



Initiatives of the Malaysia-Japan International Institute of Technology (MJIIT) in University-Industry-Government (UIG) Partnership for Achieving the SDGs

SDGsの達成に向けたマレーシア日本国際工科院(MJIIT)の産学官連携の取り組みについて

Shohei Matsuura, PhD JICA DRR Advisor / Visiting Associate Professor

Speaker's profile

Shohei Matsuura, PhD

JICA Expert / Visiting Associate Professor

Malaysia-Japan International Institute of Technology, UTM KL



1998-2005 Ministry of Foreign Affairs

2005-2007 UNDP (Philippines), Programme Officer

2007-2012 JICA (Tokyo, Vietnam), Programme Officer

2012-2014 Kyoto University, Researcher

2014-2016 JICA DRR Advisor (Fiji)

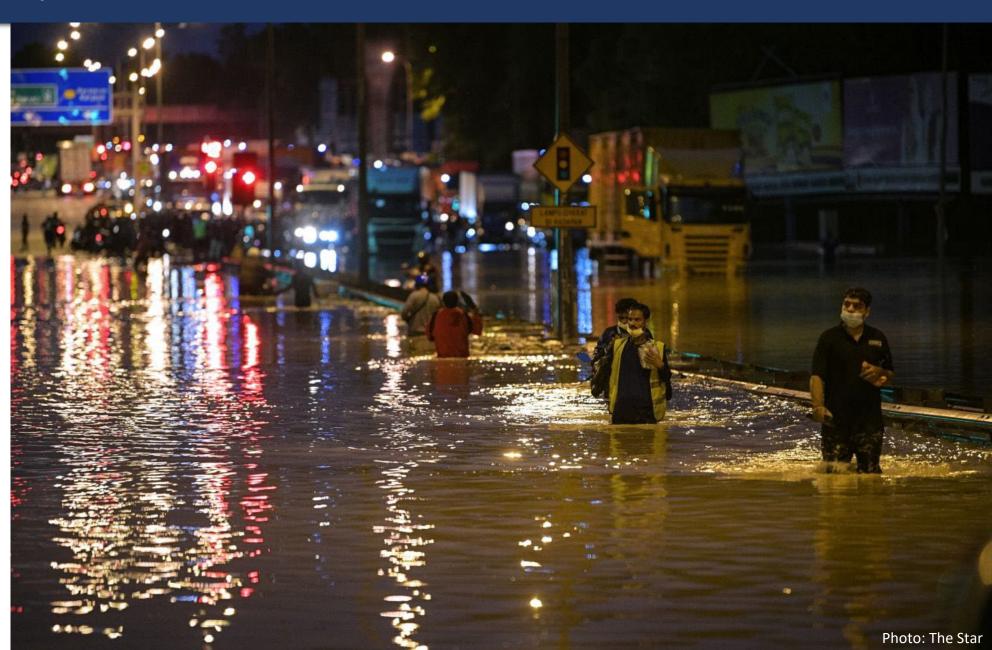
2016- JICA DRR Advisor to MJIIT (Malaysia)





Disasters in Malaysia

2021-2022 Malaysian floods (under COVID-19)



Disasters in Malaysia

Effects on Japanese industries



マレーシア洪水 日系メーカーに影響 長期化 で半導体影響も懸念

2021年12月21日 19時09分

マレーシアで発生した洪水のため「トヨタ自動車」の現地工場が稼働を停止するなど、日 系メーカーに影響が出ています。

マレーシアには半導体関連の工場も集まっているだけに、事態が長期化する場合、世界の サプライチェーン=供給網への影響も懸念されます。

マレーシアでは、今月18日まで降り続いた大雨で洪水が発生し、現地メディアによりま すと、首都クアラルンプール近郊のセランゴール州などで、少なくとも14人が死亡し、6 万人以上が避難を余儀なくされています。

NHK 21 Dec 2021

State of Selangor, consisting of about 40% of Japanese investment to Malaysia, received significant damage and loss from the flooding in 2021-2022

