

SATREPS and Beyond

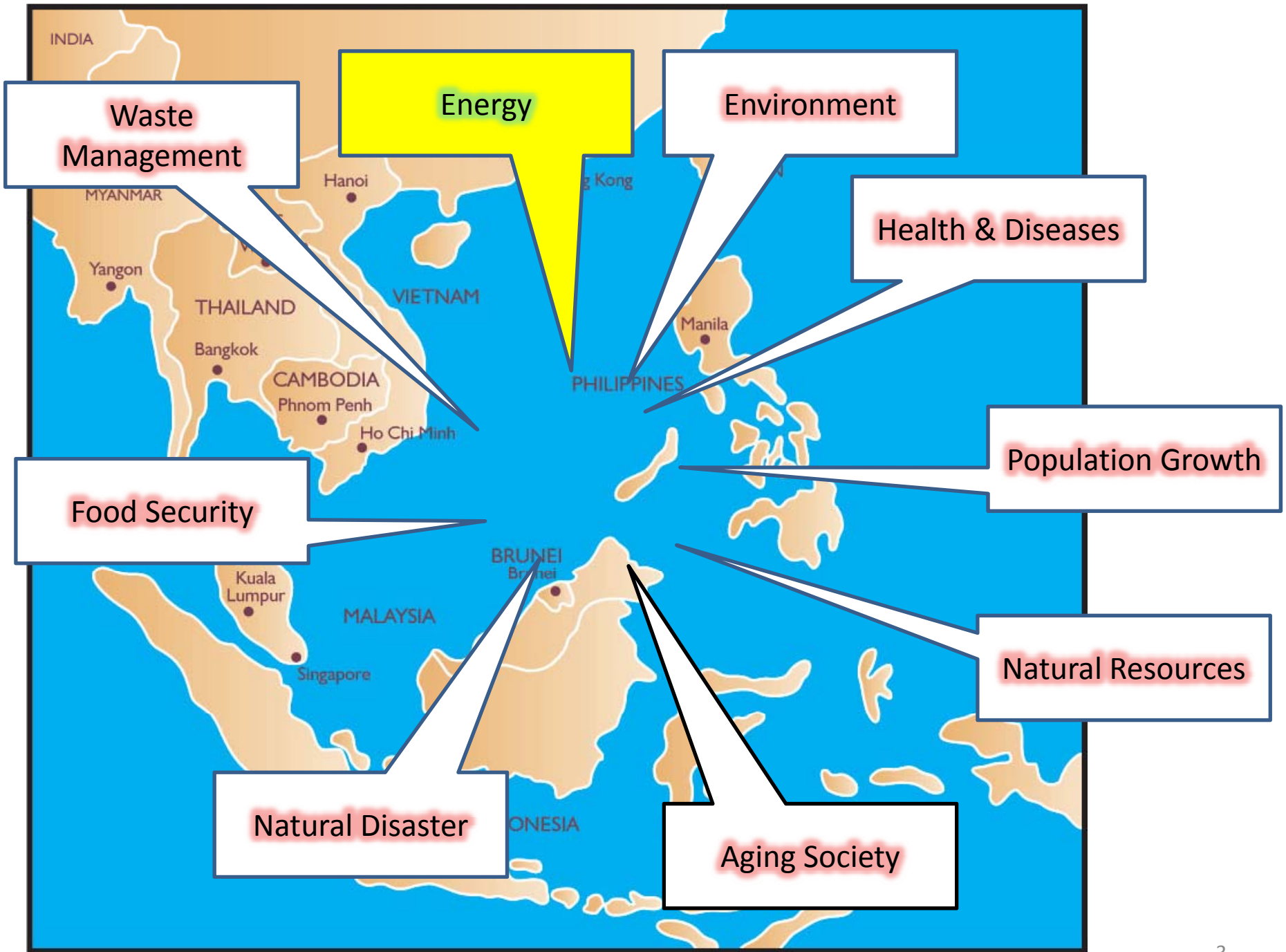
**Japan Science and Technology Agency
(JST)**

**Partnerships for Enhanced Engagement in Research
(PEER)**

**Science Participants' Conference 2013,
4 October, 2013
Bangkok, Thailand**



78 projects in 39 countries since 2008
41 projects in 13 Asian Countries



Four Birds with One Stone: Energy Production System Resolves All Problems at Once

