 are in Yangon. These are East, North, South and West and the sub-industrial zones account to 19 and there is also one proposed special economic zone located at Thilawa Port and it is called Thilawa Special Economic Zone.



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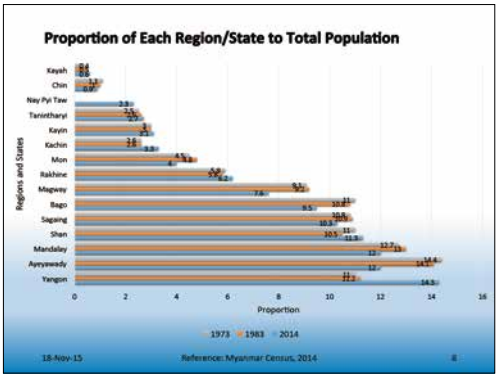
And this is the picture of the location of the Thilawa Economic Zone which takes about 30 minutes from the downtown. There are currently 500 companies that have signed MOU with our government.

7

According to this chart, you could observe that Yangon's population, according to 2014, has the largest proportion. Could you please guess the number, too? The population of Yangon?



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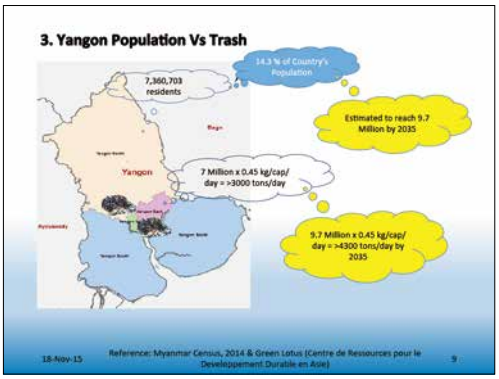
The answer is over 7 million. It accounts up to 14.3 % and so the garbage amounts to over 3,000 tons per day disposed at the main location sites in Myanmar. The garbage disposal rate per person per day accounts up to 0.45 kg according to Green Lotus data from France. It is estimated that by 2035 Yangon's population will reach up to 9.7 million according to the "Greater Yangon Project" conducted by YCDC, the Yangon City Development Committee, and JICA. So the rubbish grows. And it would reach up to over 4,300 tons per each day.



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The current disposal method is by collecting waste by trucks and by carts or the public has to go to the nearest rubbish bins and throw but they rarely do this. You can see the rubbish rather on the street, not in rubbish bins, and the curbsides – at the side of pavements. All this waste goes to open dump sites.

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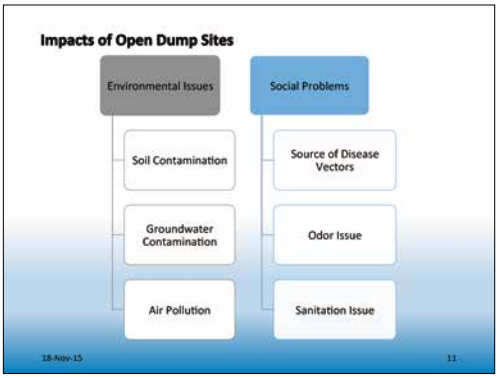
These are the very prominent social and environmental problems because of open dump sites. These will be the breeding grounds for rodents like rats and insects, and also the odor issue is very significant if dump sites are in public places. When flood comes to the city, sanitation could be a very prominent issue, too. Other environmental problems like soil contamination as well as groundwater and also air pollution are caused.



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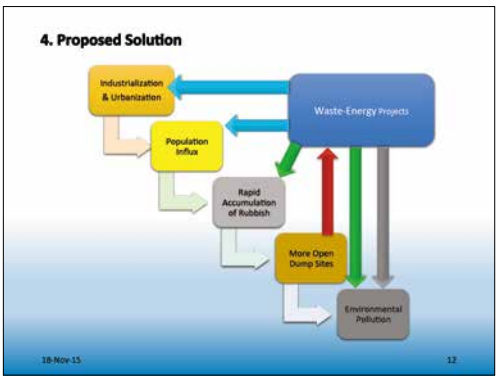
The current proposed solution by the YCDC is to turn electricity from the trash and so this would reduce the amount of waste and it is seemingly proper. This would contribute to the growing population and expansion of industrial zones. However, according to the type of technology used, this might lead to certain environmental issues, too. That is what I will discuss later.



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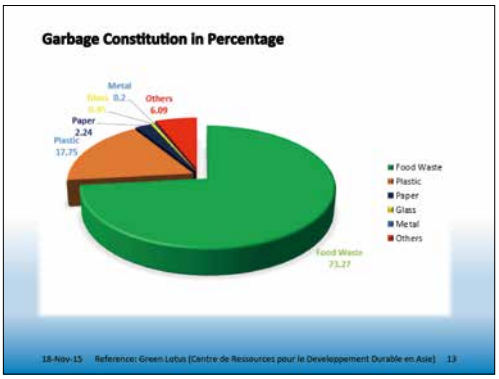
Fortunately, about 75 % of the waste disposed is organic waste. That is why, we can extract natural gas from this to produce electricity.



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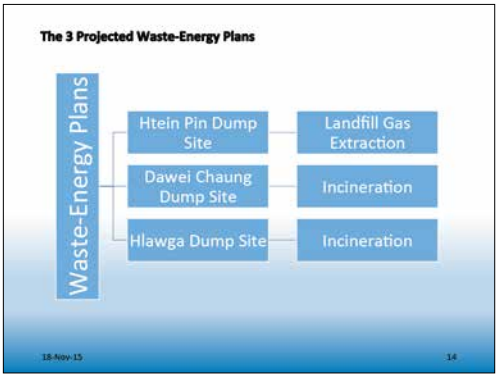
Here are the 3 proposed sites. The first one will use landfill gas extraction type and the other two will be applying incineration type.



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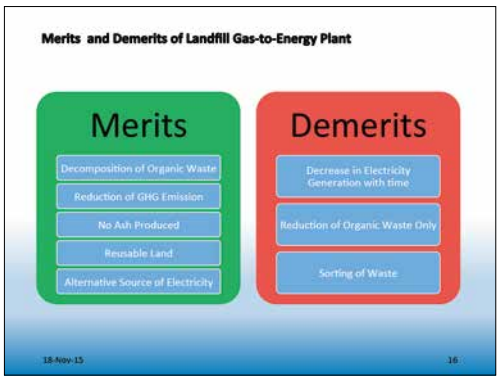
This is the largest dump site located in Hlaing Thar Yar Township and where the technology used will be the landfill gas-to-energy type and this will consume about 800 tons per day that would cover the total waste disposed of in a single day. Yet, according to the data, the output power will be reduced year by year and also, it is expected to produce 92 % pure natural gas. At the dump site, there will be a large pit and they will put a geomembrane layer so that the groundwater will not be polluted and the gas will be extracted from this.

15

It has certain merits and demerits likewise. It can only decompose organic waste but not the inorganic one. That is merit but in terms of other inorganic matters, this could be a very bad thing, too. Anyhow, it helps to reduce greenhouse gas emission. No ash will be produced from this site and the land could be reused and also this would compromise the growing need of electricity. But the sorting of waste is truly a need for this type of operation.



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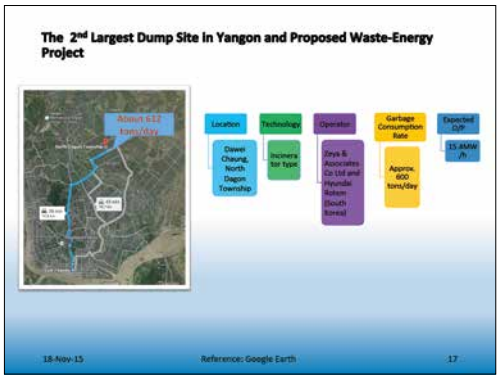
Right here is the second largest. This will consume about 600 tons per day to produce electricity of 15.4 MW per hour.



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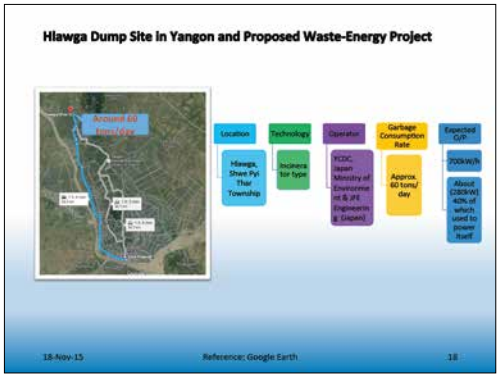
The third one is not that large compared to the previously described ones. It consumes about only 60 tons per day and the operator will be joint venture between the Yangon City Development Committee and Japan Ministry of Environment and the company that will build this plant will be JFE Engineering from Japan and it is expected to start operation in 2017 March. This will only produce 700 kW per hour but only 60 % of this will be distributed to the nearest industrial sites.



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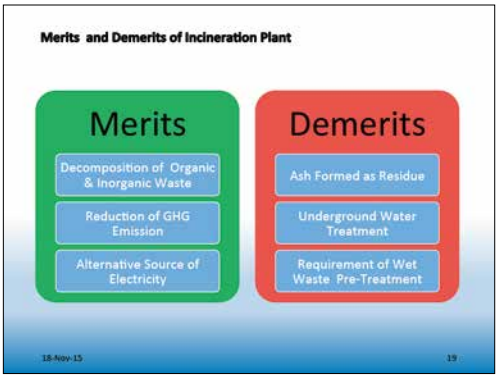
But when it comes to the incineration type, the ash will be produced. That is a serious problem. Also, what they said about the second largest dump-site plant is that the groundwater will be applied to treat the waste. There is also a requirement of pretreatment of the wet waste. Yet, it also helps to reduce greenhouse gas emission and, not like the landfill type, it will consume both organic and inorganic waste.



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But there are currently very demanding challenges in Myanmar. Like, from the public side, there are little public awareness about the rubbish matter and cooperation. Although there are certain organizations that motivate people to dispose of waste systematically but these numbers are very few. This is the growing issue. Also, in terms of labour, labour force is not enough and so are the vehicles used either. In terms of planning, yet there are certain laws and rules, like Environmental Conservative Law depicted in 2012 and Environmental Conservative Rules in 2014, the enforcement is not enough. When it comes to lack of sorting, although there are some sites and rubbish bins that differentiate between the wet and dry rubbish, the vehicle to collect the waste is the same and so all the waste will mix. That is the main problem. There is also little education about systematic waste disposal. These are the growing issues in Myanmar against implementing the projects.
Thank you for your attention.

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21

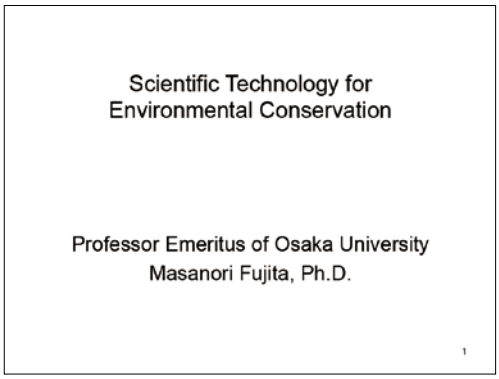
Keynote Speech

Keynote Speech 1

Masanori Fujita, Ph.D.
Professor Emeritus, Osaka University

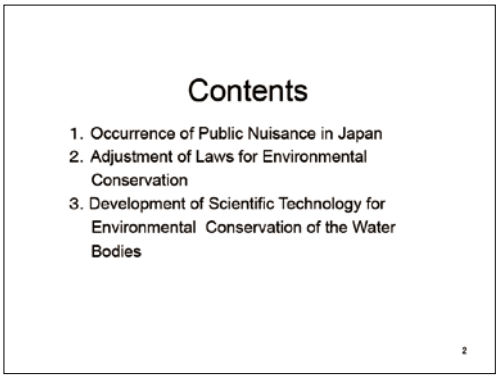
Scientific Technology for Environmental Conservation

Mr. Chairman, thank you very much for your kind introduction. I am Masanori Fujita, Professor Emeritus of Osaka University. Today, I'd like to talk about scientific technology for environmental conservation. Especially, I focus on the water conservation technology using my research works.



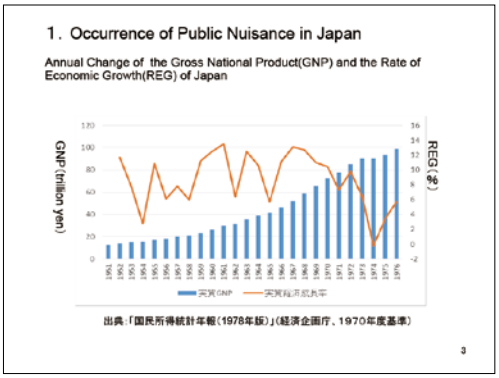
1

This shows contents of my speech. I'd like to talk according to this contents.