NNA Asia 21 Dec 2021

大規模水害で物流などに支障

道路網が寸断、日系の操業停止も

経済 2021年12月21日

🕠 記事を保存







マレー半島中央部で17日から降り続いた大雨による洪水の影響が、マレーシアの首都圏で広がった。国内有数の工業 地帯と港湾を擁するスランゴール州では多くの道路が寸断され、物流に支障が出た。日系企業でも浸水や停電で操業を 停止した工場が出ている。20日までに首都圏などでの大雨警報は解除され、浸水した地域でも徐々に水が引いてはい るが、復旧には少なくとも数日を要する見通しだ。

IETRO

JETRO 22 Dec 2021

国・地域別に見る▼ 目的別に見る▼ 産業別に見る▼

ビジネス短信

ビジネス短信のコンテンツ一覧 🚯

マレー半島の洪水被害、日系企業の操業にも深刻な影響 **ー** (マレーシア)

6 💆 🙃 🖸

マレーシアでは、半島中央部を中心に12月17日から18日にかけて豪雨に見舞われ、日系企業の操業にも影響が出 ている。雨は19日には弱まり、気象局も警報を同日解除したものの、クランタン州、クアラルンプール、マラッカ 州、ヌグリ・スンビラン州、パハン州、セランゴール州、トレガヌ州が影響を受けた。「100年に一度」とも評され る洪水被害により21日時点も浸水は続いており、道路の寸断による物流停滞や被災した工場の生産停止などが報告さ れている。

ジェトロが21日までに現地日系企業などから集めた情報によると、多くの日系企業が集積するセランゴール州シャ アラム地区では、床上浸水、変電所の損傷による電力供給の寸断、従業員と連絡が一時取れなかったケースなどが発 生し、21日時点で操業再開のめどが立たない企業もある。クラン川支流の運河沿いに工場のある企業では、洪水も想 定して立地を底上げしていたものの、膝下まで水没したとの報告もある。また、地元メディアによると、同シャアラ ム地区の大手電機製造企業は20日、被災した機械や設備の状況把握に1週間程度は要する見込みで、当面は主力製品 の製造を中止すると発表している(「エッジ」紙12月20日)。

Disasters in Malaysia

History and characteristics of floods in Malaysia

(出典:DID 2022)

FLOOD CONDITION



10.1% (33,298 km2)

Flood Prone Areas

21% (5.7 million people)

Exposed to flood risk

RM36 (USD9) billion

Annual Average Damage (AAD)

Source: Updating of Condition of Flooding and Flood Damage Assessment in Malaysia, 2012



Monsoonal Flood

Seasonal flood due to extreme rainfall for long duration during the Northeast Monsoon (Nov-March). The worst monsoonal flood in December 2014 hits 6 state with record of 30% (1000mm) annual rainfall fell in 10 days.

TYPE OF FLOODS



Flash Flood

Flash flood due to high intensity short duration rainfall occurs mostly at urban areas coupled with inadequate drainage and storage system. Smart Tunnel engaged 3 times to operation mode IV, in 2012 after a heavy downpour (230mm/5 hour) & (132mm/2hour)



Coastal Flood

Backwater effect from tidal influence affecting lower reaches. Major coastal flood in September 2016 hits 4 state (Selangor, Pulau Pinang, Perak & Kedah) at more than 44 locations

MAJOR CAUSE OF FLOODS

Extreme Rainfall	Tidal Effect	Low Lying Areas
>60mm/hour (urban) & >6 hours continuous rainfall (rural)	High tide varies from 1.8-6.1m combine with storm surge	61% peninsular less than 100m above sea level
Land Development	Discharge Increase	River Obstruction
Land clearing without MSMA/ESCP compliance	0-40% development, Q increase 190% V increase 2 times	Column/bridge structure in river & rubbish dumping
Floodplain Encroachment	Insufficient Drainage	Poor Maintenance
River corridor obstruction	Minor system (2- 5 ARI)	River widening & deepening with