Project Title	Multi-beneficial Measure for Mitigation of Climate Change in Vietnam and Indochina Countries by Development of Biomass Energy		Research Period	5 Years
Principal Investigator	Research Prof. MAEDA Yasuaki / Research Organization for University-Community Collaborations, Osaka Prefecture University 			
Collaborators	Ehime University, Osaka City University, Japan International Research Center for Agricultural Sciences (JIRCAS)			
ODA Recipient Country	Socialist Republic of Vietnam 	Counterpart Research Institutions	Vietnam National University, Hanoi (VNU-Hanoi), etc	
General Description of the Research Project				
<p>Vietnam faces serious problems: the 9 million ha of land contaminated with defoliants or devastated by activities such as slash-and-burn agriculture, the atmospheric pollution in urban areas resulting from rapid economic development, and the poverty in mountainous regions. The goal of this project is to plant trees in the devastated land and use them to produce oil as a feedstock for fossil-fuel alternatives, manufacturing clean fuels that can be used in urban areas. Not only would this resolve three issues at once — revitalize devastated land, prevent atmospheric pollution and create local jobs — it would also create a biomass energy production and utilization system that would be an effective means of mitigating climate change.</p>				

Storage Tank for agent orange at DaNang Air port



Cat Fish(6 months)



Cat Fish Fillet Production in An Giang(200,000t)

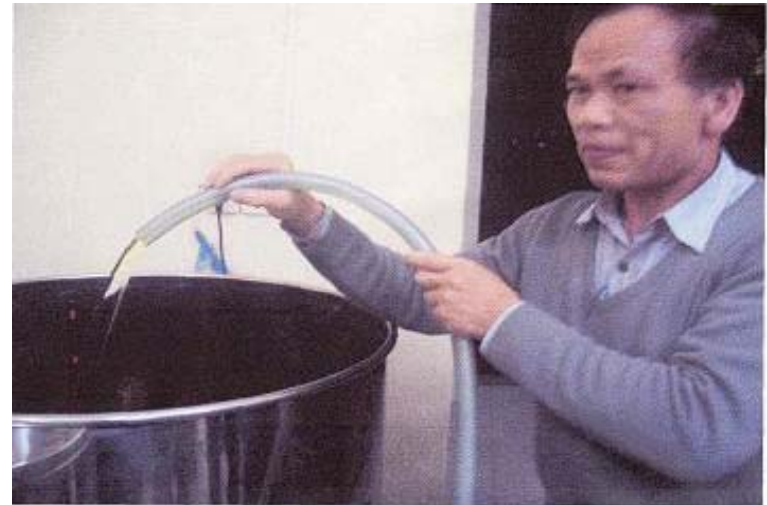


BDF made of Cat Fish fat

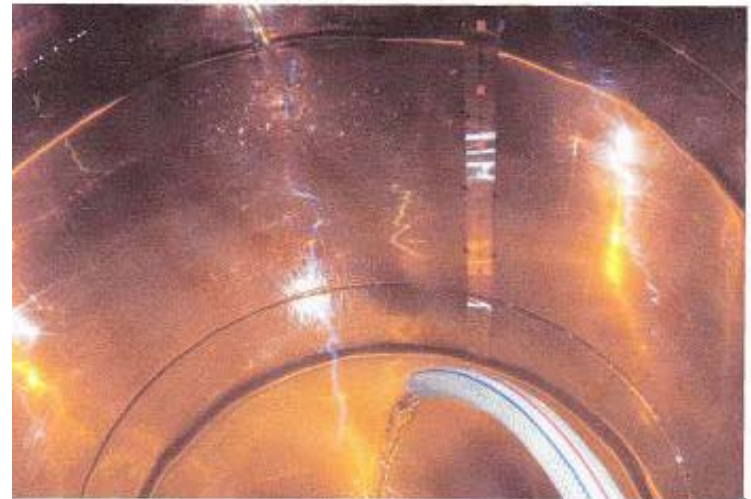
Cat Fish Fat Oil



BDF processed by Co-solvent Method



洗浄・乾燥後の最終製品 BDF



Boat for garbage Collection



[Co-solvent method]

<before reaction>

Conventional
Method
⇒heterogeneous

Co-solvent
homogeneous

Add 10% Acetone



<After reaction>

Conventional
⇒Excess amounts of MeOH



Co-solvent



Is it possible to use B100 BDF produced by Co-solvent method

Raw Material	inedible					Food
	Jatropha (%)	Tabaco (%)	Rubber(%)	Cat Fish(%)	Waste Cooking (%)	Soy Bean(%)
Saturated Fatty Acid	17.3 FFA(13%) Two step	9.4	15.8 FFA(49%)	35.2	11.6 35.6	16.2
BDFPurity (%)	99.1	98.8	98.2	97.8	97.5	97.8
Yield (%)	96.2	96.6	97.0	93.5	96.6	93.5
Co-solvent	○	○	○	○	○	○
BDF Raw Matrial	○	○	○	○	○	×

Practice “Zero Discharge” and Save the nature of Borneo island!