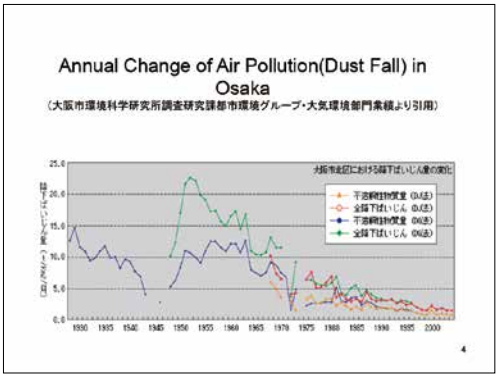
2

During about 20 years since 1950, the Japanese GNP was growing tremendously and the rate of economic growth of Japan was kept at about 10%.
So serious air and water pollution might happen in big cities or industrialized cities such as Tokyo, Osaka, Yokkaichi. I will show you serious air and water pollution using statistical graphs of Osaka.



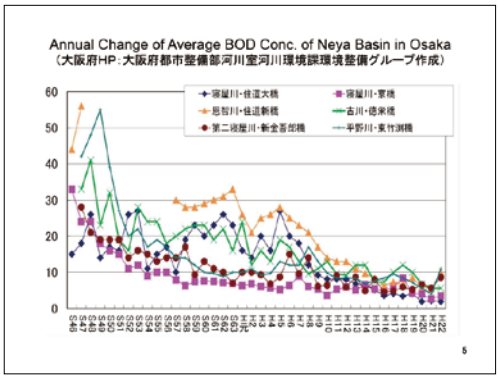
3

This shows the annual change of air pollution in Osaka. The graph shows the average dust fall concentration in the central part of Osaka City. We can see the high dust fall concentration since 1950. But after 1975, air pollution was improved according to the adjustment of laws for environmental conservation.



4

This slide shows average BOD concentration of Neya River flowing in Osaka Prefecture. It also shows high concentration of BOD in 1970. S45 is 1971. BOD of river water in 1971 was about 50 mg/l. Since average BOD of sewage of Osaka City is about 200mg/l, we can guess that it was so polluted.

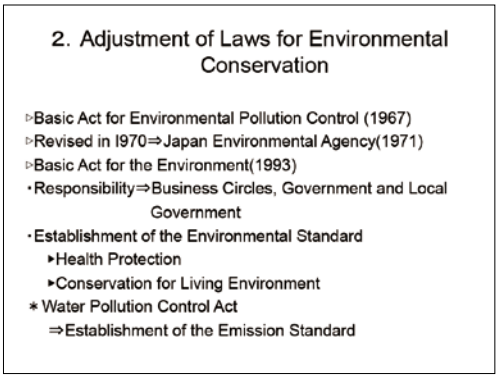


5

These two photos shows air pollution and water pollution of Osaka City in 1970.
We could not see distant buildings and the methane gas was generated from the bottom of the river.

6

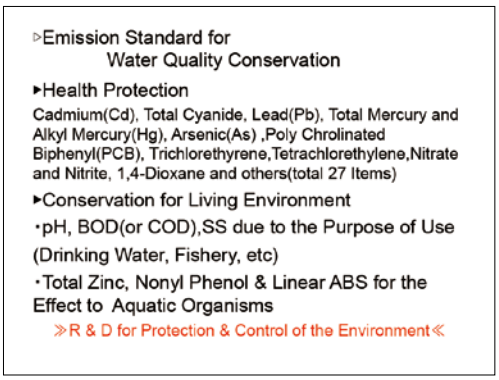
Many laws for environmental conservation were adjusted since 1967 such as Basic Act for Environmental Conservation. In 1971, Japan Environmental Agency was established. According to these laws, business circles, government and local government should take the responsibility to protect our health and to preserve the good living environment. Water pollution control act was established at the same time. It gave us the emission standard for health protection and conservation of living environment.



7

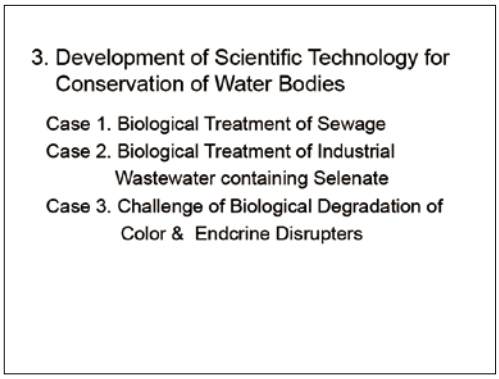
Emission standard for water quality included two categories. One is the standard for health protection such as cadmium, total cyanide, lead, total mercury, alkyl mercury, arsenic, PCB, and so on. Total 27 items were included. The other is the standard for conservation for living environment, which includes pH, BOD or COD, SS due to the purpose of use, such as drinking, fisheries, etc. And total zinc, nonyl-phenol and linear ABS were added to conserve the aquatic organisms.

So we have to do research on aquatic organisms and ecosystems and also to develop the technology to preserve the good living environment.



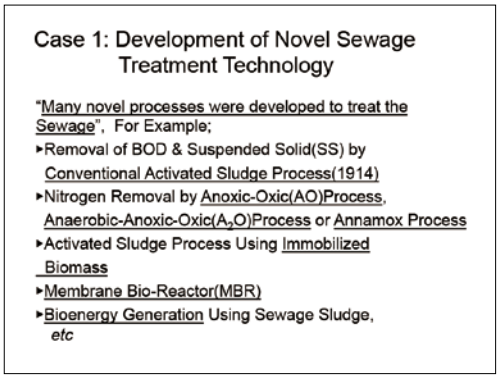
8

I pick up three topics from my research works which were done with my co-workers and students in Osaka University. First, Biological treatment using immobilized activated sludge. Second, Biological treatment of selenate using special bacteria isolated from the field. Third, Bio-degradation of artificial detergent, development of monitoring method and Bio-treatment of endocrine disrupter which is the by-product of that detergent.



9

Activated sludge process has about a 100-year history and many novel bio-treatment processes have been developed and made in practice for treating both municipal and industrial wastewater. Initially it was applied to treat the BOD and SS. Eventually it was applied to treat both nitrogen and phosphorus, using AO process and A_2O process. Membrane bio-reactor (MBR) and Immobilized activated sludge process were also made in practice. Now bioenergy generation process form the sewage sludge was focused on due to the reduction of CO_2 emission.



10

This photo shows immobilized activated sludge like beads. They are immobilized using poly-ethylene glycol (PEG). Poly-vinyl alcohol is also used.

Immobilized activated sludge using PEG

11

This shows the microscopic figure of immobilized bead. Microbial communities grow both on the surface and inside the bead.

Microscopic figure of immobilized bead

12

Energy is now generated in Japan using "methane from anaerobic digestion of sewage sludge", "charcoal from dehydrated sludge" and /or "fuel cell using hydrogen converted from methane". Biomass such as food residue, coffee production grounds, animal manure and so on is also used as a carbon source mixed with sewage sludge.

▸Bioenergy Generation Using Sewage Sludge

①Power Generation Using Biogas from Anaerobic Digestion of Sludge
②Production of Charcoal from Dewatered Sludge
③Conversion of Methane to Hydrogen for Fuel Cell

13

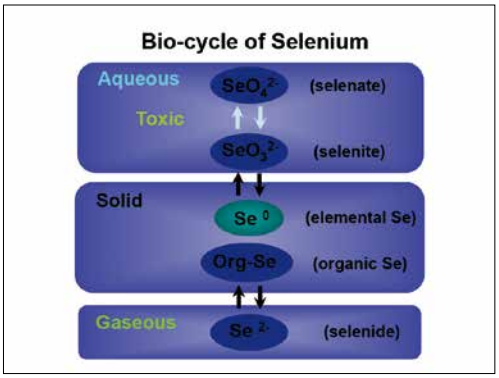
Now I would like to talk about the microbial reduction of selenate to apply it to industrial wastewater treatment. Selenate is toxic, but elementary selenium is not toxic. Since we'd like to establish the anoxic process to treat the wastewater containing selenate, we tried to isolate a selenate-reducing bacterium from selenate-contaminated sediment. We got an excellent bacteria, "Bacillus sp. SF1". It needs organic carbon like lactic acid as a hydrogen donor and selenite reduction is inhibited by nitrate. But elementary selenium is accumulated in the medium.

Case 2: Microbial Reduction of Selenate (SeO_4^{2-})

- Selenate is Toxic, but Selenium is not Toxic.
- Isolation of Selenate –Reducing Bacterium from Selenate-contaminated Sediment
- Facultative anaerobic *Bacillus* sp. SF1
- Selenate was Reduced Using Organic Substances as Hydrogen Donor
- Inhibition of Selenate-Reduction by Nitrate
- Elemental Selenium was Accumulated in the Experimental Bench Scale Reactor

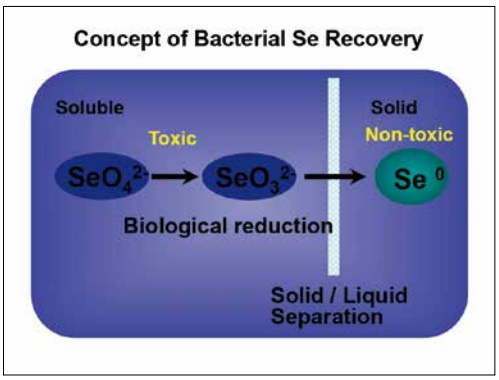
14

This shows the bio-cycle of selenium. First, Selenate is reduced to selenite in the anoxic condition. And then selenite is converted to elementary selenium and eventually elementary selenium is accumulated as a crystal form. But sometimes elementary selenium is converted to organic selenium and then to gaseous form, selenide.



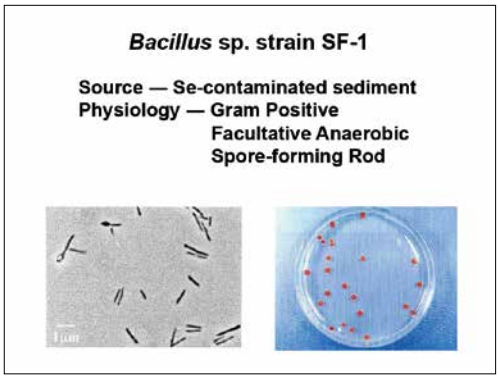
15

This shows the concept of bacterial selenium recovery or to develop the selenate treatment process. Soluble selenate is reduced to selenite microbiologically. And then elementary selenium, nontoxic form, is recovered.



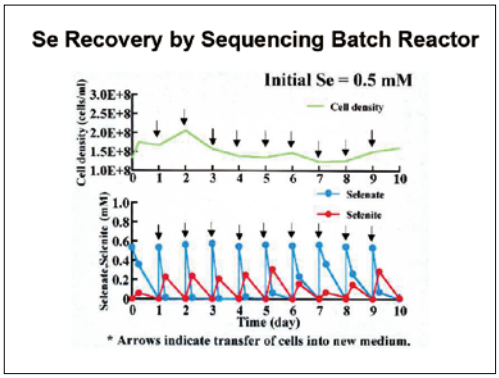
16

This slide shows the microscopic figure of the isolate, *Bacillus* sp. SF1. Since elementary selenium, which is amorphous form, is a red color, it is easy to recognize the selenate-reducing bacteria.



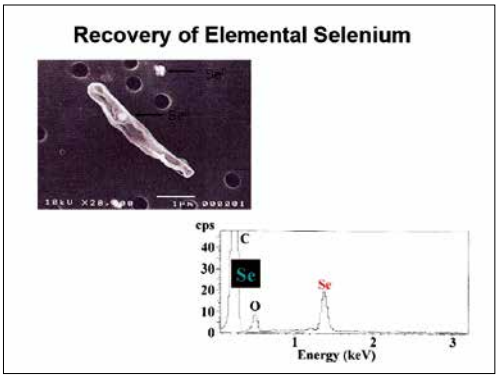
17

We tried to develop the selenate-treating process. So we kept some amount of pre-cultured bacteria, *Bacillus* SF1 in the experimental reactor and then, added the selenate solution, which is the model wastewater containing selenate, to the reactor once a day. Selenate was reduced quickly and selenite was detected in some amount, but eventually selenite was also disappeared. Bacteria was maintained in the reactor. It shows this idea should be applied to the practical process.



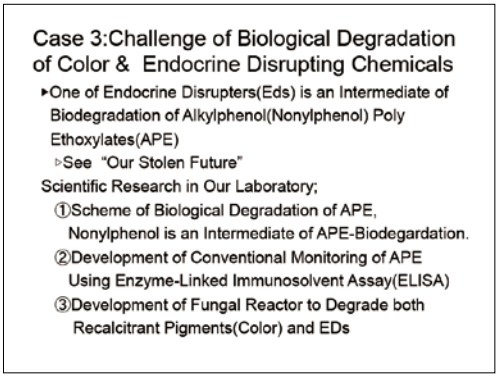
18

I'd like to show you a microscopic figure of Bacillus sp. SF 1 after selenate was reduced. Elementary selenium is accumulated in the cell.



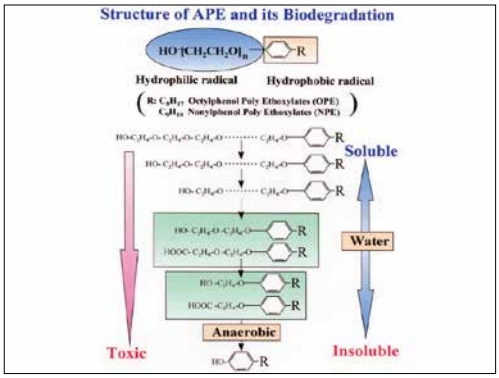
19

Finally I'd like to speak the story of alkylphenol polyethoxylate, which is an artificial detergent. It was mainly used in the memory chip production factory for cleaning up a base material. First, I show the degradation step of alkylphenol polyethoxylate. One of intermediates of biodegradation of these materials is nonylphenol, which is so-called "environmental hormone". It was introduced by the book, "*Our Stolen Future*". And it is one of environmental standards for living environment.
I will show our scientific research in my laboratory using several slides.