Major system

(up to 100 ARI)

1926

Major floods in Perak, Pahang, Kelantan and Terengganu 1971

Catastrophic flash flood in Kuala Lumpur causing 24 deaths. DID lead flood control 1996

Tropical storm Greg at Sabah claimed 241 lives and USD 97.8 million damage 2000

15 people killed in Kelantan, Terengganu and 100,000 people at Peninsular affected 2006

Flood in Johor caused 18 deaths and USD 489 million in damage 2008

Flood in Johor caused 28 deaths and USD 21 million in damage 2010

2/3 of Perlis submerged, killed 4 people, 50,000 people moved & 45,000 ha rice field destroyed 2014

affecting

maintenance

"The YELLOW flood" resulted 25 deaths, 500,000 people moved & USD 750 million loss 2017

Penang worst flood ever caused 7 casualties and million in damages 2021

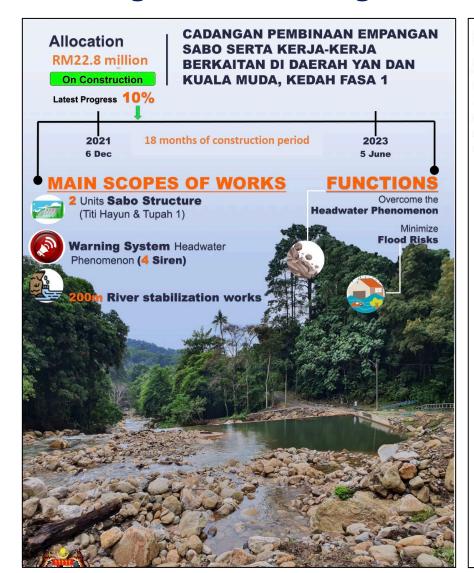
high cost

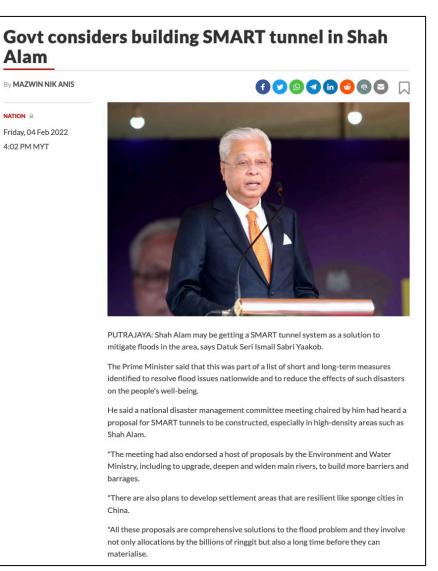
Floods in Selangor



Investment for Disaster Risk Reduction (DRR) in Malaysia

Planning for flood mitigation works





Flood control:

2nd SMART Tunnel,
improvements for river
stabilization, drainage
works, retarding ponds,
water gates, EWS

Sabo measures: Sabo structure, EWS

Government to budget 15 bil MYR (or 3.3 bill USD) in flood mitigation by 2030?

How can research institutes and industrial partners support the government?

Links between DRR and SDGs

1. Building resilience of the poor and those in vulnerable situations

11. Reduce number of deaths and people affected and decrease economic losses

13. Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters





13 CLIMATE ACTION



8 DECENT WORK AND ECONOMIC GROWTH

14 LIFE BELOW WATER



9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

15 LIFE ON LAND



10 REDUCED INEQUALITIES

16 PEACE, JUSTICE AND STRONG

















Sendai Framework for Disaster Risk Reduction 2015 - 2030



"We call for disaster risk reduction and the building of resilience to disasters to be addressed with a renewed sense of urgency in the context of sustainable development and poverty eradication"

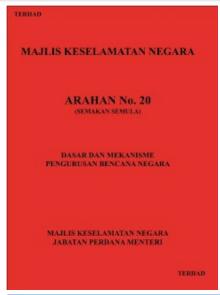
DRR policies in Malaysia

National Security Council Directive No. 20 (MKN 20)

 Adopted in 1997, prescribed a holistic crisis/disaster management system that clarified roles and responsibilities of various stakeholders, but does not address the role of academia.