Project Title	Project on Promotion of Green Economy with Palm Oil Industry for Biodiversity Conservation	Research Period	4 Years
Principal Investigator	Prof. ASAMI Kenji / Faculty of Environmental Engineering, The University of Kitakyushu		
Collaborators	Kitakyushu Foundation for the Advancement of Industry Science and Technology , Kitakyushu International Techno-Cooperative Association		
ODA Recipient Country	Malaysia 	Counterpart Research Institutions	Universiti Putra Malaysia
General Description of the Research Project			
<p>The current palm oil industry is inefficient in utilization of resources in creation process, and discharge energy and biomass to the environment wastefully. Therefore, the Project aims to improve the situation by utilization of excess energy and biomass more efficiently with technology developed under the Project, resulting in improvement of environmental quality and conservation of biodiversity, and establishment of win-win situation between development and environment.</p> <p>“Zero-discharge” in the Project means that all by-products from mills will be transformed into useful biomass , energy and recycled water which are valuable or tradable as a result of improved energy efficiency and resource utilization in the process of palm oil production. The level of gasses (Sox and NOx) and particle matter discharged will be controlled under the regulatory standard, and methane from the biomass waste will be collected.</p>			

Background & Purposes



JICA Bornean Biodiversity Ecosystems Conservation Program Phase II (BBECII)

Purposes : Biodiversity conservation around the Kinabatangan, Sabah and creation of new green innovative industries. **Ramsar Wet land as litmus paper!**



Sabah State

- Nature
- Eco-tourism**
- Promising Income**
- Palm Oil
- Greatest Income**



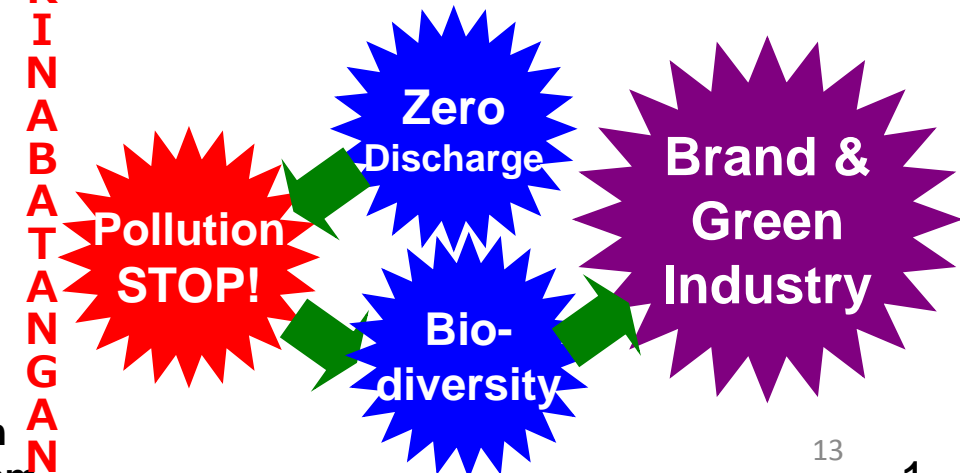
Palm Oil mil

⇒
POME



Anaerobic Pond

⇒
Treated Water
COD
>1000ppm
BOD<100ppm



Great Return to Green City



1960

1992



**From Death Sea to
Environmental Leadership
Awarded by UN (1992)
The Environmental Future
City (2011)
The OECD Green Growth
City (2011)**

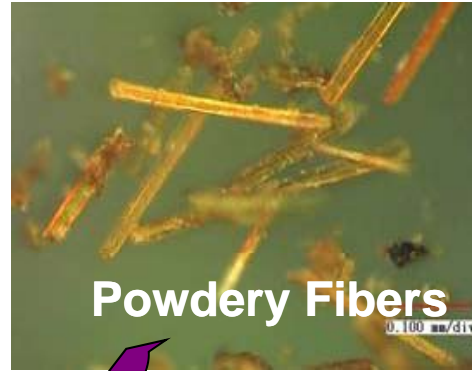
***Not only the environment but also industries greatly progressed!
New Nippon Steel Co. Mitsubishi Chemicals Co. TOTO etc.!!***

Production of Powdery Fibers by Superheated Steam



Bamboo

H_2O
 H_2O H_2O
 H_2O
 200~250°C
 Superheated Steam



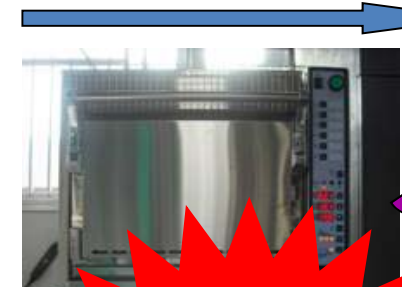
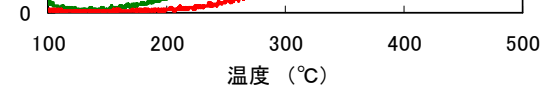
Powdery Fibers

Less Water Adsorption



残重量率

DTG



Odd smell
Volatilize!