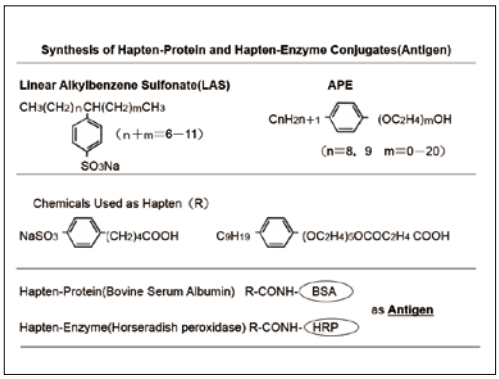
20

This shows the structure of alkylphenol polyethoxylate and its bio-degradation scheme. Left shows the hydrophilic radical and right is the hydrophobic radical. Its structure shows a typical detergent. Nonylphenol and octylphenol polyethoxylates are mainly used for the industrial detergent. Hydrophilic radical is degraded gradually by bacterial reaction. Finally alkylphenol is remained in the water environment. It seems to disturb the ecosystem in the water.



21

I'd like to analyze the concentration of these detergents which are widely used quantitatively, quickly, simply and cheaply. Of course, it can be analyzed quantitatively by HPLC, but it is a time consuming method and expensive. I chose the immunoassay to analyze various kinds of detergents quantitatively.
This shows hapten-protein and hapten-enzyme conjugates to produce antibodies. We picked up linear alkyl-benzene sulfonate (LAS) and octylphenol polyethokylate (APE) as candidates for quantitative analysis. We used bovine serum albumin as a protein and horseradish peroxidase as an enzyme. The lower shows antigens which were used as antigens.



22

This slide shows the procedure to make the antibody which is a monoclonal antibody, using a mouse.

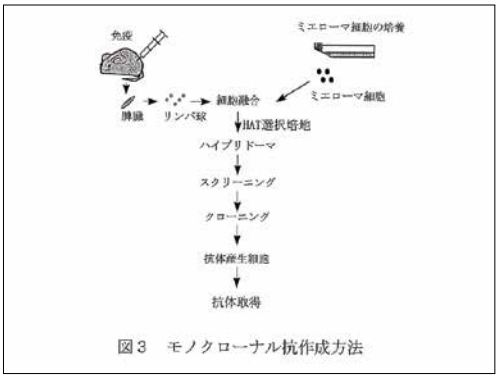
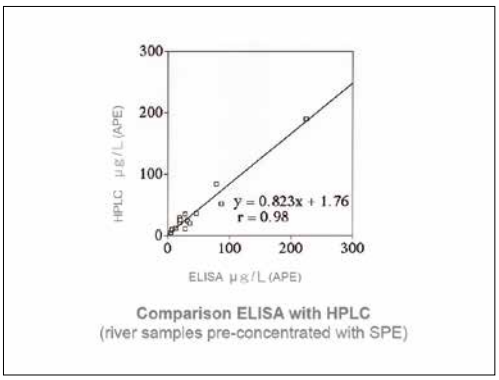


図３　モノクローナル抗体作成方法

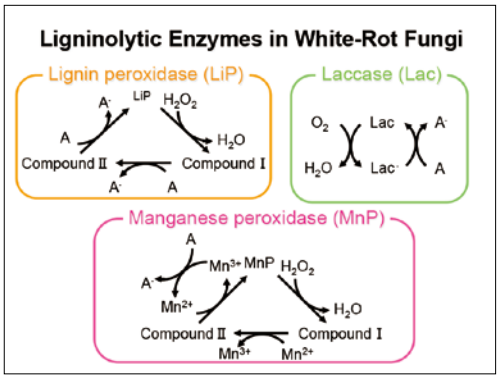
23

This shows the relationship between HPLC method and ELISA method using river sample. We could get a good correlation. So we could prove the ELISA method to measure the LAS and other detergents. ELISA is short for enzyme linked immunosolvent assay which is so-called immunoassay. This measuring methods were commercialized at that time.



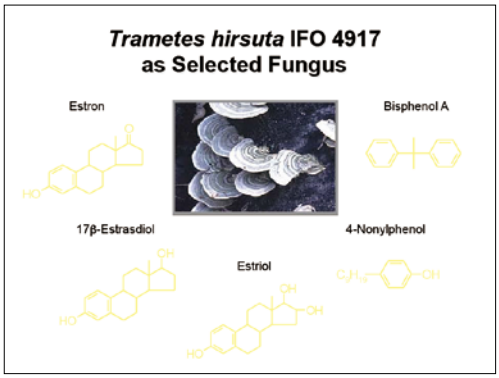
24

The following slides show how to develop the new technology to treat both endocrine disrupters and recalcitrant color in my laboratory. We focused on white-rot fungi with strong lignin-degrading enzyme. This scheme shows the roles of three enzyme, lignin peroxidase, laccase and manganese peroxidase, which were secreted by white-rot fungi. These enzymes shows very strong oxidizing power.



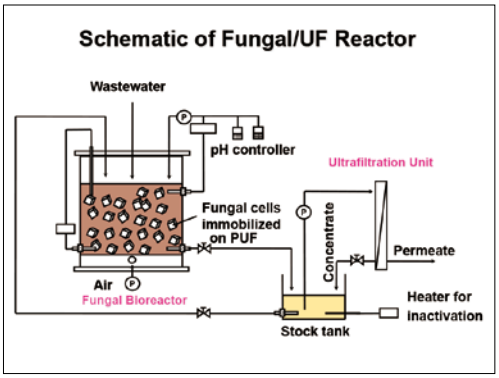
25

We selected *Trametes hirustas* IFO 4917 as a candidate. We recognized It could degrade bisphenol A, 4-nonylphenol, estriol, 17β-estradiol and estron.



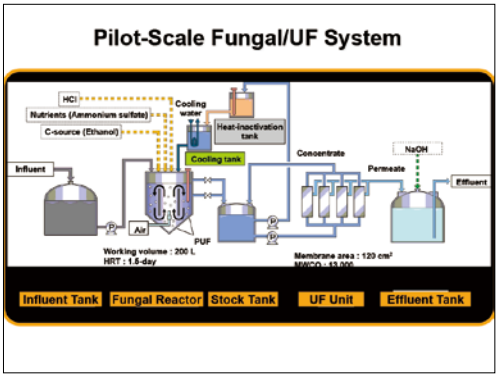
26

We immobilized fungal cells on polyurethane cubes and then put them inside the reactor. Urtrafiltration membrane was used to get the effluent.



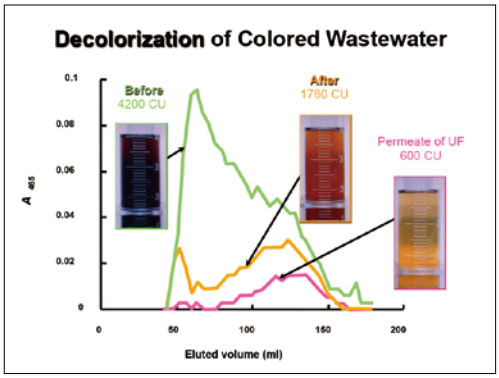
27

This slide shows the pilot-scale Fungal/UF membrane system.



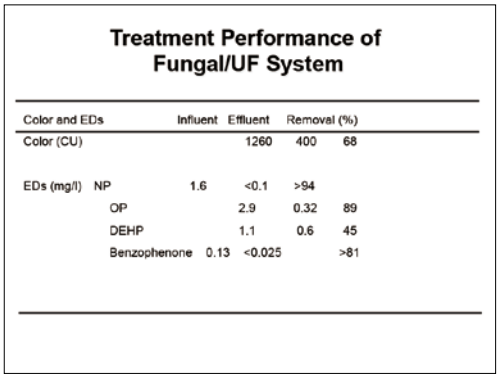
28

This shows the efficiency to remove the recalcitrant color, melanoidin, using the reactor. Initial color unit of the influent was 4200 CU, and finally color unit of the effluent was 600 CU. So the removal efficiency was about 86%.



29

This shows the treatment performance of endocrine disrupting chemicals using fungal/UF membrane reactor. Nonylphenol was removed with about 100%, octylphenol was about 90% the other chemicals were also removed with high efficiencies. So this system was proved as an effective tools to treat both color and endocrine disrupting chemicals.
Unfortunately it was, at that time, too expensive to be made in practice.



Color and EDs		Influent	Effluent	Removal (%)	
Color (CU)			1260	400	68
EDs (mg/l)	NP	1.6	<0.1	>94	
	OP		2.9	0.32	89
	DEHP		1.1	0.6	45
	Benzophenone	0.13	<0.025		>81

30

Finally, I expect young scientists and engineers to achieve scientific researches to protect the health and the biological diversity. You have to try to develop the novel technology to control the newly designated pollutants.
I expect young scientists and engineers to act to protect the local and global environment.
Thank you for your attention!

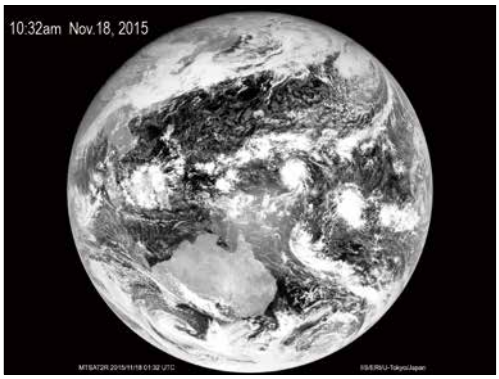
31

Keynote Speech 2

Yoshifumi Yasuoka, Ph.D.
Professor Emeritus, the University of Tokyo

How Can Remote Sensing Contribute to Tackling Climate Change?

Good afternoon, ladies and gentlemen. Today, my talk is rather global. This morning I had all the representations and most of you are focused on the local environmental improvement. But my talk is rather global.

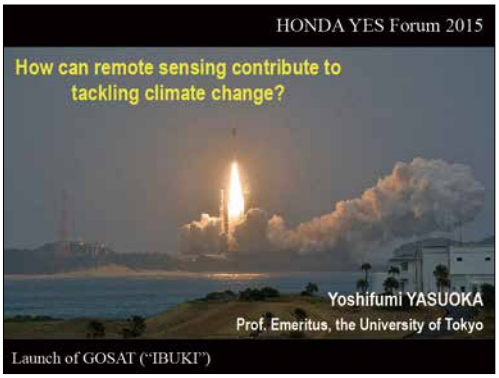


1

These two images show today's earth at 4:32 this morning and 6:32 this morning. And I have just downloaded this image from my site. This is noon today. Well, you can download this kind of image from the site of the University of Tokyo, where I was. One point which I would like to emphasize is that the earth is very beautiful. We have to keep this beautiful earth for the next generation. Make it sound, make it sustainable. How can we contribute to that?

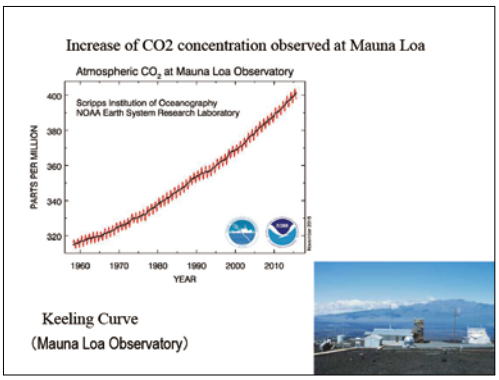
Besides these global-scale satellite images, nowadays we can use this kind of very fine special resolution satellite data. This is the image over Fukushima Nuclear Power Plant. The special resolution is only thirty-one centimeters. If we remove away the roof of this building, the satellite can count the number of audiences in this room. You can use this kind of data. Of course you have to buy. This never be the military satellite data nor the intelligence satellite data. This is commercial satellite data.

Today's my talk is how to use remote sensing for tackling climate change.



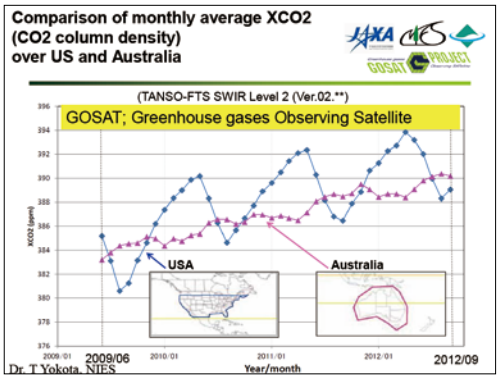
2

You know this curve. This is called as "Keeling Curve." Professor Keeling, of the Scripps Institute of Oceanography started the observation of the carbon dioxide concentration from 1957 at Mauna Loa and also at the Antarctic continent. This curve is very famous since this lets us know that our earth has risks due to climate change. Very famous data. This curve is observed on the ground at Mauna Loa.



