

**JICA Knowledge Co-Creation Program
Short-term Program of Innovative Asia**

Big data and Sustainable Development Goals (SDGs)

**Hokkaido University
JFY 2021
NO. 201702823-J041**

**Online Course Period:
January 31 – February 28, 2022**

Participants

Cambodia

- Mr. CHAN Sophal, Lecturer, Applied Mathematics and Statistic, Institute of Technology of Cambodia
 - Doctor of Philosophy in Data Science/Prince of Songla University, Hadyai Campus (20-21)
- Mr. PHAUK Sökkhey, Lecturer, Department of Applied Mathematics and Statistics (AMS), Institute of Technology of Cambodia (ITC)
 - Doctor of Engineering in Interdisciplinary Intelligent Systems/ University of the Ryukyus (18-21)

Malaysia

- Ms. Charmila Flora Miuse, Postgraduate Student (Master), Nature Park & Recreation Universiti Malaysia Sabah (UMS)
 - BA Forestry Science[Nature Park & Recreation]/Universiti Malaysia Sabah[13-17]
- Ms. Shairatul Akma Binti Roslan, Postgraduate Student (PhD), Department of Electronic Systems Engineering University Technology Malaysia (UTM)
 - MA Urban & Regional Planning/International Islamic University Malaysia[14-16]

Pakistan

- Mr. IQBAL Muhammad, CEA, ITS Pvt. Ltd.
 - M.Sc MTIM/ UTM, Malaysia (2019-2021)

Vietnam

- Ms. DO Thi Ninh, Visiting Researcher, Climate Change and Development Vietnam - Japan University
 - Master in Climate Change and Development/Vietnam - Japan University ('18 - '20)
- Ms. PHAM Thi Oanh, Research Fellowship, Climate Change and Development Program, Vietnam - Japan University
 - Master in Climate Change and Development/Vietnam - Japan Uni. ('18 -'20)
- Ms. LE Thi Ngoc Diep, Student, Climate Change and Development Program Vietnam - Japan University
 - Master in Climate Change and Development/Vietnam - Japan Uni. ('19 -'21)

Lecturers and supporters

Faculty of Environmental Earth Science, Hokkaido University

<https://www.ees.hokudai.ac.jp/>

- Teiji Watanabe (Professor)
- Yuichi S. Hayakawa (Associate Professor)
- Ram Avtar (Associate Professor)

Graduate School of Environmental Science, Hokkaido University

- MENG Yu, Doctor course student
- Refat Faisal, Doctor course student
- Tennyson Lo, Doctor course student
- Azim Zulhilmi, Master course student
- Wenwen Ke, Master course student
- Stephan Louw, Master course student
- Koki SHIGEISHI, Master course student
- Riki HIRASHIMA, Master course student

Details of the external lecturers are provided on the following pages.

January 31 (Mon), 2022

Introduction to Innovative Asia 2021: Big Data and SDGs

Teiji Watanabe

Yuichi S. Hayakawa

Ram Avtar

Faculty of Environmental Earth Science, Hokkaido University

<https://www.ees.hokudai.ac.jp/>

Timetable

13:00-15:00

Briefing, orientation, self-introduction

February 1 (Tue) – 4 (Fri), 2022

module 1

Big Data and SDGs

Teiji Watanabe

Faculty of Environmental Earth Science, Hokkaido University

<http://www.teiwatanabe.com/>

Timetable

February 1 (Tue)

13:00-14:30 Lecture 1:

History of data collection and analysis in Land science related to the SDGs

14:45-16:15 Lecture 2:

SDGs and MDGs, the coming of big data

16:15-17:00 Discussion

February 2 (Wed)

13:00-17:00 Individual work:

Search for big data in your country

February 3 (Thu)

13:00-15:00 Individual report and discussion:

Briefing of country group work and gathering of the necessary information

15:00-17:00 Country Group Discussions

February 4 (Fri)

13:00-14:00 Lecture 3:

Future land use and management, SDGs and the potential of big data applications

14:30-17:00 Country group presentations and review

February 7 (Mon), 2022

module 2

Big Data of High-Definition Topography

Yuichi S. Hayakawa

Faculty of Environmental Earth Science, Hokkaido University

<https://www.hdtopography.org/>

<https://sites.google.com/view/yshayakawa/>

Timetable

13:00-14:30 Lecture 1

High-definition topographic data and environmental science

14:30-14:40 Break

14:40-16:10 Lecture 2

Applications of high-definition topographic big data

16:10-16:20 Break

16:20-17:00 Group work and discussion

February 8 (Tue), 2022

Life/Environment and Big Data

module 2

Dr. Tsuyoshi Hattanji

Dr. Thomas Parkner

Dr. Takuro Ogura

Faculty of Life and Environmental Sciences, University of Tsukuba

<https://www.life.tsukuba.ac.jp/>

<http://chikei-tsukuba.blogspot.com/>

(moderator: Y. S. Hayakawa)