Use of Excess Steam In Palm Oil Industry



Quickly Dry!

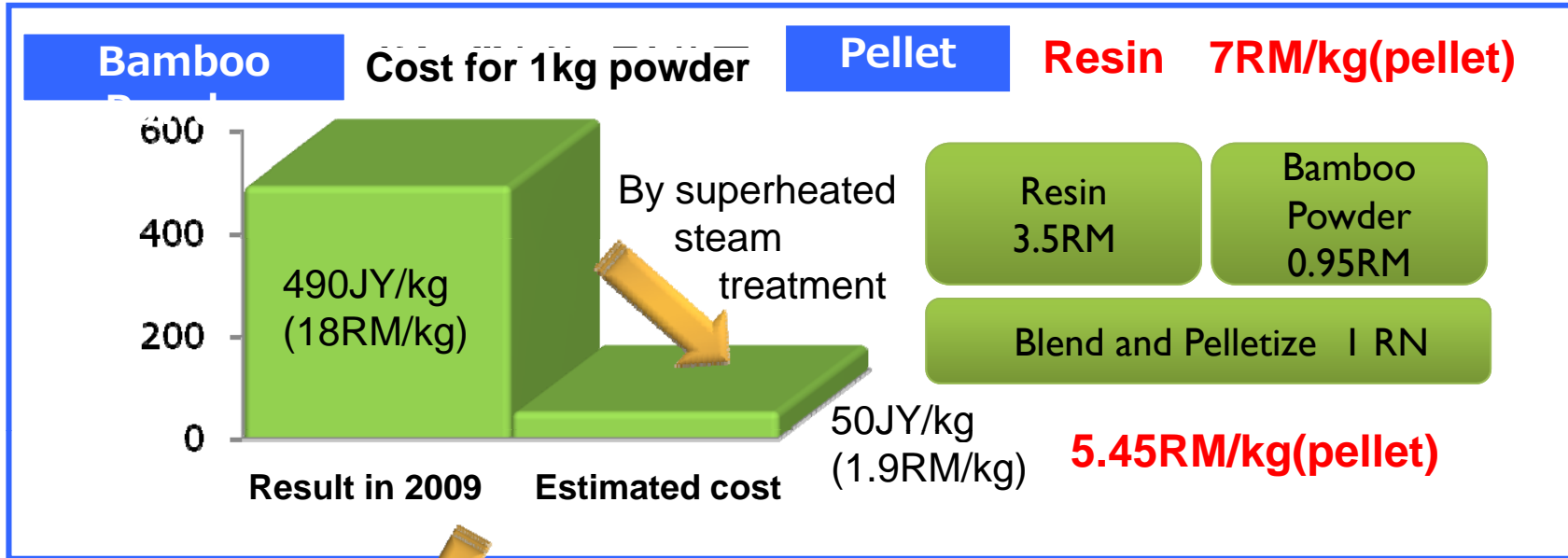
Break and Crash Biomass fillers with higher aspect ratios!

Higher Quality Biomass Composite!



Mesocarp Fiber

Cost for Biomass Composite in Japan



A. 標準サイズ B. サイズダウン C. サイズアップ

耐衝撃力: 95%, 射出スピード: 90%, 他条件全て同じ

Cost down



Higher Quality : More Elasticity, Size Stability

Plastics

High aspect ratio bamboo powder



More stable and larger amount of biomass (MF) from Palm Oil Industry

New “HiBD” Biofuel Can Use Waste Food Oils, Animal/Vegetable Fats and Oils, Etc.

Project Title	Development of New Biodiesel Synthesis in Thailand	Research Period	4 Years
Principal Investigator	Prof. ASAMI Kenji / Faculty of Environmental Engineering, The University of Kitakyushu		
Collaborators	Kitakyushu Foundation for the Advancement of Industry Science and Technology , Kitakyushu International Techno-Cooperative Association		
ODA Recipient Country	Kingdom of Thailand 	Counterpart Research Institutions	Chulalongkorn University
General Description of the Research Project			
<p>New technological and social development for the utilization of bio-based fuels is strongly required to harmonize both economic growth and improved living standards with environmental problems in South-East Asian countries like Thailand. This project aims at developing a new technology by which high quality diesel fuel can be produced at high energy efficiency with a simple process. Specifically, a low-cost and environmentally-friendly processing method will be developed for making aliphatic hydrocarbons for diesel fuel through the decarboxy-cracking of triglyceride over solid catalyst. The method will be disseminated as a novel bio- fuel production which is different from Fatty Acid Methyl Ester (FAME) or Hydrocracking process.</p>			