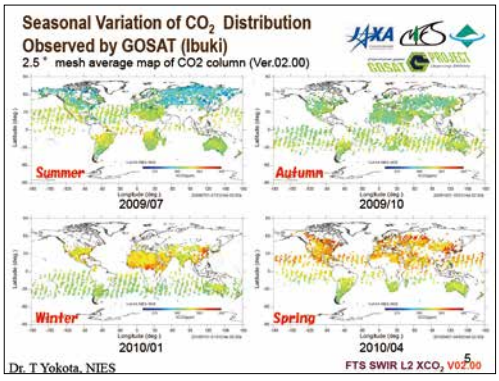
3

And let me show you this curve. This is very similar to the Keeling Curve, increasing and fluctuating. Seasonal fluctuation they have. But this curve is the carbon dioxide concentration over USA. This curve is for Australia. This curve is from GOSAT satellite, Greenhouse Gases Observing Satellite. Japan launched this satellite 2009. Started to observe the global distribution of carbon dioxide methane from space. This is only one satellite in the world. Now we have these technologies.



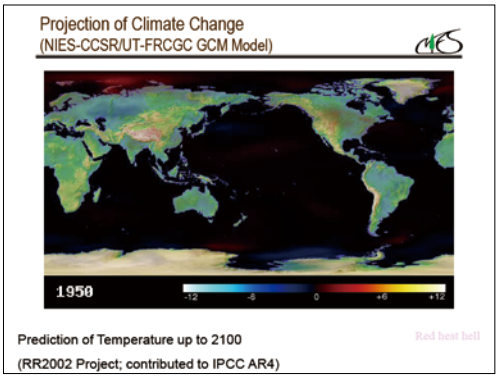
4

This is the global distribution of carbon dioxide observed from GOSAT. Seasonal data. Of course the original data is monthly. So we have aggregated for summer, autumn, winter, spring.



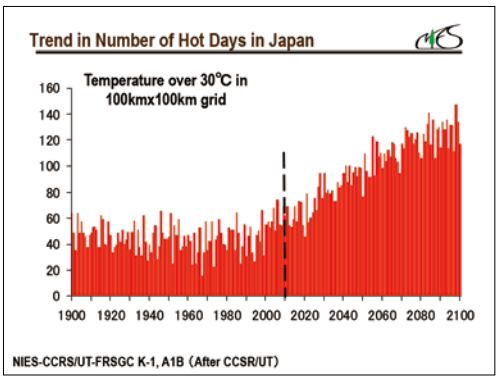
5

With the satellite observation data, we can improve the model which can simulate the future condition of the earth. This color shows temperature. Up to 2100, the color is getting red and red. That means the temperature is getting higher and higher. In Northern Hemisphere and Southern Hemisphere, the behavior is usually different. But in polar regions, the increases in temperature are rather distinguished from other areas. Red heat hell. We have to avoid this condition.



6

This shows… from that model, we can simulate the future condition. This is the trend in number of hot days in Japan. This is today. We may have very hot days in the near future. And now we are experiencing that.

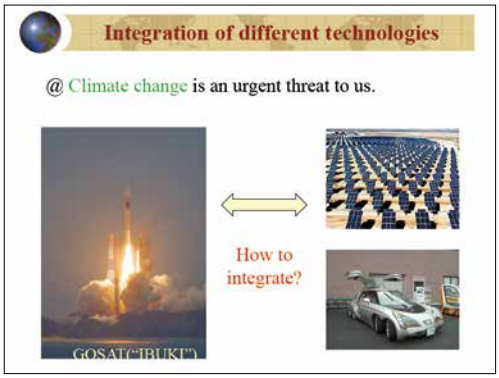


7

Besides these observation data and simulation data, we have new technologies on mitigation. This is electric car. My friend Professor Shimizu of Keio University, he produced this one. This is very powerful tool to mitigate carbon dioxide emission. I use fully electric car at my home. It's a commercial one, Nissan Leaf. It is very good, but distance is very short. I am sorry about that.

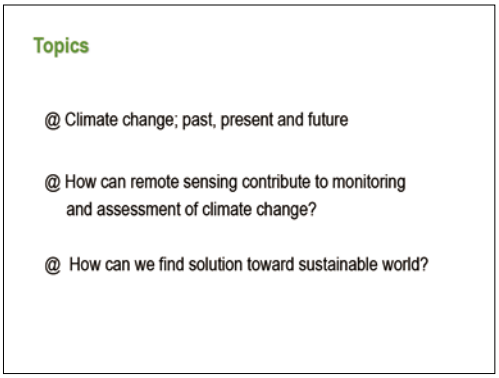
8

We have monitoring tools, simulation tools and we have mitigation tools. How to link these new technologies? Climate change is an urgent threat to us, so we have to combine these new technologies towards the realization of a sustainable world.



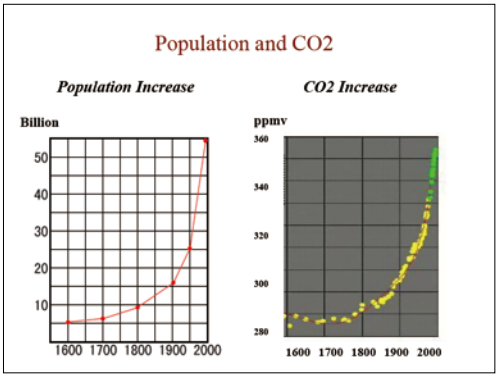
9

My talk is on climate change conditions and remote sensing applications and finally, I would touch on how we can find solution towards a sustainable society. But you know this part, so I will rush, go quickly.



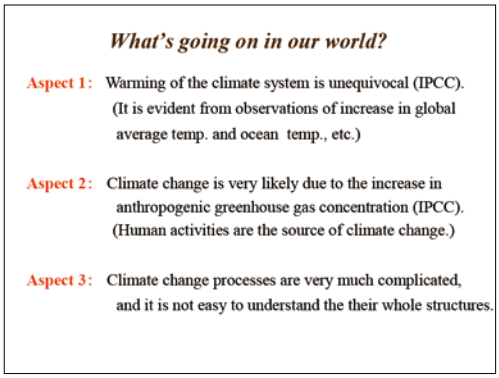
10

Associated with population increase, the CO_2 concentration or carbon dioxide concentration has been increasing very drastically.



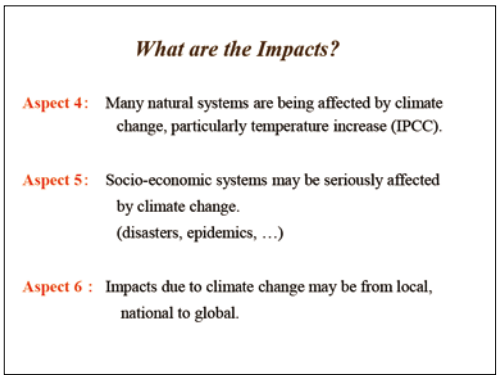
11

"Global warming is unequivocal," the IO-IPCC declared that.
Climate change is very likely due to human activities.
Climate change processes are very much complicated in terrestrial system, in atmosphere and in ocean. We have to know, we have to figure the whole images.



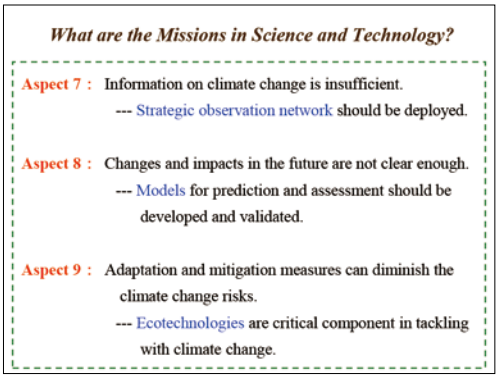
12

What are the impacts in the future? Many natural systems are being affected by climate change. Socio-economic systems may be seriously affected by climate change. For example, we may have disasters, epidemics. We have to prevent these for the next generation. Impact due to climate change may be from local, national to global. We have to cover whole world from very local part. It is not so easy.



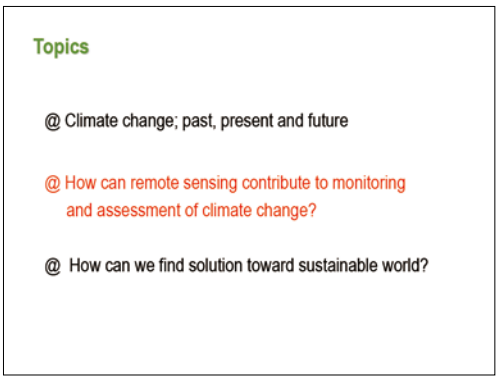
13

What are the missions of science and technology?
We have to deploy the strategic observation network to monitor the whole globe. And we have to devise or develop models for future simulation. We need a very precise projection of carbon dioxide behavior or temperature behavior and other behaviors. And also we have to develop adaptation or mitigation measures for the next generation. These new technologies can diminish the climate change risks. We have to decrease the risk. My talk today is rather focusing on this part.



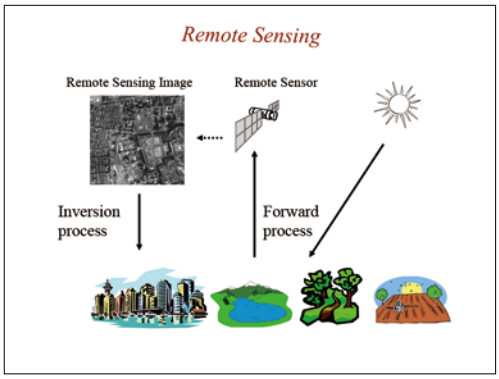
14

How can remote sensing contribute to monitoring and assessment of climate change?



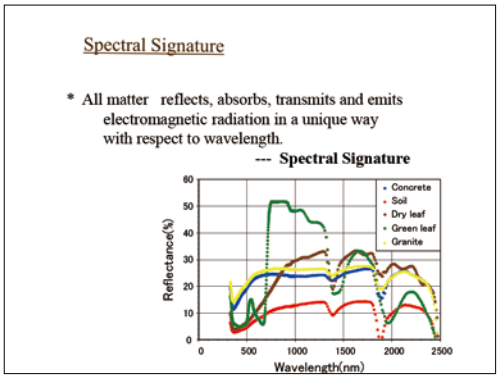
15

Well some of you know the remote sensing, what remote sensing is. Satellite sensors, we usually call these remote sensors. We put these sensors on board satellite and observe the earth or surface of the earth. The sensor can observe the two dimensional or three dimensional structure of our earth. From these images, we can retrieve the surface conditions.



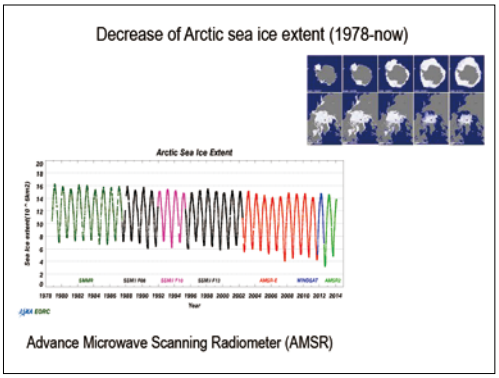
16

Let me show you some examples why we can observe the conditions of the earth. All of the matter reflects, absorbs, transmits and emits electromagnetic radiation in a unique way with respect to wavelength. This is the essential point in remote sensing. This is physics. For example, this is the spectral reflectance of the active leaf. But when it turns to brown, it turns to dead, the spectral signature would be changed. Water has a different spectral signature, soil has a different spectral signature. So we can identify what they are from these characteristics. This is remote sensing.



17

Let me show you some examples. This is the decrease of Arctic sea ice extent. This is from advanced microwave scanning radiometer. These are from the Japanese satellite called AMSR, advanced microwave scanning radiometer. Very distinguishable trend from the past to now. So you can easily imagine the ices in Arctic Sea would be disappeared, maybe in the near future. It might happen, I'm not sure.

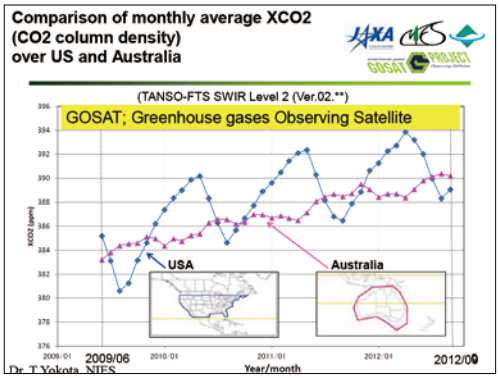


18

As I mentioned, 2009, Japan launched new satellite named GOSAT. This is a very sensitive sensor. This carries the fully transformed spectrometer on both satellites. Very difficult sensor.