12th Malaysia Plan (12MP) 2021-2025

- Advocates for Green Development, sustainable environment and building resilience to the effects of climate change and natural hazards.
- Development of sustainable and resilient cities and societies.
 - > There is no Disaster Management Law in Malaysia to define UIG
 - ➤ Science and Technology Experts Panel (STEP) that includes industrial partners were established by the National Disaster Management Agency (NADMA) in 2018





UIG Partnership for Environmental Resilience and Sustainability

Public sector

Private sector

Academia

Interests in DRR

- Saving lives and protecting public assets
- Maintaining delivery of public services
- Coordinating and implementing to achieve national and international DRR agendas
- Sustainable socio-economic development

Interests in DRR

- Maintaining business operations, profits and opportunities (PS contributing to 70-80% of GDP)
- Developing products for disaster prevention/mitigation
- Corporate Social Responsibility (CSR)

Interests in DRR

- Pursuing excellence in science, technology and innovation in disaster science for education and research activities
- Understanding of local issues and suggesting solutions

UIG Partnership for Environmental Resilience and Sustainability

Public sector

Private sector

Academia

Roles in DRR

- Planning and funding for recovery, mitigation and preparedness
- Development and enforcement of DRR regulations and policies
- Ensuring social safety net

Roles in DRR

- Business Continuity Plan (BCP)
- Providing physical, technological and financial resources/products
- Maintaining national and regional economy/livelihood
- Ensuring risk-informed investments

Roles in DRR

- Provision of scientific data and risk analysis
- Capacity building
- Development of technology & innovation
- Linking with local communities and field practice
- Providing platform for various stakeholders

UIG collaboration will bring mutual benefits and facilitate investment and advancement of science, technology and innovation for DRR (beyond CSR)

MJIIT's Environmental Resilience and Sustainability Programme

History of MJIIT's Disaster Programme



↑Historical flooding in Eastern Malaysian Peninsular in 2014

Establishment of Disaster
Preparedness & Prevention
Centre (DPPC) and Master of
Disaster Risk Management
(MDRM) Programme at MJIIT
in 2016→





↑Government of Malaysia and Japan agree to cooperate in DRR at the Third World Conference on DRR in Sendai, Japan in 2015

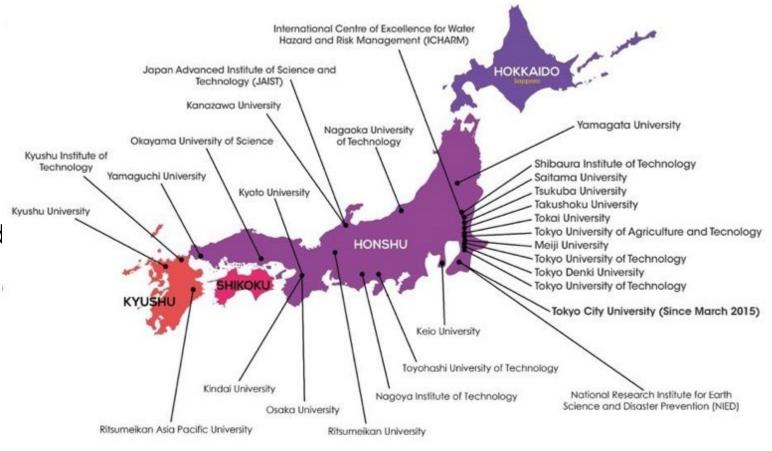


MJIIT's Environmental Resilience and Sustainability Program

DRM Subcommittee

- Tsukuba University (Chair)
- Kyoto University (Co-Chair)
- Kyushu University (Co-Chair)
- Shibaura Institute of Technology
- Yamaguchi University
- International Centre for Water Hazard (ICHARM)
- National Research Institute for Earth
- Science and Disaster Resilience (NIED)
- Tokyo City University
- Kanazawa University