Timetable

13:00-13:10 Introduction (All)

13:10-14:10 Lecture 1

Dr. Hattanji: Earth surface processes and slope hazards

14:10-14:20 Break

14:20-15:20 Lecture 2

Dr. Parkner: Finding appropriate scales for topographic analysis

15:20-15:30 Break

15:30-16:30 Lecture 3

Dr. Ogura: Development of geoscience education and outreach using high-definition topographic data

16:30-17:00 Discussion (All)

Agriculture and Big Data

Hokkaido Agricultural Research Center, NARO

<https://www.naro.go.jp/english/laboratory/harc/index.html>

(moderator: Y. S. Hayakawa)

Timetable

13:00-13:05 (5 min) Introduction (Obanawa)

13:05-13:25 (20 min)

Dr. Kazuhiro Umemura: Overview of Hokkaido Agricultural Research Center

13:25-14:10 (45 min)

Dr. Ryo Sugiura: Remote sensing technology for agricultural field information using drone imagery

14:10-14:20 (10 min)

Break 1

14:20-15:05 (45 min)

Dr. Hiroyuki Obanawa: Development of drone sensing technology for the realization of smart agriculture

15:05-15:50 (45 min)

Dr. Stephen Njehia Njane: Utilisation of precision techniques for suitable agricultural practices towards feeding 9 billion population

15:50-16:00 (10 min)

Break 2

16:00-16:45 (45 min)

Dr. Takeshi Yamazaki: Genetic improvement of dairy cows using big data from dairy farms

16:45-17:00 (15 min)

Free discussion (All)

Forestry and Big Data

Forestry Research Institute, Forest Research Department, Local Independent Administrative Agency Hokkaido Research Organization
<http://www.hro.or.jp/list/forest/research/fri/index.html>

(moderator: Y. S. Hayakawa)

the presentations are in Japanese but will also be translated into English

Timetable

13:00-13:10 Introduction (All)

13:10-14:10 Lecture 1 Forest Management Division (森林経営部)

- Masuto Ebina (蝦名益仁): Overview of research in the Forest Management Division, forest measurement (e.g. laser measurements) (森林経営部の研究概要、森林レーザ計測)

14:10-14:20 Break

14:20-15:20 Lecture 2 Forest Environment Division (森林環境部)

- Yasutaka Nakata (中田康隆): Ground surface change due to freeze-thaw action on a collapsed slope in a forest area (observation by drones) (森林域の崩壊斜面における凍結融解作用による地表面変化(ドローンによる観測))
- Masato Hayamizu (速水将人): Verification of the effectiveness of erosion control dams - using sediment and fish as indicators (治山ダムの効果検証～土砂と魚類を指標に)
- Akiko Nagasaka (長坂晶子): Water resources management in forest watersheds (森林流域の水資源管理)

15:20-15:30 Break

15:30-16:30 Lecture 3 Protection and Breeding Division (保護種苗部)

- Kon Hirokazu (今 博計): Overview of breeding and seedling development (育種と育苗の概要)
- Hisayuki Wada (和田尚之): Relationship between forest diseases and insect pests and tree decline (森林病虫害と樹木の衰弱の関係)

16:30-17:00 Free Discussion (All)

February 11 (Fri), 2022

module 2

Big Data in Environmental Studies

Yuichi S. Hayakawa

Faculty of Environmental Earth Science, Hokkaido University

<https://www.hdtopography.org/>

<https://sites.google.com/view/yshayakawa/>

Timetable

13:00-14:30 Lecture

Big Data in Environmental Studies: some cases for urban and suburban areas

14:30-14:40 Break

14:40-16:10 Group work

Some examples of big data analysis

16:10-16:20 Break

16:20-17:00 Discussion

February 14 (Mon), 2022

Human flow and Big Data

Dr. Naoya Fujiwara

Graduate School of Information Sciences, Tohoku University

https://www.is.tohoku.ac.jp/jp/laboratory/list_dept/c10.html

Dr. Takaaki Aoki

Dr. Toru Terao

Faculty of Education, Kagawa University

<https://www.ed.kagawa-u.ac.jp/~aoki/>

<http://www.kards.kagawa-u.ac.jp/profile/ja.a3d6fd176e0c4dcb60392a0d922b9077.html>

(moderator: Y. S. Hayakawa)

Timetable

13:00-13:10 Introduction (All)

13:10-14:10 Lecture 1

Dr. Terao: Climate change, disaster and climate model data

14:10-14:20 Break

14:20-15:20 Lecture 2

Dr. Fujiwara: Response to severe disasters revealed by the human mobility data

15:20-15:30 Break

15:30-16:30 Lecture 3

Dr. Aoki: Finding a potential of human flow

16:30-17:00 Free Discussion (All)