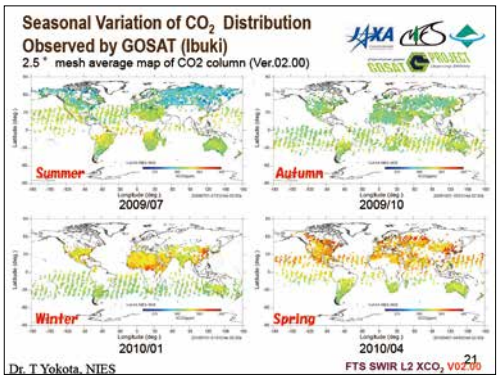
19

But we have succeeded, and we now can get this kind of data. I'm sorry the spatial resolution is not so high on GOSAT 1 but we're now planning to launch GOSAT 2 and GOSAT 3. In these sensors, the special resolution would be improved and we can observe the conditions of carbon dioxide or methane over Vietnam, Myanmar, Cambodia, Laos, Thailand. Even for these small countries, we can observe the greenhouse gases.



20

This is the global distribution of carbon dioxide.



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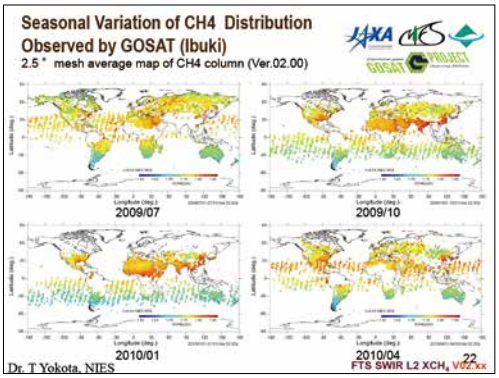
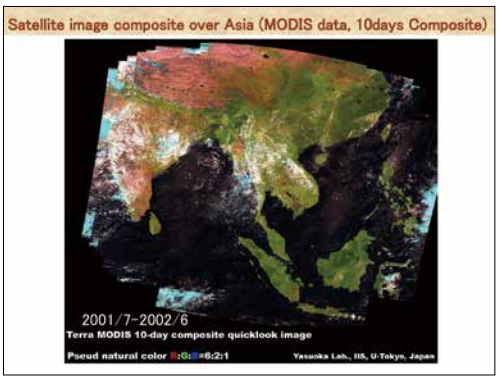
And this is for methane.



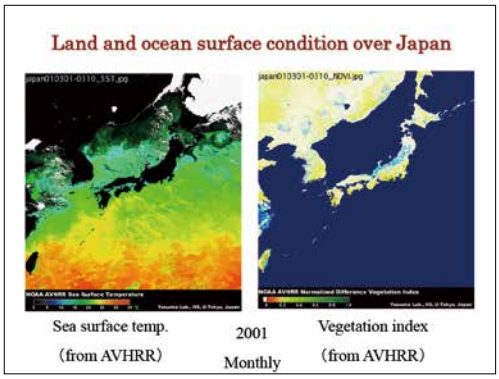
22

As for the land observation, this is seasonal, time-series land surface conditions observed by satellite. This shows the green cover condition.



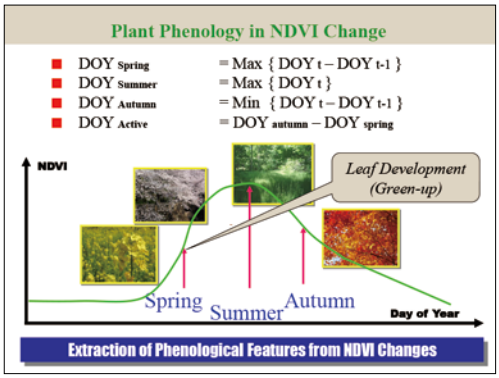
23

This is sea surface temperature. This is greenness on the ground. You can easily watch this one. But the students at my lab, they have been struggling with the original data. It is not so easy to produce this kind of data. They are crying everyday. But now, finally they can produce this kind of image.



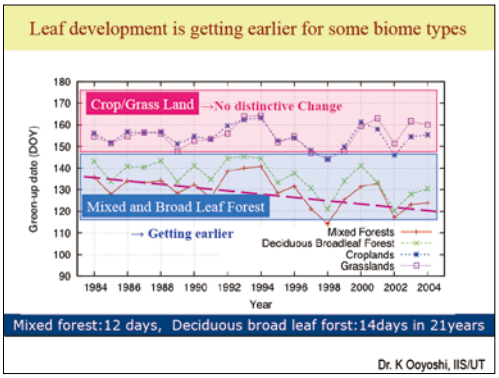
24

By watching, by observing the phenology of vegetation, spring, summer, autumn, if we detect the leaf open, leaf development days, leaf development green-up of the vegetation, we can monitor the trend of the vegetation condition.



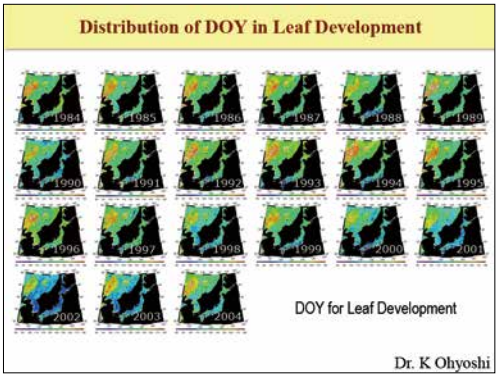
25

The leaf development is getting earlier and earlier. Twenty years ago, the leaf development occurred at the end of May, around one hundred thirty, or one hundred thirty five or one hundred forty days from January first. So this indicates that the green-up is getting earlier. I don't know if this would reach to January first. It may happen, it may not happen. Very tough question.



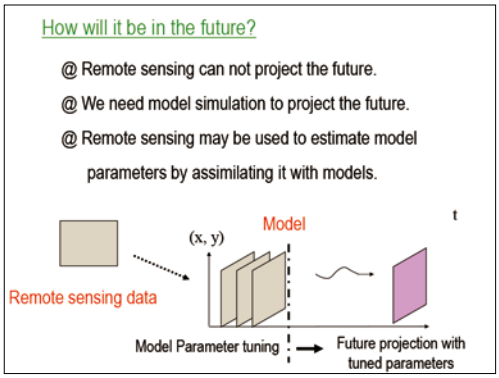
26

This is the spatial distribution of the day of the year in leaf development in the East Asian Region.



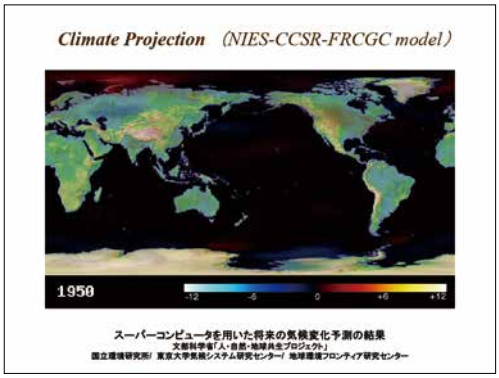
27

How would it be in the future? Remote sensing can observe in the past and today. But we cannot project the future from remote sensing but we can use model, physical model, climate model. And remote sensing data can improve the quality of models. We can tune the parameters of models with remote sensing data.



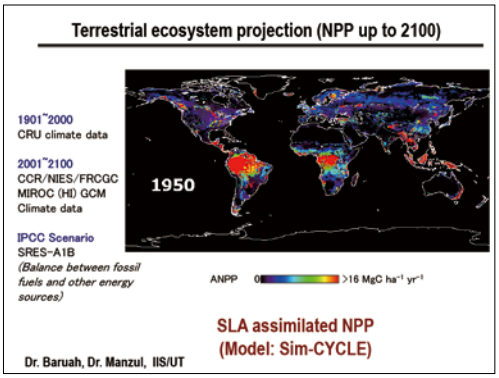
28

And this is the result, which I showed you already.



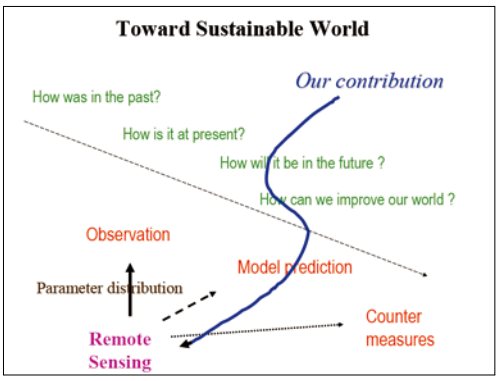
29

How is the vegetation condition in the future? Up to 2100, the vegetation gets active. Since they have a lot of carbon dioxide fertilization effect, they can enjoy. And temperature is increasing so vegetation would be active in the future. But in this model, no vegetation competition is taken into account. There should be a sort of competition between vegetation species. And also, we don't know if the temperature is over 2-degree Celsius increase, they can survive or not. We have very few information on that. Anyway, in this model simulation, Dr. Baruah and Manzul, they developed the model, terrestrial ecosystem model, to simulate the future.



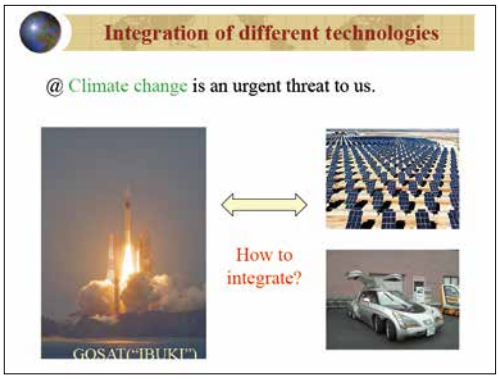
30

Towards sustainable society, we have to know how it was in the past, how it is at present, how it will be in the future. And also, we have to know how we can improve our world. Of course remote sensing can contribute a very small portion. We have to integrate all new technologies—countermeasure technologies and simulation technologies, social system improvement. We have to do everything.



31

Integration of different technologies is a critical component to tackle the climate change.



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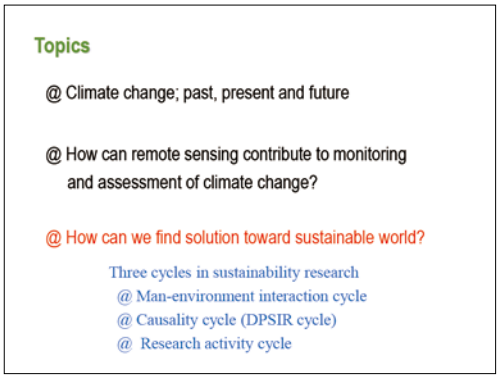
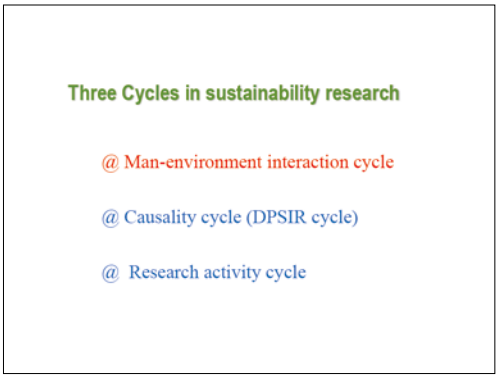
Last part is how we can find solution towards a sustainable world.



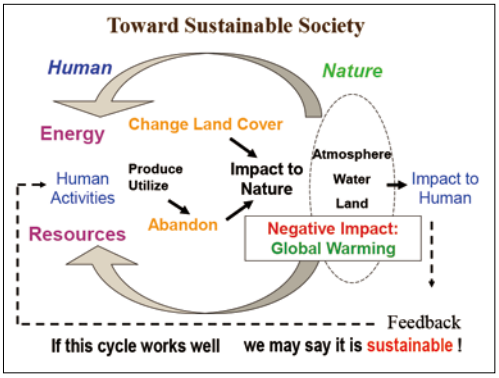
33

I would like to introduce three cycles: man-environment interaction cycle, causality cycle, research activity cycle. I would focus on this part.



34

Well, man-environment interaction cycle is this. We human beings use energy and resources from nature. And associated with that activity, we change our land and we abandon many things. Some of the impact would be negative to the human being. But we have to make this feedback sound, otherwise we would be collapsed. How to make this cycle sustainable and sound? This is our mission and this is the mission of this forum. If the cycle works well, we can say it is sustainable.



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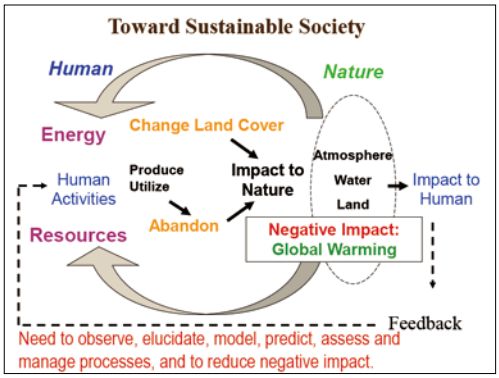
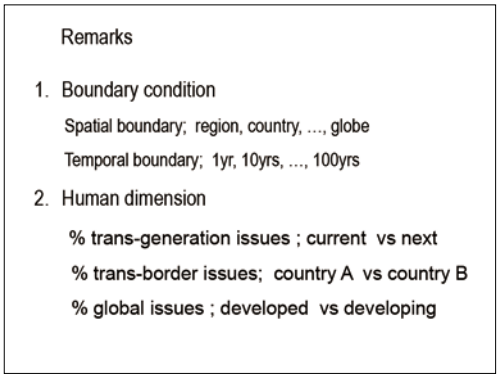
We have to observe, elucidate, model, predict, assess and manage processes to reduce negative impact. But be careful. This has a boundary. It depends on country basis, content basis or global basis. And also, I put two humans in this chart. If this human is current generation, and this human is next generation, this is a generation gap issue. Not generation gap. I'm sorry, I don't know it in English. In Japanese words, "sakiokuri."