Reducing CO2 Emissions with Vehicle Biofuel Made from Non-edible Vegetable Oil

Project Title	Innovation on Production and Automotive Utilization of Biofuels from Non-food Biomass		Research Period	5 Years
Principal Investigator (Affiliation)	Dr. YOSHIMURA Yuji / Research Center for New Fuels and Vehicle Technology-AIST			
Collaborators	Waseda University			
ODA Recipient Country	Kingdom of Thailand		Counterpart Research Institute	NSTDA, TISTA, KU, KMUTNB, etc
General Description of the Research Project				
<p>Using Jatropha as a biofuel feedstock that does not compete with food crops</p> <p>The utilization of biofuels in the transportation sector could help to mitigate global warming, but because of the risk that production of biofuels derived from grains or vegetable oil will compete with food crops, there is a demand for manufacturing technologies that exploit nonfood sources of biofuel. For this project we are cooperating with Thailand, which is the Asian automotive production hub, to develop the production technologies of fuels from Jatropha, an inedible plant. We are also conducting engine tests and developing the automotive utilization technologies, as well as estimating CO2 emission reduction benefits through life cycle assessments.</p>				

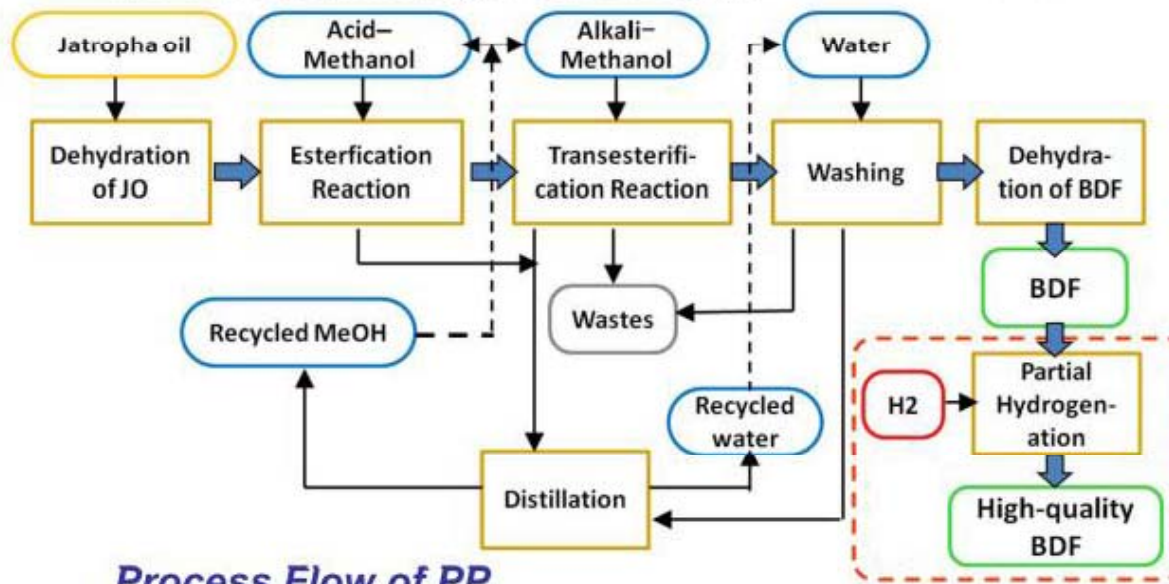
3-6. High-Quality BDF Production PP (1.0 ton/day) @TISTR AIST



BDF Production Unit (1.0 ton-BDF/day)



BDF Upgrading Unit (partial hydrogenation of polyunsaturated FAME)



Process Flow of PP





High-quality BDF

1st generation BDF
→ 1.5th generation BDF





Integrating Agriculture with Locally Self-sufficient Bio-energy Generation in Asia

Project Title	Sustainable Integrations of Local Agriculture and Biomass Industries	Research Period	5 Years
Principal Investigator (Affiliation)	Prof. SAKODA Akiyoshi / Institute of Industrial Science, The University of Tokyo		
Collaborators	National Agriculture and Food Research Organization		
ODA Recipient Country	Socialist Republic of Viet Nam		Counterpart Research Institutions
General Description of the Research Project			
<p>Population growth in Vietnam has led to a number of serious problems including food and energy shortages, environmental degradation, and poverty. We are seeking to address these problems by designing systems and developing relevant technologies for integrating locally self-sufficient, sustainable agriculture with sustainable energy in the form of biomass. We are focusing in particular on the construction of a plant that puts these ideas to the test by manufacturing bio-ethanol from rice straw and biogas from domestic animal manure.</p> <p>From experimentation to verification: operating a biomass plant with sights on practical implementation</p> <p>We installed an experimental bio-ethanol plant on the grounds of Ho Chi Minh City University of Technology and are conducting pilot operations while providing local personnel with on-site technical training.</p>			