Japan University Consortium = JUC





















MJIIT's Environmental Resilience and Sustainability Program

Objectives

Education/Training:

Master of Disaster Risk Management (MDRM)
Master of Sustainable Systems
Master of Sustainable & Environmental Science

 Masters taught course for fresh graduates and mid-career professionals in environmental resilience and sustainability including disaster risk reduction (DRR)

Research:

Joint research projects and publications through iKohza

 Implementation of joint research projects with partners from Japan and ASEAN (including Malaysia) in academia and government



ASEAN Hub:

Regional hub for education and research in environmental sustainability

- Regional hub in disaster prevention for JASTIP and AUN/SEED-Net
- New ASEAN University Consortium (AUC) concept forthcoming

<u>University-Industry-Government</u> <u>Partnership (UIG):</u>

- Utilize MJIIT's research capacity to match industry's technology with needs of government to solve societal needs
- MJIIT to function as platform for various UIG stakeholders

Pillar 1: Education and Training

Masters of Disaster Risk Management (MDRM) Program

- 1 year taught course for mid-career professionals
- Joint lecture team from Malaysia and Japan (12 pax from 7 institutes), including guest lecturers from industrial partners
- 73 graduates since 2016 and 50+ students of Certified Professional Training (CPT) per year
- Students from government, NGOs and private companies from Malaysia, other ASEAN countries, South Asia & Middle East
- Balanced program between theory and practice, including technical visit to industries







Pillar 1: Education and Training



Research Institute Experiencing large-scale rainfall simulator

National Research Institute for Earth Science and Disaster Resilience (NIED)

(Government)

Technical visit to Ara River flood

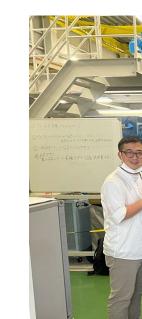
mitigation sites

Ara River Management Office

(Ministry of Land, Transport & Tourism)



[Industry] Collaboration through industrial training and joint R&D Nippon Koei Co., Ltd. R&D Center



Technical visit to IHI's Disaster Prevention and Water Gate Technology Training Center by MDRM students on 2 Sep. 2022

Master of Disaster Risk Management

(MDRM 2021/2022)

MDRM Japan Attachment Program

Utilization of MJIIT's UIG Partnership







Pillar 2: Research & Survey



Malaysia-Japan Advanced Research Centre (MJARC)

マレーシア・日本先端研究センター

Advanced Disaster Risk Management Laboratory Rainfall Simulator and X-band MP Radar System

Research related to predicting extreme rainfall and flooding



Research on water resource/quality and solid waste management

IV Lab – Modeling and Simulation of Disaster Events

Research on simulating and visualizing disaster events



Research on landslides and debris flow



Pillar 2: Research & Survey

Malaysia-Japan Advanced Research Centre (MJARC)

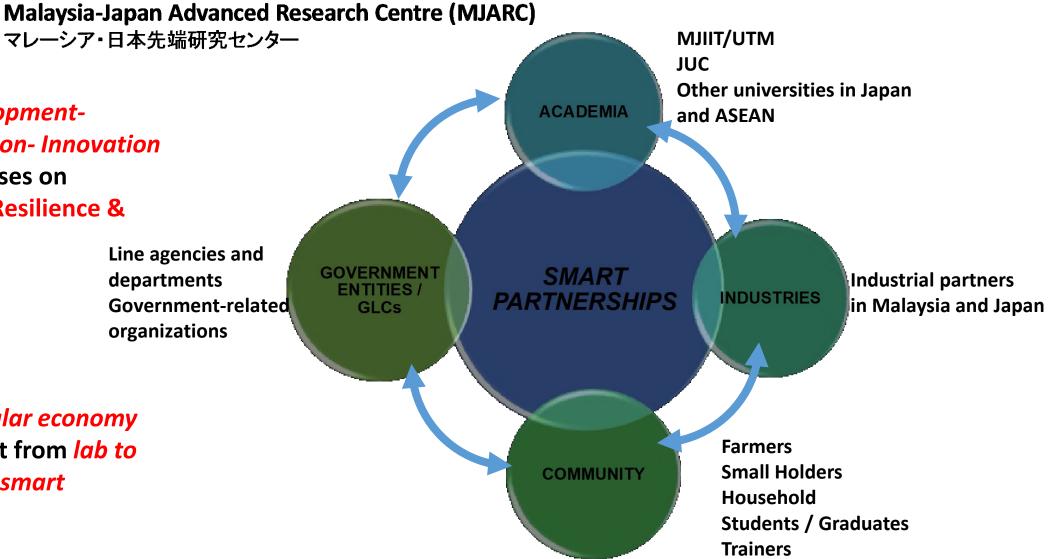
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Research-Development-Commercialization-Innovation centre that focuses on