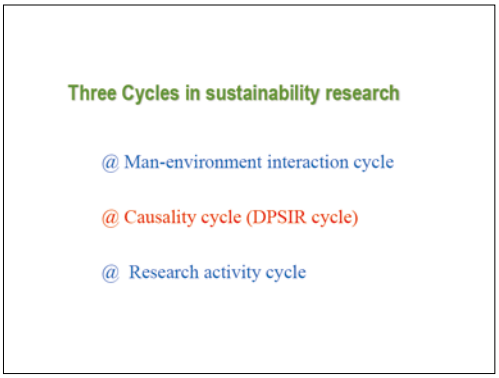
36

But anyway, so trans-generation issue, and here is trans-border issue. The left hand side human is in A Country, the right-hand side human is in B Country. This is trans-border issue. It is a sort of a national security issue. And also, it contains global issue. So we have to fully utilize new technologies. This is remote sensing. Remote sensing can observe land surface conditions, atmospheric conditions and simulate future conditions. We have to integrate everything, what is the causality cycle.



37

Due to the population increase, the CO_2 increase and the current state is the temperature increase we have. The impact would be in the temperature in the future or rainfall in the future. We have very serious impact. And by identifying the causality relations, we can do effective response for this cycle. This DPSIR cycle, this is developed in Europe. This is not my idea. The first cycle is my idea.



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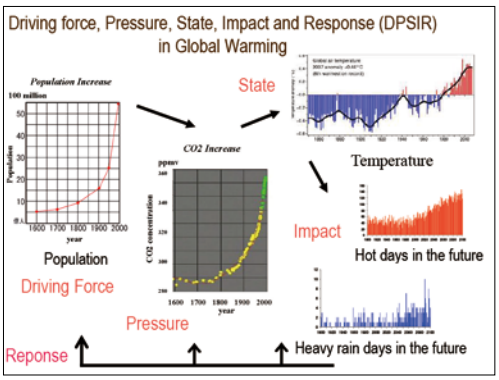
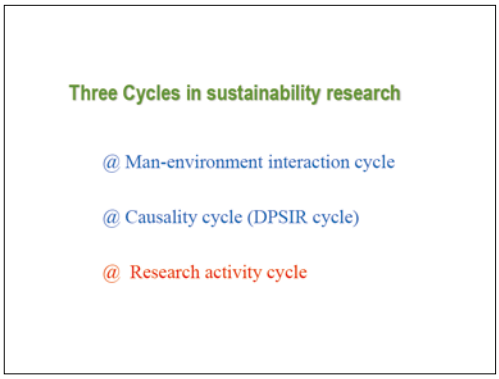


39

And next cycle, this is very important.



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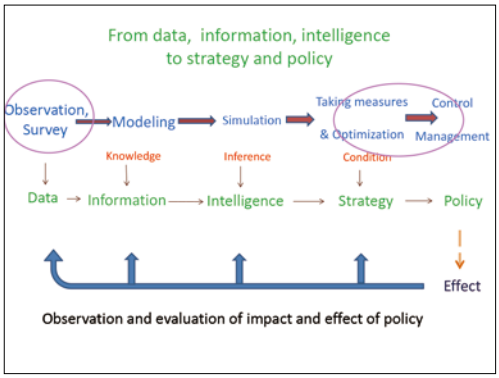
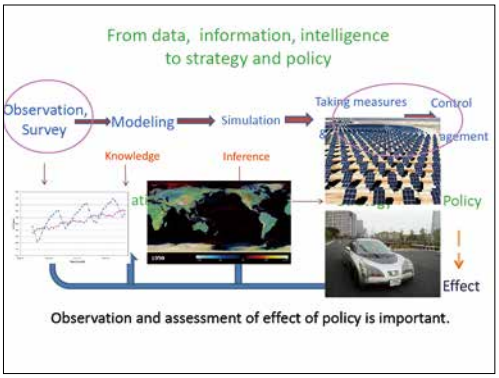
Observation, I'm in charge of this part. And we have to develop many measures or optimization. And we have to put these into policy. There is quite a gap between the observation and measures, and policies. But we have to link these together.



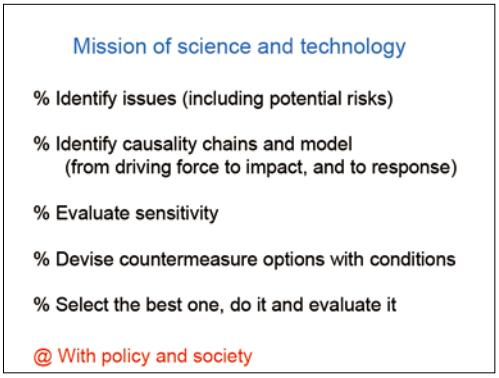
41

If we introduce new technologies, including solar panel or electric car, we can observe the effect of this policy. For Vietnam, we would introduce these new technologies. We Japan, would measure there CO_2 decrease in the future with GOSAT and will do. And we would simulate the future of your country introducing new technologies and we can observe the conditions in your country with these new technologies. These are the cycles.



42

The mission of science and technology is to identify issues, identify causality, evaluate sensitivity, devise countermeasures options and select the best one. Do the best with policy and society.



43

So far, all over the world, there are so many trials to tackle these issues how to combine science and technology and society.
UNESCO and ICSU declared Budapest Declaration. It stated that science should be for society, that science should be in society. In the last 20 years after this declaration, there have been many papers, scientific papers, there have been many new knowledges, still we have many problems. Problems that have not been solved yet—global warming, biodiversity loss. We have to do many things. For example, I would like to introduce to you the new program sponsored by JST and JICA, "SATREPS." This is the international collaborative research program to solve social problems.

SATREPS stands for the Science and Technology Research Partnership for Sustainable Development. Professor Yakushiji, over there, he is the commander of this program.

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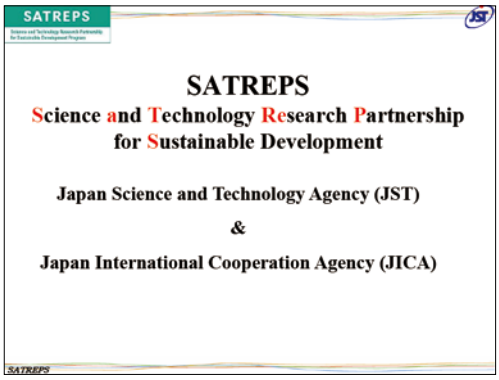

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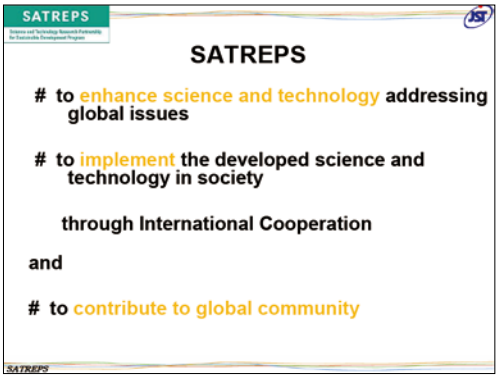
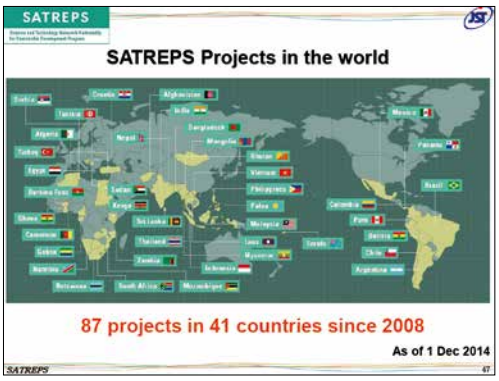
This is a very good program. Outside the school, there are so many cases developed in this research program.



46

So far, we have more than 90 projects, more than 90 projects are deployed over 40 countries. One project, the budget is one million US dollars per year, a very big project. So in total, the Japanese government invested a lot of money. So we need to fruit for the tax payer.



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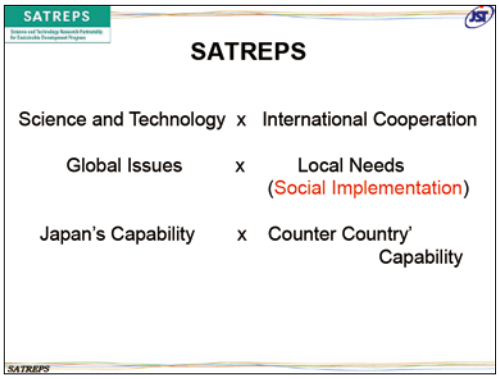
The SATREPS challenges are there. Science and technology should be done with international cooperation. Global issues and local needs. The final goal in this SATREPS program is how to do social implementation after this program.



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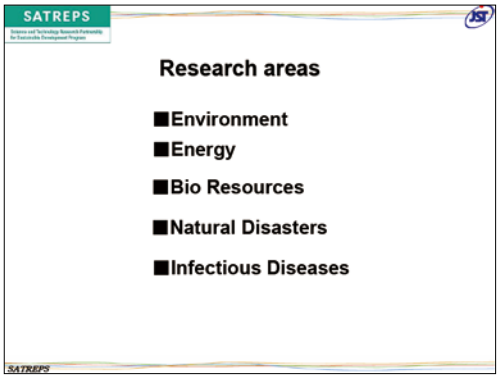
So we have to look for the final goal from the beginning with stakeholders. There are such areas—environment, energy, bio resources, natural disasters, infectious diseases. They cover many global issues.



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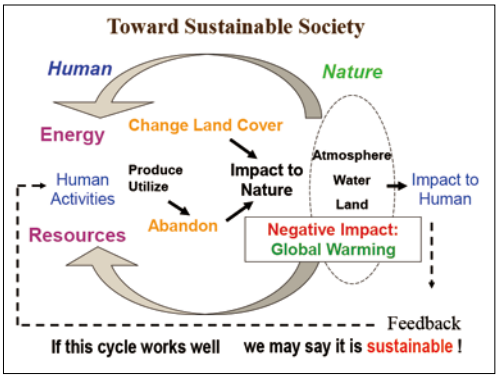
Again, please look at this chart. Please place your position in this chart. For example, some of you gave presentation on water quality treatment, some of you presented garbage processing this morning. But they are within the circle, within this cycle. So you have to recognize your position.



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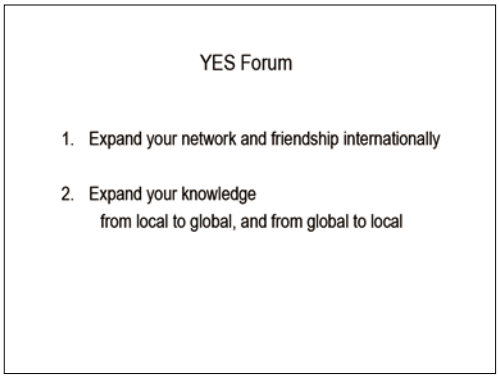
Any one single discipline cannot cover the whole issues.
Any one single technology cannot cover the whole issues.
Any one single organization cannot cover the whole issues.
Any one single country cannot cover the whole issues.
The base idea of the SATREPS program is to tackle these ones. So, we have to integrate all of these. We need to collaborate together and integrate all.

50

This Y-E-S forum is a very good opportunity for you to expand your networks and friendships internationally, and a very good opportunity for you to expand your knowledge from local to global, and from global to local. Thank you very much.



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Panel Discussion

Panel Discussion—Summary

1. Introduction

Panel discussion is deemed one of the most important agenda of our Honda Y-E-S Forum as it is a precious opportunity to further discuss in detail regarding the theme of the forum with an active participation from Honda Y-E-S Awardees of all the five countries (Vietnam, India, Cambodia, Laos, and Myanmar), honorable guest speakers, and audience. Most importantly, the discussion highlights key aspects of each country's challenges raised by the representatives from each country and especially solicits perspective and commitment of each representative in addressing the encountered problems and challenges. Additionally, the comments and experiences sharing from the honorable guest speakers and audience shed a light on the solution to the addressed problems of each country.

2. Content of Discussion

With facilitation from Dr. Sunami as a moderator, the panel discussion was conducted informatively and smoothly. The honorable guest speakers Dr. Fujita and Dr. Yasuoka gave their candid feedback on the presentations made by each country's representatives and the poster contestants. Dr. Fujita appreciated the fact that all representatives of each country had chosen well-established over advanced technologies to solve the problems prevalent in their respective nations. The appropriate technologies thus chosen are easier to implement and cheaper to finance. Their implementation would have far-reaching impact in relatively shorter time horizon. In addition, Dr. Yasuoka mentioned how the application of remote sensing could be deployed to deal with both global issues as well as local issues, as he raised the cases of eutrophication in Japanese lakes and the illegal dumping sites. He also diverted our attention towards the possibility to gauge and thus control the pollution emitted in each country.