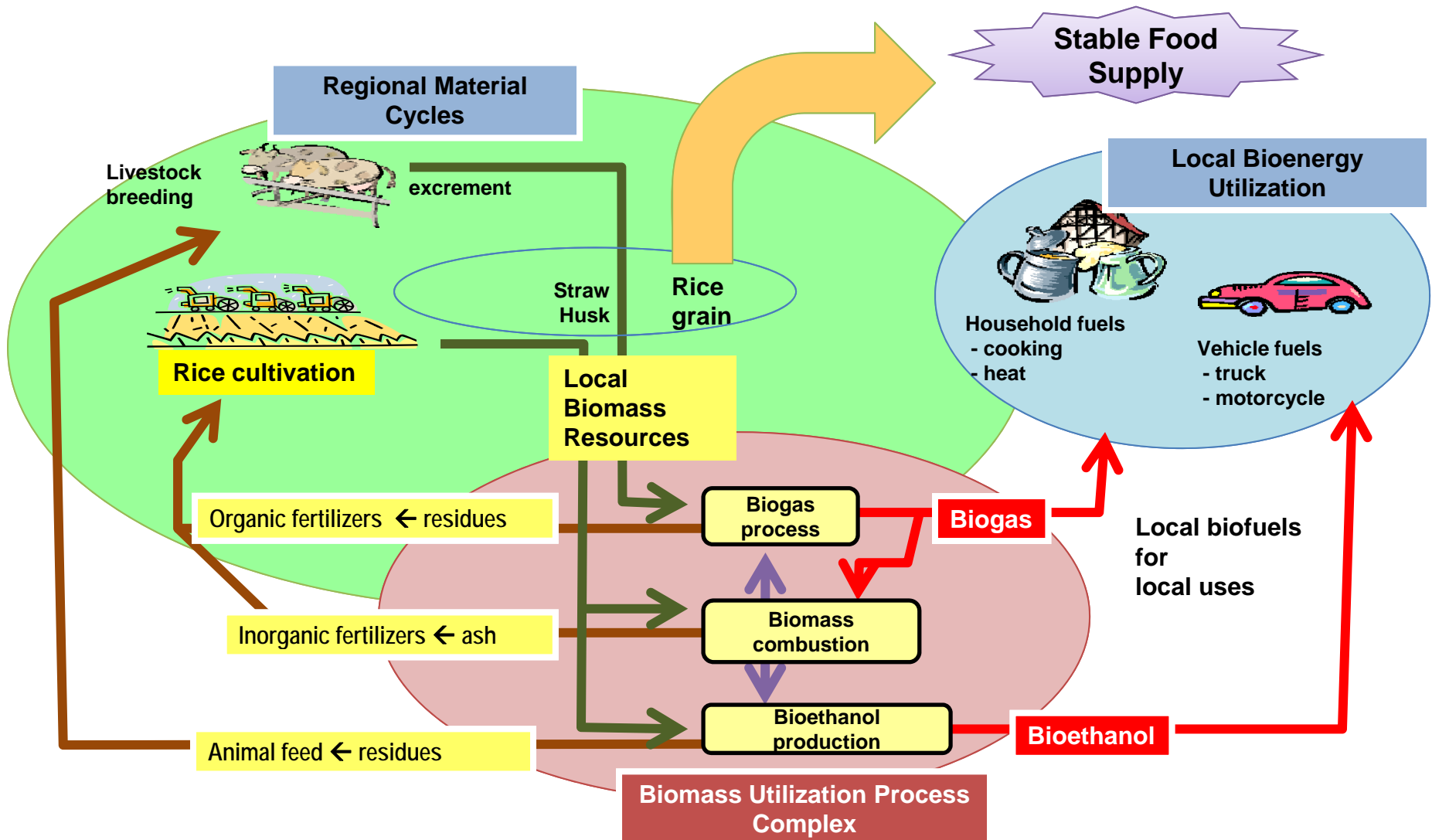
Objectives:

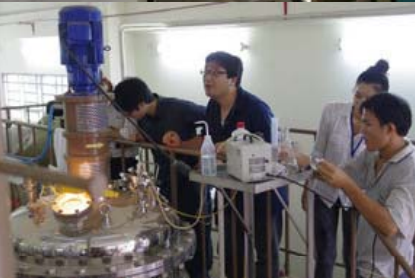
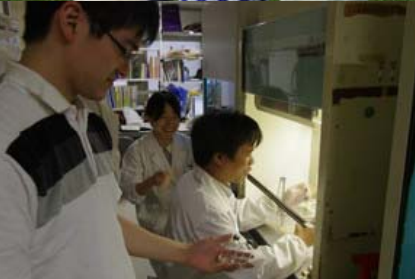
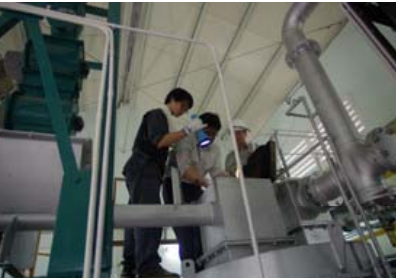
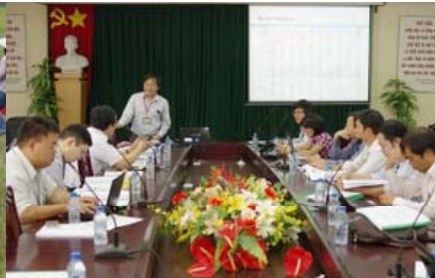
A model of "Sustainable Integration of Local Agriculture and Biomass Industries" is developed and demonstrated in an area of Southern Vietnam, focusing on biomass conversions for the production of biofuels, such as bioethanol and biogas, and bio-based materials.

Outputs:

- (1) A methodology for designing "Sustainable Integration of Local Agriculture and Biomass Industries" is developed.
- (2) Small-scale regional biorefinery processes based on the concept of local production of biofuels and bio-based materials for local consumption are developed and demonstrated.
- (3) Key technologies for biorefinery processes, including production technologies of biofuels and bio-based materials, are studied and developed. "Sustainable Integration of Local Agriculture and Biomass Industries"

An Example of Sustainable Biomass Towns in Asia









New “HiBD” Biofuel Can Use Waste Food Oils, Animal/Vegetable Fats and Oils, Etc.

Project Title	Development of a New Biodiesel Production and its Utilization	Research Period	4 Years
Principal Investigator	Prof. FUJIMOTO Kaoru / Faculty of Environmental Engineering, The University of Kitakyushu 		
Collaborators	Kitakyushu Foundation for the Advancement of Industry Science and Technology , Kitakyushu International Techno-Cooperative Association		
ODA Recipient Country	Kingdom of Thailand 	Counterpart Research Institutions	Chulalongkorn University
General Description of the Research Project			
<p>New technological and social development for the utilization of bio-based fuels is strongly required to harmonize both economic growth and improved living standards with environmental problems in South-East Asian countries like Thailand. This project aims at developing a new technology by which high quality diesel fuel can be produced at high energy efficiency with a simple process. Specifically, a low-cost and environmentally-friendly processing method will be developed for making aliphatic hydrocarbons for diesel fuel through the decarboxy-cracking of triglyceride over solid catalyst. The method will be disseminated as a novel bio- fuel production which is different from Fatty Acid Methyl Ester (FAME) or Hydrocracking process.</p>			

Creating Drugs Effective against the Dengue Virus from Human Beings

Project Title	Research and Development of Therapeutic Products against Infectious Diseases, especially Dengue Virus Infection		Research Period	4 Years
Principal Investigator	Prof. IKUTA Kazuyoshi / Research Institute for Microbial Diseases, Osaka University			
Collaborators	None			
ODA Recipient Country	Kingdom of Thailand		Counterpart Research Institutions	Department of Medical Sciences (DMSCs) Ministry of Public Health
General Description of the Research Project				
<p>Dengue fever is a viral disease spread by mosquitoes that infects 50 million people living in the tropics every year, with 250,000 suffering seriously as a result, but no effective therapies have yet been discovered. They are studying patients and microorganisms from Thailand to contribute to the development of drugs effective against dengue fever. Since the human body creates proteins (antibodies) to combat the dengue virus, they are investigating these proteins to find any that appear particularly effective against the virus.</p> <p>They discovered target antibodies and now are testing one of them on Marmosets in Japan. They are now applying to PCT (WO2013035345)</p>				