Environmental Resilience & Sustainability

Line agencies and departments **Government-related** organizations

Champions circular economy bringing the best from lab to market through smart partnerships



Pillar 3: Becoming the regional hub in ASEAN

Linking with research partners from Japan and ASEAN through MJIIT

- JASTIP joint lab established in 2017
- Implementation of JASTIP-net Projects
- Host of Regional Conference on Natural Disasters (RCND) x 3
- Implementation of CEP-SEEN

DRR Hub for Japan-ASEAN Science, Technology and Innovation Platform (JASTIP)

DRR Hub for AUN/SEED-Net

Regional Hub for Environment-Disaster Research & Capacity Building

ASEAN University

Consortium (AUC)
-forthcoming-

DRR Subcommittee of JUC

UN-DRR
Asia-Pacific Scientific
and Technical
Advisory Group
(AP-STAG)

Malaysia University Consortium (MUC)

- 12 lectures dispatched from7 JUC member universities
- MDRM Japan Attachment
- Engagements with disaster scientists in AP Region
- Implementing CBDRR project with Tohoku University (STAG member)
- In process of being acknowledged by NADMA in DRR sector

MJIIT offers access to Japanese & ASEAN (including Malaysian) partners in academia, industry and government

Pillar 3: Becoming the regional hub in ASEAN

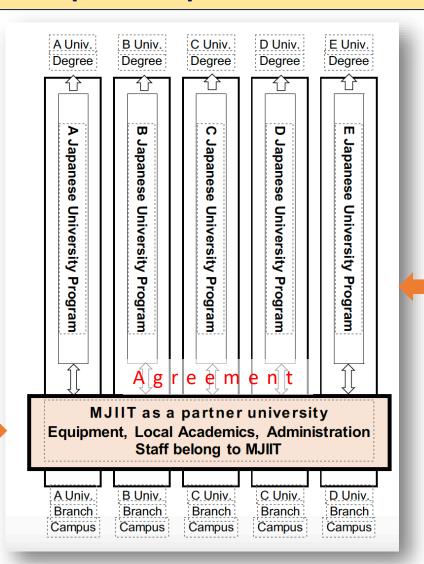
Concept of Branch Campus of Japanese Universities with MJIIT Partnership



UIG Workshop at MJJIC 2022

Partners in ASEAN

Partners from other regional & international organizations



San-gaku-kan Renkei(産学官連携)

Japanese Industries

JP

Malaysian Industries

MY

- Joint research
- Joint student supervision
- Joint consultancy
- Joint training programs
- Student & staff exchange
- Student recruitment
- Corporate scholarship

Japanese Government

JP

Malaysian Government

MY

Pillar 4: University-Industry-Government (UIG) Partnership

MJIIT Joint / Contracted Research with Japanese Company

INPEX

INPEX Corporation

Research Period: May 2016-Jun 2021 (5 years)

PI MJIIT: Prof.Tsuji Tomoya

MJIIT Research Group: SHIZEN iKohza Research Area: Chemical Engineering



DAIICHI KAGAKU

Research Period: 2017-2021 (4 years)