February 15 (Tue), 2022

module 2

Remote Sensing and Big Data

Dr. Kotaro Iizuka

Mr. Hiroyuki Yamauchi

Center for Spatial Information Science, The University of Tokyo

<https://www.csis.u-tokyo.ac.jp/>

(moderator: Y. S. Hayakawa)

Timetable

13:00-13:10 Introduction (All)

13:10-14:20 Lecture 1

Dr. Iizuka: Remote Sensing Application for Environmental Studies

14:20-14:30 Break

14:30-16:00 Lecture 2

Mr. Yamauchi: Utilization of a Virtual Reality application implemented three-dimensional geospatial data

16:00-16:10 Break

16:10-17:00 Group discussion and presentation (Hayakawa)

#Please install softwares below (for Windows users only)

STEAM and VRCHAT

<https://noa-phantom.com/vrchat-tutorial-en/>

streaming url

<https://www.youtube.com/watch?v=s42jdWcZSag>

February 16 (Wed), 2022

Discussion on Big Data and SDGs

Teiji Watanabe

Faculty of Environmental Earth Science, Hokkaido University

<http://www.teiwatanabe.com/>

Timetable

13:00-17:00 Group discussion on action plan #1

February 17 (Thu), 2022

module 3

Geospatial Big Data and SDGs

Ram Avtar

Faculty of Environmental Earth Science, Hokkaido University

<https://ramenvjnu.wixsite.com/mysite>

Prakhar Misra

Synpective

<https://synspective.com/jp/>

Timetable

13:00-15:00 Lecture 1:

Ram Avtar: Role of Geospatial data and SDGs

15:00-17:00 Lecture 2 (recorded video):

Prakhar Misra: Basics of Google Earth Engine and Geospatial data processing

<https://drive.google.com/drive/folders/1Ccegrwdw204vFCoKU1tuTidgAPViVLsD?usp=sharing>

February 18 (Fri), 2022

module 3

SDGs and Interlinkages

Xin Zhou

Mustafa Moinuddin

Institute for Global Environmental Strategies

<https://www.iges.or.jp/en>

<https://www.iges.or.jp/jp/pub/sdg-interlinkages-web-tool-v3/en>

(moderator: R. Avtar)

Timetable

13:00-15:00 Lecture 1:

Xin Zhou: SDGs interlinkages: methodology and analysis

15:00-17:00 Lecture 2:

Mustafa Moinuddin: Applications of SDGs interlinkages and case studies

Questionnaire:

<https://forms.gle/p6sV5HnuoC7YJoTL8>

February 21 (Mon), 2022

module 3

Water Resource and Big Data

Pankaj Kumar
Institute for Global Environmental Strategies
<https://www.iges.or.jp/en>

(moderator: R. Avtar)

Timetable

13:00-17:00 Lecture:
Pankaj Kumar: Role of Big data for building robust water resource management
and achieving SDGs

February 22 (Tue), 2022

module 3

Raster Analysis of Big Data

Rage Uday Kiran

Aizu University

<https://www.u-aizu.ac.jp/en/>

(moderator: R. Avtar)

Timetable

13:00-17:00 Lecture:

Rage Uday Kiran: An open-source Python package to analyze Terabytes of Raster data

February 23 (Wed), 2022

module 3

Deep Learning and Big Data

Vaibhav Katiyar

Yamaguchi University

<http://www.yamaguchi-u.ac.jp/english.html>

(moderator: R. Avtar)

Timetable

13:00-17:00 Lecture:

Vaibhav Katiyar: Fulfilling targets of SDGs 6 and SDGs 11 with Deep Learning techniques

February 24 (Thu), 2022

module 3

Deep Learning and Big Data: practice

Vaibhav Katiyar

Yamaguchi University

<http://www.yamaguchi-u.ac.jp/english.html>

(moderator: R. Avtar)

Timetable

13:00-16:00 Lecture:

Vaibhav Katiyar: Hands-on training for surface water monitoring using deep learning techniques

16:00-17:00 Group presentation and discussion, review (Avtar)

February 25 (Fri), 2022

Discussion on Big Data and SDGs

Teiji Watanabe

Faculty of Environmental Earth Science, Hokkaido University

<http://www.teiwatanabe.com/>

Timetable

13:00-17:00 Group discussion on action plan #2

February 28 (Mon), 2022

Action Plan Summary and Closing

Teiji Watanabe

Yuichi S. Hayakawa

Ram Avatar

Faculty of Environmental Earth Science, Hokkaido University

Timetable

13:00-16:30 Group presentations and review on action plans

16:30-17:00 Closing