<http://www.jst.go.jp/global/english/index.html>

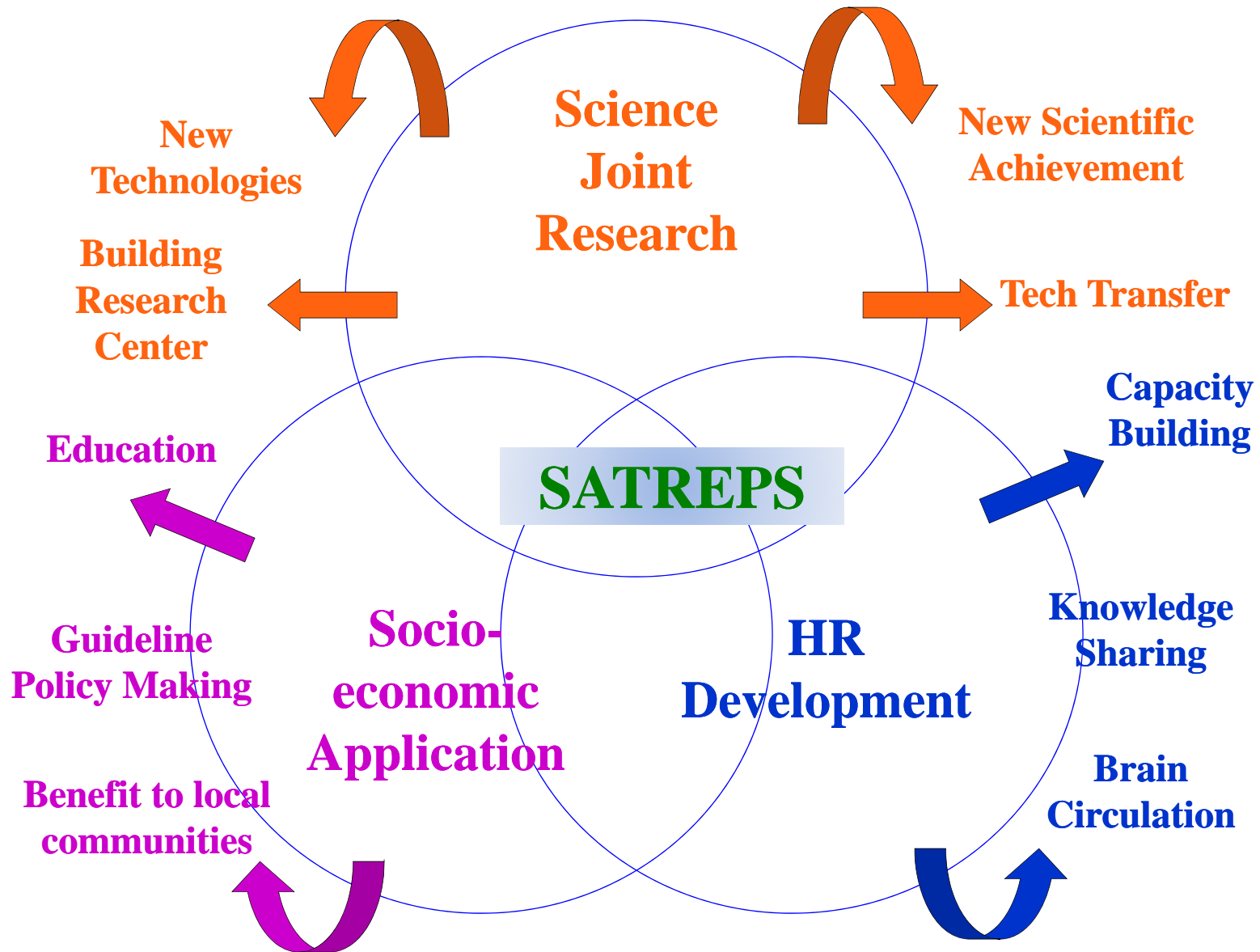
The screenshot shows the SATREPS website homepage. At the top, the SATREPS logo is followed by the tagline "For the Earth, For the Next Generation". Navigation links include "About SATREPS", "Case Studies", "Projects", "Access for Research Institutions", and "Friends of SATREPS". A main banner features a photo of researchers in a forest and text describing SATREPS as a JST and JICA program for research projects targeting global issues. Below this, the "Case Studies" section is divided into categories: Environment and Energy, Bioresources, Natural Disaster Prevention, and Infectious Disease Control. Each category has a featured project with a thumbnail image and a brief description. On the right side, there are sections for "JICA Japan International Cooperation Agency", "Friends of SATREPS", "Access for Research Institutions" (with buttons for "Research Fields & Areas" and "Invitation of Research Proposal"), and "Contact Us" (with contact information for the JST Research Partnership for Sustainable Development Division). At the bottom, there are links for "More about SATREPS: YouTube videos" and "SATREPS Projects Around the World".

www.jst.go.jp/global/english

A project for earthquake and tsunami mitigation

Video clips of projects at youtube site

SATREPS is not just a joint research program!



Thank you!

Masahito@jstsg.org

Funding for Science and Technology R & D in Japan

Please visit <http://www.jst.go.jp/>

Japanese governmental Science and Technology System

Ministries	Funding Bodies	R&D Performance
MEXT Min. of Education, Culture, Sports, Science & Technology	JSPS Japan Society for the Promotion of Science JST Japan Science and Technology Agency	Universities etc 758schools (National+Public+Private) National Institute RIKEN NIMS JAXA JAEA NIED etc
METI Min. of Economy Trade & Industry	NEDO New Energy & Industrial Technology Developing Organization	National Institute AIST Advanced Industrial Science and Technology

Japanese Innovation Scheme