PI MJIIT: Prof.Fukuda Kanao

MJIIT Research Group : TriPreM iKohza Research Area: Fundamental Study

NIPPON KOEI

NIPPON KOEI

Research Period: 2019-2022 (3 years)

PI MJIIT: Dr.Iwamoto Koii

MJIIT Research Group: Algae Biomass iKohza

Research Area: Bio-Soil Crsting

MITSUBISHI HEAVY INDUSTRIES ASIA PACIFIC

Mitsubishi Heavy Industry Asia Pacific

Research Period : Aug 2016–Mar 2022 (6 years)

PI MJIIT: Prof. Tsuji Tomoya

MJIIT Research Group: SHIZEN ikohza Research Area: Chemical Engineering

IHI Corporation

Research Period 2016-2020 (5 years)

PI MJIIT: Prof.Fukuda Kanao

MJIIT Research Group: TriPreM iKohza Research Area: Fundamental Study



NTT MSC

Research Period: Feb 2018- Jan 2021 (3 years)

PI MJIIT: Dr.Zool Hilmi Ismail

MJIIT Research Group: CAIRO iKohza Research Area: Water Pollution Sensing, IOT

NSK

NSK

Research Period: 2019-2023 (4 years)

PI MJIIT: Prof.Fukuda Kanao

MJIIT Research Group : TriPreM iKohza Research Area: Fundamental Study

企 理化学研究所

RIKEN

Research Period: Feb 2019 - Mar 2023 (4 years)

PI MJIIT: Dr.Nor Azizi

MJIIT Research Group : MemoBio ikohza Research Area: Isolation and Characterization of

Tropical Algal Strains in Malaysia

HITACHI

Hitachi Jonson Air Conditioning

Research Period: Jun 2019- May 2020 (1 year)

PI MJIIT: Dr.Sheikh Ahmad Zaki MJIIT Research Group: WEE iKohza

Research Area: Air conditioners & indoor thermal

comfort in Malaysia

KANSAI PAINT

Sime Kansai Paints

Research Period: Nov 2020 - Mar 2022 (2 years)

PI MJIIT: Dr.Nor Azizi

Collaborating iKohza: Memobio iKohza

Research Area: Analysis on Automobile Painting

Material



Kansai Paint Asia Pacific

Research Period: Nov 2020 - Mar 2022 (2 years)

PI MJIIT: Dr.Kamyar Shameri Collaborating iKohza: ChECA iKohza

Research Area: Material Analysis on Painting

Material

Pillar 4: University-Industry-Government (UIG) Partnership

MJIIT Joint / Sponsership Laboratories with Japanese Company

一高砂熱学

Takasago-Ikohza

Establishment: October 2015

Partner: Takasago Thermal Engineering Co.Ltd MJIIT Research Group: Takasago-ikohza

Research Area: Thermal and Fluid Engineering, Renewable Energy, Energy Saving Technology

https://mjiit.utm.my/takasago/





Leave a Nest

Nest Bio Venture Laboratory

Establishment: January 2019 Partner: Leave A Nest Co.Ltd

MJIIT Research Group: MemoBio-ikohza

Research Area: Bio-technology, Genetic Engineering,

Waste utilization https://nlab.lne.st/





KANTJU Kantsu/UTM-Robotics Laboratory

Establishment: March 2020 Partner: Kantsu Co.Ltd

MJIIT Research Group: CAIRO-ikohza

Research Area: Artificial Intelligent, Internet of

Things, Smart-Warehouse https://cairo.utm.my/





delightex

DELIGHTEX Laboratory

Establishment: July 2020 Company: Delightex Pte.Ltd

MJIIT Research Group : MemoBio-ikohza

Research Area: Natural Substance https://mjiit.utm.my/research-memobio/





ROHN SEMICONDUCTOR

ROHM-WAKO Laboratory

Establishment: November 2020

Company: ROHM-WAKO Electronics Malaysia

MJIIT Research Group: CHEKA iKohza

Research Area: Physio-Chemical Characterization

of Material

https://mjiit.utm.my/checa-research-lab/





Panasonic

Panasonic Collaborative Labo

Establishment: November 2021

Company: Panasonic Appliances R&D Centre Asia

Pacific SDN. BHD.