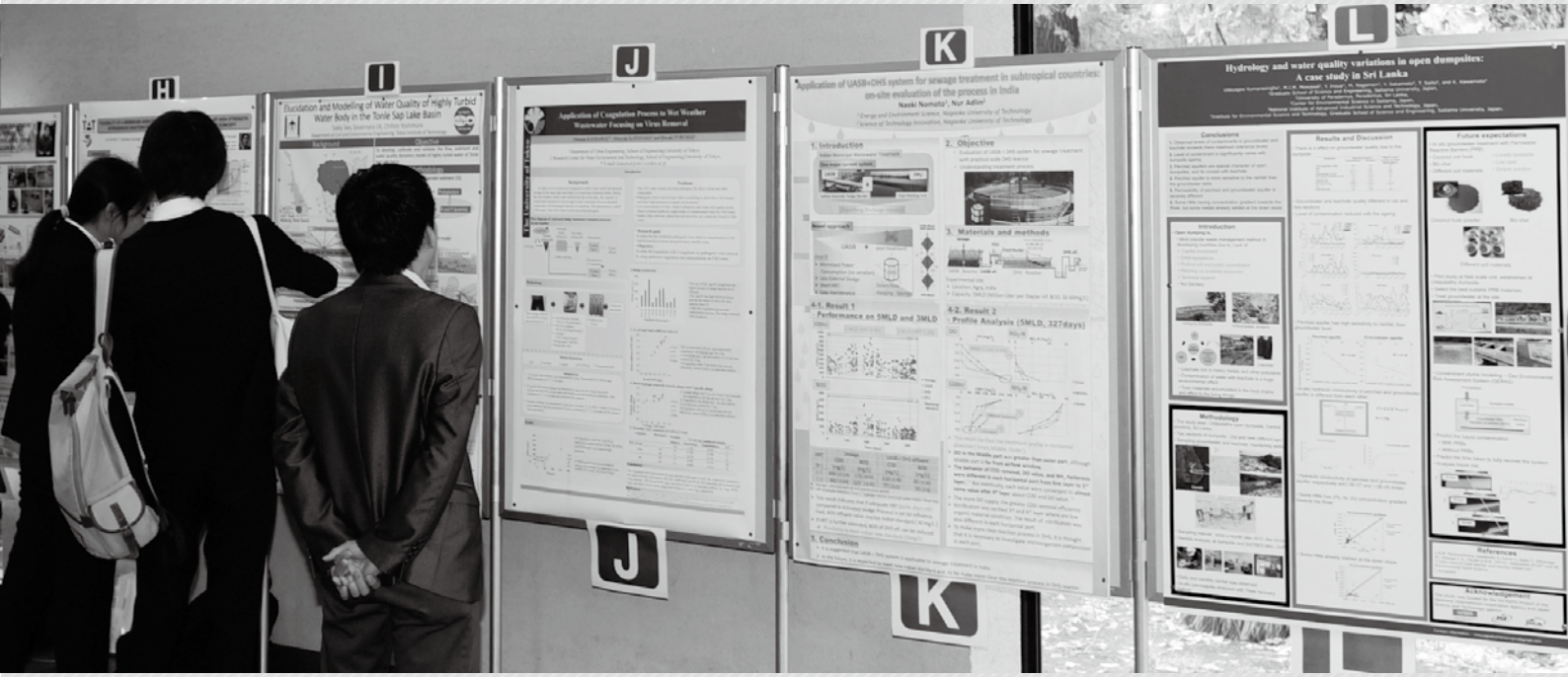
Remarkably, two questions raised by the moderator to Honda Y-E-S awardee panelists are; (1) "what are the common challenges that each country faces in implementing green technologies and controlling the pollution levels?" and (2) "what are the take away notes and what next actions would Honda Y-E-S awardee panelists take once they are back to their countries?". To respond to the first question, the representative from Myanmar mentioned the social and technical challenges by specifying the law

enforcement in the country. He also emphasized the importance of human factor as the most valuable but not-well-utilized resource. The representative from Laos addressed the lack of human resource, technology, and budget to deal with problems, while the representative from Cambodia also emphasized that the human factors, attitude and knowledge in particular, should be the common reason in the five developing countries, and along with it, resources and technology challenges should also be coped with at the same time. The representative from India raised the people's attitude problem and the political will, which affects the development goal of the country. In addition, the representative from Vietnam addressed the lack of cooperation between cross-border countries in the region. In the second question, the representative from Vietnam addressed his action plan in learning from the researches and pilot projects of the developed country. He also raised the point that developed countries should help the developing countries financially to solve the environmental problems. The representative from India mentioned that publicizing the available solutions and projects in tackling their problem is his action plan as he hopes to bring the projects and ideas to India to improve the country condition. Similarly, representative from Cambodia shared her action plan in spreading the awareness of the problem to people in her country and initiating the forum like Honda Y-E-S Forum as a place to discuss and seek for solutions to the problem. The representative from Laos shared his action plan in transferring the ideas from the developed country to his country and encouraging the people to think and seek for solution, and he emphasized his plan in sharing his knowledge and available data in this field to his students in class. The representative from Myanmar specified his plan in designing a solar charge controller in a customized way to provide easier fixing solution over the existing ones.

In facilitating the panel discussion, the moderator shared a few stories and experiences regarding the discussed topics. He mentioned the case of contaminated sea in Japan in the past decades, which does not allow people to swim due to the contamination level, and just recently, he heard that in upcoming summer in Tokyo the government would allow the Japanese people to swim in the sea to test if there are any side effects due to it. This simply means that Japan too has undergone and suffered the pollution problems in the past decades, and it should be time people have to wake up and clean those things up. Dr. Sunami shared another interesting story of a simple technology with sustainable energy which proved to be very useful for Japan during the earthquake in Fukushima. There was no electricity supply in the region during the aftermath of Fukushima meltdown and there was no way diabetic people could have got their diabetes tests done. Portable diabetes testing devices came handy during this strenuous time and saved many patients. He thought it could be a good example of simple technologies which were developed and proved to be effective in a developed country and also be applicable to developing countries.

During the panel discussion, there was active participation from audience also. A lot of questions are directed to both the guest speakers as well as the Honda Y-E-S Awardees. One of the questions asked for the guest speakers was to highlight the similarities and differences in technology they observed in the past and present. The questioner also commented that despite advancement in technology, human beings still face the same problem. Dr. Fujita pointed out the differences between experimental and practical work of researchers hinting that it could be the cause of differences, while Dr. Yasuoka pointed out that difference he noticed is the easy availability of open data from all over the world for research, unlike in the past when it required a lot of effort to obtain data from other countries. He also addressed the similarity that is to achieve the goal, hard work is needed. In addition, an audience asked a question to Dr. Yasuoka about his remote sensing project whether it contributes to the mitigation and adaptation of climate change. Dr. Yasuoka mentioned that some projects in remote sensing field actually respond to the mitigation and adaption to climate change. Another interesting question from a poster contestant is what each Honda Y-E-S Awardee as the future young scientist and engineer has done to contribute to the raised problem of their country. This question is one of core questions which was also asked by the moderator as it is interesting to know the young scientist and engineer's action plan in dealing with the problem in their own country.

Research Poster Contest



Research Poster Contest—Summary

1. Introduction

The research poster contest within Honda Y-E-S Forum 2015 has created a media for participating students to share, discuss and improve their research on the theme of environmental issues through networking with forum audiences.

2. Purpose

The primary purposes of the poster contest along with Honda Y-E-S Forum are (i) to acquire the clear picture of the essence of sustainable development, (ii) to foster innovative ideas for solutions to environmental pollution, (iii) to help students to network and develop technical skills by getting feedback on their work, and (iv) to implement a global network in order to strengthen the momentum of finding eco-friendly solutions.

3. Competition Scheme

Students who study at Japanese universities and graduate schools and who belong to research laboratories in the field of environmental issues and technologies (including foreign students in Japan) submitted abstracts of their works prior to the Forum. Each participant team was selected through the shortlisting of their submitted abstract. 24 shortlisted teams were given the opportunities to present their works at Ichijo Hall, the venue of the Forum. They were all sharing their ideas in front of their posters displayed in the atrium of the Hall. Furthermore, 14 out of 24 teams were selected to give an introductory presentation on the stage of the Forum.

The selection of two poster contest winners among top 14 was based on the decision of the judges, consisting of the guest speakers and the directors of Honda Foundation. The first place was awarded JPY50,000 with certificate of recognition for each member; and the second place was awarded JPY30,000 with certificate of recognition for each member. Besides, the team which got the most votes from the audiences out of 24 teams was presented an Audience Award.

4. List of teams

Many participating students are from countries in which Honda Y-E-S Award are implemented, and other developing countries in Asia, such as Vietnam, India, Cambodia, Myanmar, and Thailand. They have brought to the Forum a variety of solutions for environmental issues from different aspects. Many

of the teams conducted their research on novel technologies to enhance current environmental treatment system, or provided the design, verification and development of environmental friendly tools. Some others investigated the environmental parameters in a specific area to demonstrate the impact of some polluting factors. Moreover, some works suggested applying Japanese technology to developing countries. Social approach was also introduced in investigation of social awareness and behaviors on pollution, as well as economic aspect.

The diversity of participants and poster contents has enriched the discussion and networking in the Forum.

(Full entry list of Research Poster Contest can be found on page 78.)

5. Prize and winners

The First Prize goes to the team of ATEIA, Mohamed from Tokyo Institute of Technology for their work on "Magnetic carbon nanotubes: Regeneration methods and perspective for removal of chemical substances in wastewater". They test a simple method to synthesis Magnetic Carbon Nanotubes, in order to improve the elucidating the regeneration efficiency, the removal efficiency, and the adsorption capacity of organic pollutants.

The Second Prize was presented to the team of KAMEI, Tatsuru from University of Yamanashi for their work on "Development of simple groundwater treatment systems for developing countries: A case study of installation in Kathmandu, Nepal". They develop systems for removing heavy metal and nitrogenous compounds, which are feasible applications for groundwater treatment systems in Kathmandu, Nepal. This team also gained the Audience Award.

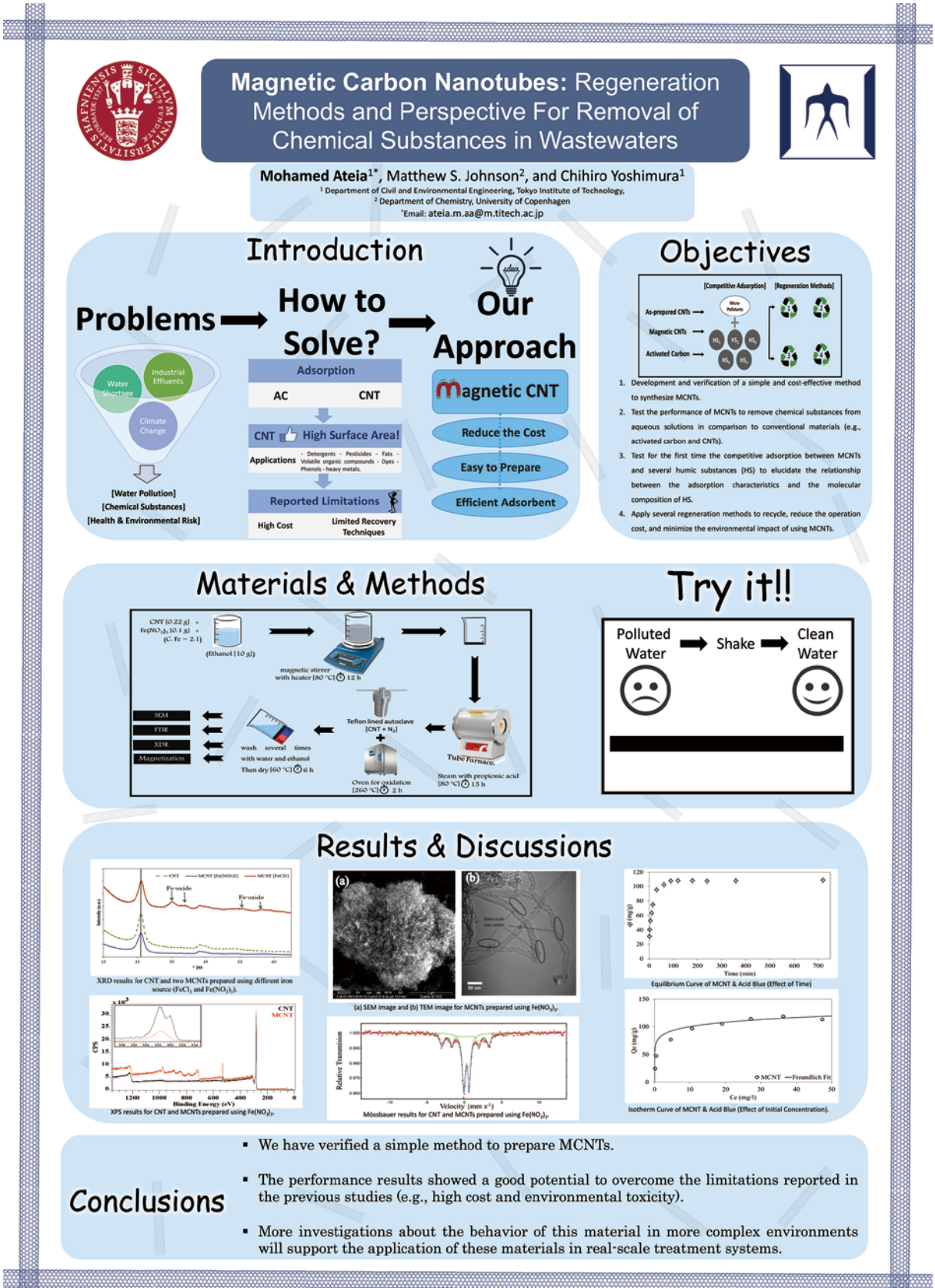
All other contestants also received the certificate and memento for their participation.