MJIIT Research Group: MemoBio-ikohza

Research Area: Removal of Harmful Microorganisms

and Harmful Substances





Pillar 4: University-Industry-Government (UIG) Partnership

MJIIT's mission on University-Industry (UI) Partnership



University



Industry



COLLABORATIVE RESEARCH

Research Contract

RESEARCH LABORATRIES

Satellite Lab, Service Lab, Joint Venture Lab

CONSULTANCY

Provide solutions for industry

EMPLOYMENT

 Career fair/Job posting, scholarships

INDUSTRIAL TRAINING

 12 weeks in Japan/Malaysia for UG students

OTHERS

 Visiting lecturers/special lecture, technical visits, joint events

University-Industrial-Government (UIG) partnership will additionally:

- Extend collaboration and research outputs beyond few partners
- Enable contribution to global and national goals for sustainable development
- Facilitate private investment for public works
- Contribute directly to the well-being of our communities, especially during crisis

Pillar 4: UIG Partnership (example)

Project Name: Study to Improve Water Supply Turbidity by Utilizing Biological Soil Crust (BSC) Methodology

- Public-Private Partnership scheme
- JICA

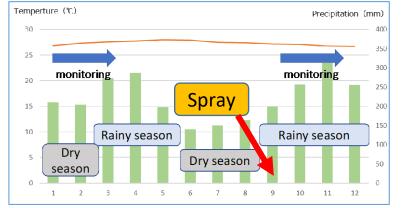
- Simple method: Spraying BSC-1 alga on slope
- Accelerate vegetation succession
- Alga starts growing in 1-2 weeks
- Has been applied in Japan (Okinawa, Honshu, Hokkaido)





Significant improvement of vegetation covers of slop failure in Yambaru National Park, Okinawa Prefecture







Pillar 4: UIG Partnership (proposal)

Project name: Study on Reservoir Sedimentation and High-intensity Rainfall Implications to Dam Storage Capacity in Malaysia (Pilot area: Batu Dam)

Background:

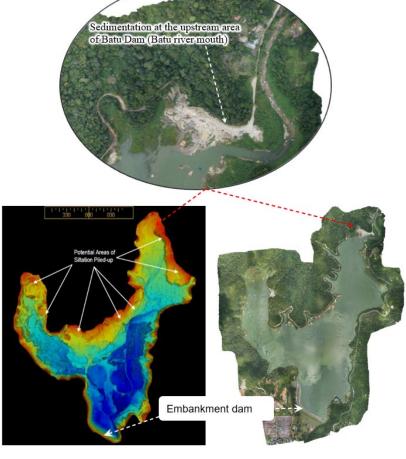
Batu Dam is an earth-fill dam, built in 1987 to alleviate flooding that used to occur in Kuala Lumpur. But 35 years after its construction, there is significant risk of sedimentation at major dams built during this era. Experiencing historical rainfall and flooding in December 2021, it is crucial to conduct a study on reservoir sedimentation and impacts due to losses of storage capacity of dams in Malaysia.

Objective:

- 1. To forecast inflow sediment induced by high-intensity rainfall
- 2. To determine the pattern and distribution of sediment in the dam reservoir
- 3. To conduct survey (1. and 2.) of key dams in Malaysia
- 4. To develop an integrated monitoring and sediment-rainfall mapping system

UIG partners and roles:

- MJIIT: Project and stakeholder coordination, training for local engineers, data acquisition and hydrological analysis and sediment modelling
- DID: Hydrological data, develop standards/regulations on dam sedimentation
- Company X: Support on hydrological and sedimentation analysis, development of automated river, rainfall and sediment monitoring system



Potential risk of sedimentation upstream Batu Dam reservoir (Source : DID Malaysia)



NHK Side-by –Side here 👍



Disaster Science with Tohoku Uni.