Entry list of Research Poster Contest

Team	Abstract Title	University	Name
Finalist for 1st, 2nd, and audience award			
A	Microbial Community Analysis for the Biofouling Prevention of Membrane Bioreactors in Advanced Wastewater Treatment	Osaka University	Takada, Kazuki
B	Magnetic carbon nanotubes: Regeneration methods and perspective for removal of chemical substances in wastewater	Tokyo Institute of Technology	Ateia, Mohamed
C	To Reduce Environmental Pollutions and Access Benefits From Waste Electrical and Electronic Equipment (WEEE) in Myanmar Using Japanese Recycling Technol-	Waseda University	Than, Win Maung Shungo, Hobo
D	Constructed wetlands for treatment of leachate from solid waste landfill in Southeast Asia : A Lab-scale feasibility study	Osaka University	A, Dan Fujii, Daiki
E	Improvement of Duckweed Hydroculture system using plant-microbe interaction for efficient water purification and biomass production	Osaka University	Ishizawa, Hidehiro Kaji, Yukiko
F	Investigation of capturing behavior of strontium by $CaCO_3$ as a method of removing radioactive strontium	Waseda University	Nakai, Akari
G	Development of simple groundwater treatment systems for developing countries : A case study of installation in Kathmandu, Nepal	University of Yamanashi	Kamei, Tatsuru
H	Feasibility of a membrane-aerated biofilm reactor for removal of high strength nitrogenous wastewater with minimum N_20 emission: Proof of concept	Tokyo University of Agriculture and Technology	Co, Thi Kinh
I	Elucidation and modelling of water quality of highly turbid water body of Tonle Sap Lake	Tokyo Institute of Technology	Siev, Sokly Uk, Sovannara
J	Application of coagulation process of wet weather wastewater focusing on virus removal	The University of Tokyo	Kansawat, Orawan Katayama, Hiroyuki
K	Application of UASB+DHS system for sewage treatment in subtropical countries: On-site evaluation of the process in India	Nagaoka University of Technology	Nomoto, Naoki Adlin, Nur
L	Hydrology and water quality variations in open dumpsites: A case study in Sri Lanka	Saitama University	Kumarasinghe, Udayagee
M	Assessment of air pollution caused by boats in Saen Saep canal, Bangkok	The University of Tokyo	Maw, Kay Khaing Kanazawa, Kaori
N	A high pressure jet device as an innovative technology for excess sludge reduction from an activated sludge system: A pilot-scale demonstration	Tokyo University of Agriculture and Technology	Yoshino, Hiroyuki
Participation for audeince award			
O	Environmental Impact caused by mining sector in Myanmar	Waseda University	Oo, Kyaw Swar Yagisawa, Makoto
P	Synthesis of Bismuth Selenide by Selenite-reducing Bacteria	Osaka University	Suda, Soshi
Q	Air Pollution in Bangladesh and lesson learned from the Japanese Solution	Waseda University	Mamun, Abdullah Al Takehiro, Uchida
R	Stakeholders involvement and its important toward ecotechnology in Vietnam	University of Tsukuba	Nguyen, Hong Son Kenichi, Matsui
S	Knowledge, perception and preventive behaviors on air pollution among mobile vehicles drivers in Bangkok, Thailand	The University of Tokyo	Wai, Kyi Mar Liu, Jaiqi
T	Evaluation of community structure and metabolic functions of sediment microbial ecosystems in brackish water and freshwater areas of Yodo River in Japan	Osaka University	Yamato, Mei
U	Integrated solid waste management in Nonthaburi province, Thailand	The University of Tokyo	Guragai, Bibas Gunawan, Patricia Angelina
V	Estimating agricultural water demand in the Kathmandu Valley, Nepal	University of Yamanashi	Tomoaki, Kozono Hiroshi, Ishidaira
W	Assessing knowledge on urban heat island phenomenon on human health in Bangkok, Thailand	The University of Tokyo	Muasa, Lilian Nakajima, Misaki
X	Identification of Bio-Fenton process in diatoms and its capability to degrade Antibiotics in aqueous medium	Waseda University	Vadakke Pariyarath, Ranjusha Inagaki, Yoshihiko

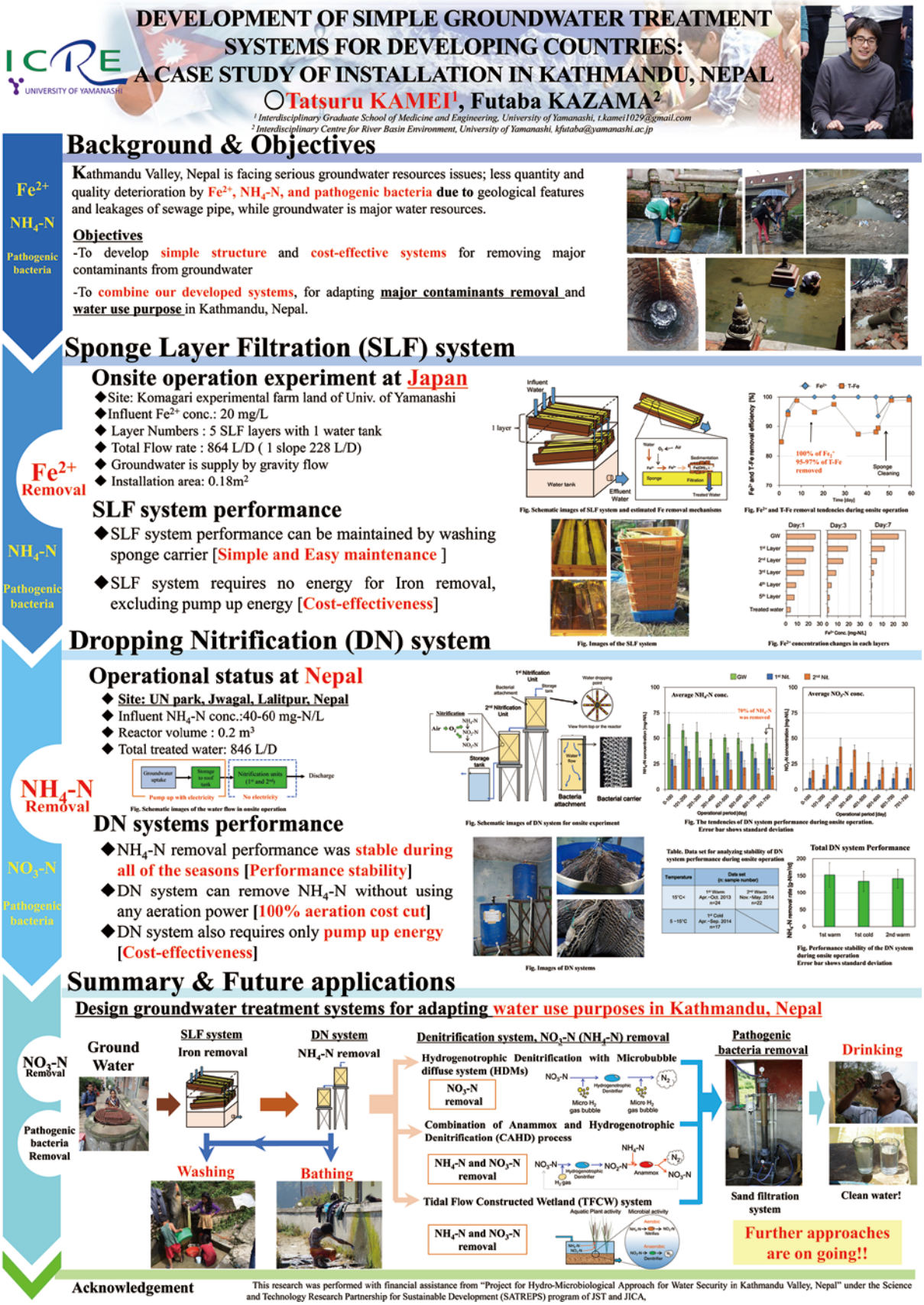
First Prize

"Magnetic Carbon Nanotubes: Regeneration Methods and Perspective for Removal of Chemical Substances in Wastewaters" by Ateia, Mohamed, Tokyo Institute of Technology



Second Prize

"Development of Simple Groundwater Treatment Systems for Developing Countries: A Case Study of Installation in Kathmandu, Nepal" by Kamei, Tatsuru, University of Yamanashi



Closing Remarks

Closing Remarks

Mr. Akira Kojima
Advisor, Japan Center for Economic Research

It has turned out to be a wonderful day. You may be physically tired, but mentally and spiritually you have been energized. I just want to congratulate you all on your beautiful presentations, participation, performances, and achievements, which have made this first Honda Y-E-S Forum very, very successful. I enjoyed feeling your high sense of mission and also strong passion. In the last session, you talked about the next action, so the mission, passion, action you shared, so you are committed to the future.

As for technology, technology is still very important. We are talking about innovation in Japan to get out of the secular stagnation that has happened over the last 20-something years in Japan. But innovation is something different from just technological improvement. It's more comprehensive, like has been discussed in this Forum.

An interesting episode is the inventor Edison, who was the founder of the General Electric Company. He was the inventor of the light bulb. This is a good invention technologically, but the bulb itself is not good enough. The bulb needs an electricity generator, but even that is not enough. You need to connect wires and have plugs, sockets, and converters, but in a short period of time Edison invented everything so it became applicable to our lives.

When he first invented this light, people were afraid that it was dangerous and so held a performance on Fifth Avenue in New York City where he put many charming young ladies on a big truck with bright light bulbs on their heads. This was a great performance so everyone began to enjoy this value added. So technology itself is very important but it must be applied to real life.

In this Forum, we discussed about technology related to the environment. You are issue orientated and that's great, but being solution orientated is now needed. In that sense, I enjoyed your very active participation with this orientation. Everybody must be feeling happy with their participation and I do hope that we can see you again and that this is going to be a good start for new entrepreneurs and enterprises based on this first, but not the last, Y-E-S Forum. This is a very important first beginning.

May I thank you again. Congratulations.

Closing Remarks

Ein Kaung
2014 Honda Y-E-S Awardee in Myanmer

Minasan Konbanwa. I do believe that you all have a very wonderful moment and also I think this event is totally knowledgeable. First, I thought remote sensing would be like some kind of remote control car with sensors but it was totally different. Also, as Dr. Yasuoka said, we must focus on one thing when we are still young. Dr. Fujita pointed out that new tech has very sharp point and so, we must look at the outcomes, mustn't we? These are the very wonderful remarks. Additionally, I would like to add one thing to this Forum. It is my conviction that technology has no boundary. I think so. Honda Soichiro said that technology should be for society. It should be truly contributing to the society and that is why, we are working for it. We are engineers and we are the great contributor to the development of our society.

Right now, the world is not just looked at as a village. I feel that this might be like a community size. We must learn what is happening outside our country. This is truly necessary and the things that we have got from this Forum are very invaluable. The posters are really amazing. I have got the chance to learn that even very simple things could mitigate the pollution problems and thank you for this, poster contest teams. I really enjoy and happy, the same as the awardees of the poster contest.

Last but not least, I would like to say "Thank You" to the Honda Foundation for granting us this great chance. In the next year, please do participate in the Forum and actively ask questions. Here I would like to quote what Morgan Freeman said on Discovery Channel and Discovery Science that science is questioning and question everything. We must question everything so that we can learn how to deal with our social needs. Thank you very much.

The Way Forward

Honda Y-E-S forum has been designed to create a platform for researchers, students, industrialists, and professors to discuss problems faced within the realm of ecotechnology. The student presentations and the poster competition provide means to understand the ongoing research under the broad theme of ecotechnology. The broad goal of the Forum is for the participants to learn from the research solutions presented and design more effective solutions to create a sustainable future.

Publicity

To achieve this, the focus should be on promoting the event to ensure higher international participation every year. In the future, the event could be held in different locations of the world to expand the student and research community involved in the Forum. The event should be promoted by the Y-E-S awardees in their respective Alma maters to promote ecotechnology as a highly evolving area of research and the Forum as an event to gain knowledge on this topic.

Alumni networking

Honda Y-E-S awardees must create a strong alumni network allowing the exchange of innovation and ideas. Y-E-S awardees who are currently working on in areas related to ecotechnology should be invited to the Forum to present their own research in order to motivate the participants.

Skill development

The organizing team of Honda Y-E-S awardees or Honda officials should organize a skills workshop wherein students could learn useful skills- "How to give a great presentation", "Best tools to present scientific data" etc. Students could also share their experiences in working for start ups, applications to graduate school and working for multinational companies.

The events in the Honda Y-E-S forum should be designed such that innovation in the field of ecotechnology is promoted, and a strong Y-E-S alumni network is created every year.

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2015

Honda Y-E-S Forum

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